Program Final Environmental Impact Report
SCH# 2011012042

Exception to the California Ocean Plan for Areas of Special Biological Significance Waste Discharge Prohibition for Storm Water and Nonpoint Source Discharges, with Special Protections

California 40 years of WATER LEADERSHIP
WATER BOARDS

February 21, 2012

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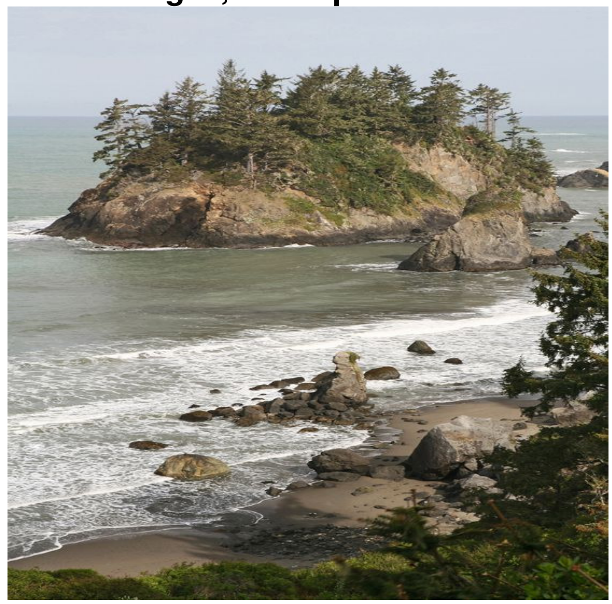

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S.0 SUMMARY

S.1 INTRODUCTION

This program final environmental impact report (FEIR) has been prepared to evaluate the potential environmental effects of the adoption and implementation of the proposed statewide General Exception to the Ocean Plan waste discharge prohibition and Special Protections pursuant to Public Resources Code (PRC) 36602(d)(6) and PRC 36700(f) and the related California Water Code (CWC) sections, included in Appendix 10 of this FEIR. The Regional Water Boards would implement special protections when issuing required permits for discharges into Areas of Special Biological Significance (ASBS).

This FEIR has been prepared in accordance with the requirements of the California Environmental Quality Act (CEQA) (Public Resources Code Section 21000 *et seq*.) and the State CEQA Guidelines (Title 14, Section 15000 *et seq*. of the California Code of Regulations). As specified in Section 15367 of the State CEQA Guidelines, the public agency that has principal responsibility for carrying out or approving a project is the lead agency for CEQA compliance. For purposes of the proposed project, the California State Water Board is lead agency under CEQA. As stated in Section 15123(a) of the State CEQA Guidelines "[a]n EIR shall contain a brief summary of the proposed action and its consequences. The language of the summary should be as clear and simple as reasonably practical." As required by the State CEQA Guidelines, this summary must include:

(1) a summary description of the proposed project;
(2) a synopsis of environmental impacts and recommended mitigation measures (see the table at the end of this chapter);
(3) identification of the alternatives evaluated; and
(4) a discussion of the areas of controversy associated with the proposed project.

The Public Resources Code defines six categories of Marine Managed Areas, one of which are State Water Quality Protection Areas. A State Water Quality Protection Area is a "marine or estuarine area designated to protect marine species or biological communities from an undesirable alteration in natural water quality…." The Public Resources Code further states that in State Water Quality Protection Areas "waste discharges shall be prohibited or limited by the imposition of special conditions" in accordance with the California Water Code and implementing regulations, including, but not limited to, the California Ocean Plan (Ocean Plan). Areas of special biological significance (ASBS) "are a subset of state water quality protection areas, and require **special protection** as determined by the State Water Board pursuant to the California Ocean Plan...." (emphasis added).

The Ocean Plan states that: "Waste shall not be discharged to areas designated as being of special biological significance. Discharges shall be located a sufficient distance from such designated areas to assure maintenance of natural water quality conditions in these areas.” This absolute discharge prohibition in the Ocean Plan applies unless an “exception” is granted.

A survey of ASBS in 2003 recorded 1,658 outfalls, primarily storm water and nonpoint sources, into ASBS. On October 18, 2004, the State Water Board notified applicants that they must cease storm water and nonpoint source waste discharges into ASBS or request an exception under the Ocean Plan. The State Water Board has received 27 applications from nonpoint source dischargers and National Pollutant Discharge Elimination System (NPDES) permitted storm water dischargers for an exception to the Ocean Plan prohibition against waste discharges into ASBS.

Stringent terms, prohibitions, and special conditions have been proposed by State Water Board staff that, if adopted, will comprise the limitations on point source storm water and nonpoint source discharges, providing Special Protections for marine aquatic life and natural water quality in ASBS. These Special Protections are proposed for adoption by the State Water Board as conditions for an Ocean Plan Exception. The requirements in the proposed Special Protections may be summarized generally to eliminate dry weather runoff, ensure that wet weather runoff does not alter natural water quality in the ASBS, and require that adequate monitoring be conducted to determine if natural water quality and the marine life beneficial use is protected.

Baseline biological information indicates that functioning marine communities persist in ASBS, but there is some inconclusive evidence that shows biota near discharges has a different species composition than areas away from discharges. Baseline water quality data indicates that wastes are present in storm water runoff into ASBS, but that waste concentrations vary considerably. Many, but not all, storm water runoff samples met various Ocean Plan Table B instantaneous maximum objectives. Receiving water samples showed lower in concentrations of Table B metals than discharges. Additional monitoring is required to fully evaluate compliance with the prohibitions and conditions in the Special Protections.

S.2 TYPE OF EIR

This FEIR is a program EIR intended to provide information at a more general level of detail on the potential impacts of implementing the proposed project. As described in detail in Chapter 2, “Project Description,” the project involves the adoption and implementation of special protections and a series of specific exceptions to the waste discharge prohibition that may be characterized as one large project and are related as individual activities carried out under the same authority and having similar environmental effects which can be mitigated in similar ways. Subsequent project-level CEQA compliance and environmental analysis at a regional or local level may be required.

S.3 PROJECT OBJECTIVES

Based on the requirements of PRC § 36602(d)(6) and PRC § 36700(f), the California Ocean Plan, CWC § 13170.2, and in the context of other state laws relating to the ASBS waste discharge prohibition and water quality, the State Water Board has identified the following objectives for the proposed project:

► In accordance with the requirements of the California Ocean Plan, adopt a statewide general exception, with conditions for a specified group of dischargers who have applied for an exception, that is consistent with other provisions of the Porter-Cologne Water Quality Control Act (Porter-Cologne) and related state water quality control plans and policies adopted by the State Water Board.

► Adopt statewide conditional Special Protections to comply with Section 13160 of the California Water Code[1].

► Help to ensure that marine life and beneficial uses of the state's Areas of Special Biological Significance waters are protected from waste discharges.

► Ensure that General Exception project and conditional Special Protections consider economic costs, practical considerations for implementation, and technological capabilities existing at the time of implementation.

The conditions in the Special Protections will assure protection of beneficial uses while allowing the continuation of essential public services, including flood control, slope stability, erosion prevention, maintenance of the natural hydrologic cycle between terrestrial and marine ecosystems, public health and safety, public recreation and coastal access, commercial and recreational fishing, navigation, and essential military operations (national security).

The costs associated with compliance with the Special Protections are less than compliance with the Ocean Plan's standing ASBS absolute waste discharge prohibition. The environmental impacts associated with compliance with the Special Protections are less than significant and the Special Protections will have a long term positive impact on protecting water quality and marine life.

S.4 PROJECT CHARACTERISTICS

The State Water Board proposes to adopt a General Exception and special protections that establish minimum requirements for the permitting, monitoring, and continued operation of selected point and non-point discharges, as required by the California Ocean Plan. The Special Protections allow responsible for these discharges to avoid

[1] State Water Board's duty under 13160 to implement the Federal Clean Water Act

having to cease discharge flows and to comply with the applicable requirements of the Ocean Plan. Both the proposed General Exception and Special Protections are elements of the proposed project analyzed in this EIR. The proposed conditional exception would impose new requirements on existing discharges. See Chapter 3.0, "Regulatory Setting," for more information on the existing regulatory setting at the regional and local levels.

The proposed Special Protections have been drafted to address the requirements identified in the Ocean Plan and are proposed to be adopted by the State Water Board in accordance with regulations for implementation of the Environmental Quality Act of 1970[2]. The text that follows describes the major elements of the proposed general exception as they relate to the potential for the project to have an impact on the ocean environment. Section references are references to specific sections in the proposed project and special protections, which are included in Appendix 10 of this EIR.

S.4.1 Proposed Project New Statewide Exception to the Ocean Plan for ASBS Waste Discharges, with Special Protections

The State Water Board proposes to adopt a General Exception to the California Ocean Plan for ASBS Waste Discharge Prohibition for Storm Water and Nonpoint Source Discharges for the Responsible Parties identified herein and a statewide conditional Special Protections that establish minimum requirements for the permitting, monitoring, and operation of these select discharges. The Special Protections allow responsible parties to discharge waste into ASBS without having to cease discharging natural flows. The Responsible Parties must comply with the applicable minimum requirements set forth in the terms and conditions of the Special Protections. Both elements are proposed for adoption as the project analyzed in this EIR.

In some cases, such as monitoring and inspections, the proposed project would impose new requirements on existing discharges. In other cases, elements of the special protections may already be in use but may vary around the state (i.e. regional monitoring programs). See Chapter 3.0, "Regulatory Setting," for more information on the existing regulatory setting at the regional and local levels, including examples of regulations from representative municipalities in the state, presented for comparative purposes.

The proposed Special Protections have been drafted to comply with state law and address the requirements identified in the Ocean Plan related to the waste discharge prohibition.

[2] Cal Public Resources Code §§ 21000 et.seq.; Cal. Code Regs. tit. 14, §§ 15000 et. Seq; Cal, Code Req. tit. 23, §§ 3720 et. Seq.

S. 4.2 IMPLEMENTATION OF PROPOSED STATEWIDE EXCEPTION AND SPECIAL PROTECTIONS

As required by the Ocean Plan, the implementation of new statewide Special Protections would commence 6 months after the General Exception is adopted by the State Water Board. The State Water Board would implement these requirements as conditions for applicability of the General Exception. The special protections would require actions to be completed by the Responsible Party. Compliance would be overseen by the State Water Board and the Regional Water Boards as part of the permitting process for discharges of waste into waters of the state. Local agencies (e.g., county and city departments and independent districts) would continue to be required to comply with local basin plans and local ordinances, consistent with existing law. It is also important to note that the proposed General Exception and Special Conditions would not prevent Regional Water Boards or local agencies from maintaining and adopting additional monitoring requirements that are more protective of the environment and public health than those set forth in the proposed Special Protections would constitute the minimum requirements for existing discharges identified in the General Exception located throughout the state. Failure to comply with the minimum statewide requirements could result in enforcement pursuant to Chapters 4 or 5 of Division 7 of the California Water Code. As a result, the responsible party could be required to cease the discharge, submit additional monitoring results, or could be subject to mandatory minimal penalties for each violation per day as determined by the Regional Water Board[3].

S.5 ALTERNATIVES

The State CEQA Guidelines (Section 15126.6) require that an EIR describe a range of reasonable alternatives to the project that could feasibly attain the basic objectives of the project and avoid and/or lessen the significant environmental effects of the project. The State Water Board has identified four alternatives for analysis in this EIR:

- ► No Action (No-Project Alternative i.e., No Exception)
- ► Amend Ocean Plan (Prescriptive Alternative)
- ►Implement Individual Exceptions for each of the 27 Applicants
- ► Implement a General Exception for the 27 Applicants (preferred alternative)

Section 4.0 of this FEIR provides a comparative analysis of the proposed project and the four identified alternatives. Other alternatives were considered but, for various reasons, have been rejected from further consideration in this EIR. These alternatives are described in Section 4.0, “Alternatives.”

[3] Cal. Water Code § 13385

S.5.1 NO-PROJECT ALTERNATIVE: NO ACTION (i.e., No Exception)

The Ocean Plan discharge prohibition is intended to prevent undesireable alterations of natural water quality. Water Code section 13301 authorizes issuance of a Cease and Desist Order (CDO) for violation or threatened violation of a discharge prohibition in a water quality control plan. The Regional Boards enforce the water quality standards and prohibitionsand may issue a CDO. There is no requirement that a permit must also be violated. An NPDES permit does not authorize violation of any federal, state, or local law or regulation, water quality standard, or prohibition.

A State Water Board funded study completed in 2003, (SCCWRP 2003) found 1658 discharges into ASBS. Only four of these were subject to Ocean Plan exceptions issued by the State Water Board. A large number of these prohibited discharges were permitted storm water outfalls. Some of the other point source discharges identified included marine laboratories and aquariums. Other sources were not regulated under any permit, including marina and boating activities, pipes draining private property, and bluff seepage most likely contaminated with anthropogenic waste from septic systems.

In January 2006, the California Ocean Protection Council identified addressing ASBS waste discharges as a state priority. The State Water Board has included this as a priority in the 2006 Consolidated Grants Program, specifically in the Ocean Protection portion of the coastal nonpoint source grants.

CEQA requires that the Water Boards consider the “No-Project” alternative. Under this No-Project alternative, the Ocean Plan prohibition against waste discharges into ASBS would continue to apply to all discharges into ASBS. The discharger could comply by terminating the discharge or by relocating the discharge so that the receiving water quality is unaffected. These actions could potentially have far greater impacts on the biological integrity of the ASBS than the discharge itself through demolition, excavation, and construction required to remove the existing discharge and redirect it away from the ASBS. In addition, the impacts on air quality and increased green house gas emissions would also be significant. For those dischargers faced with few practical options, enforcement actions could lead to protracted litigation.

Currently, the 27 applicants applying for this exception provide essential public services, including flood control, slope stability, erosion prevention, and maintenance of the natural hydrologic cycle between terrestrial and marine ecosystems, public health and safety, public recreation and coastal access, commercial and recreational fishing, navigation, and essential military operations (national security).

This alternative would not result in better water quality protection, nor does it benefit the environment, public health and welfare, or the Water Boards’ ability to protect and restore beneficial uses. As a result, staff does not recommend adopting the "No-Project" alternative.

S.5.2 NON-PREFERRED ALTERNATIVE: AMEND OCEAN PLAN

This prescriptive alternative would amend the Ocean Plan, so that discharges authorized by an NPDES storm water permit would be allowed. This would modify the discharge prohibition for point source storm water discharges into ASBS, and would allow discharges authorized by an NPDES storm water permit. Permitted storm water discharges, regardless of the effective date of inclusion under or issuance of the permit, would be allowed as long as their outlets were constructed prior to the effective date of these amendments.

No discharges from new outlets would be allowed. However, this should not be interpreted as a ban on new development adjacent to ASBS. Permitted discharges from new development would be allowed if such development connected to existing outlets (*i.e.*, those installed prior to the effective date); even if those outlets were modified. In other words, storm water conveyances with existing points of discharge could be modified, within the limits of good engineering practices and environmental considerations, and using appropriate control measures (*e.g.,* standard urban storm water mitigation plans) to accommodate the additional flow from new development. Alternatively, if permitted discharges from new outlets are deemed to meet the criteria in Chapter III (I) of the California Ocean Plan (*i.e.*that the discharge will not compromise the protection of ocean waters for beneficial uses, and that the public interest will be served), then the discharger may petition the State Water Board for an individual exception. Therefore, while the prohibition on permitted storm water discharges from new outlets may in some cases result in some limits on growth, such limits would not constitute an absolute ban.

Non-storm water discharges (dry weather flows) through storm water conveyances can contribute significant flows and pollutants and may include landscape irrigation overflow, groundwater pumping, illicit dumping, illicit connections, individual car wash water and other discharges. Non-storm water discharges, except those associated with emergency fire fighting, would be prohibited into ASBS under this alternative. Implementation of this prohibition would be within three years of the effective date of the California Ocean Plan amendment. Dischargers would be required to specifically address the prohibition of non-storm water discharges into ASBS in their Storm Water Management Plan/Program (SWMP) for MS4 dischargers or Storm Water Pollution Prevention Plan (SWPPP) for industrial storm water dischargers. The SWMP or SWPPP would describe the measures by which non-storm water discharges would be ultimately prevented from entering an ASBS, and interim measures that would be employed to reduce non-storm water flows until the ultimate measures are implemented.

Storm water (wet weather) runoff would not be permitted to cause or contribute to an exceedance of the California Ocean Plan's water quality objectives. To accomplish this State Water Board staff would propose an iterative process with an accelerated schedule (as compared to non-ASBS permit areas). All dischargers would be required to submit their revised SWMP or SWPPP to the Regional Water Board within six months of the effective date of the approved amendments. The SWMP or SWPPP would be required to address discharges into ASBS, and how pollutants would be reduced in runoff entering these ASBS through the implementation of BMPs. The BMPs will be described in the SWMP or SWPPP with a schedule for implementation. The SWMP or SWPPP would be subject to the approval of the Regional Water Board. The schedule must be developed to ensure BMPs are implemented as soon as practicably possible.

If the results of water quality monitoring indicate discharges are causing or contributing to exceedance(s) of applicable water quality objectives, this alternative would require the discharger to submit a report to the Regional Water Board within 30 days. That report must describe BMPs that are currently being implemented, BMPs that are planned for in the SWMP or SWPPP, and additional BMPs that may be added to the SWMP or SWPPP. The report shall include an implementation schedule. The Regional Water Board may require modifications to the report. Within 30 days following approval of the report by the Regional Water Board, a discharger would then revise its SWMP or SWPPP to incorporate any new or modified BMPs that have been and will be implemented, the implementation schedule, and any additional monitoring required. So long as the dischargers were complying with the procedures described above and were implementing the revised SWMP or SWPPP, the dischargers would not have to repeat the same procedure for continuing or recurring exceedances of the same water quality objective unless directed by the Regional Water Board to develop additional BMPs.

Effluent and receiving water monitoring results are valuable in evaluating source reduction of toxic pollutants. Monitoring results can also be used to develop and adjust management plans where necessary, implement additional source controls and other best management practices to reduce the discharge of the pollutants, and determine compliance with water quality objectives. Effluent and receiving water monitoring would be recommended as part of amendments to the California Ocean Plan. Minimum monitoring would include effluent flow measurements, visual observations for trash, and receiving water monitoring of chronic toxicity, indicator bacteria analysis, measurements of bioaccumulative impacts through chemical analysis of mussel (*e.g.*, mussel watch) or sand crab tissue analysis, and an intertidal and/or subtidal benthic community analysis. These minimum monitoring requirements would not preclude the State Water Board or

Regional Water Boards from imposing additional monitoring requirements as well. For example, for those dischargers operating under the general industrial storm water NPDES permit, they would also be required to conduct the effluent monitoring required under that permit in addition to the monitoring requirements being proposed herein.

Chronic toxicity tests on critical life stages of three kinds of marine organisms (fish, invertebrate, and plant species) on receiving water samples would be required during a minimum of two storm events. Except for the minimum sampling from two storms for chronic toxicity testing, the Regional Water Board would determine all other sample number, frequency, locations, and monitoring details. In making determinations regarding sample number, sampling frequency, sample locations, and other monitoring details the Regional Water Board would consider the size and characteristics of the watershed contributing to the discharges. The Regional Water Board would also have the option to relieve the permittee of receiving water self-monitoring requirements (with the exception of chronic toxicity) if the permittee provides support to a regional monitoring program that includes the applicable receiving waters and indicator bacteria, tissue chemistry, and benthic community components.

Staff previously attempted to pursue this approach in 2003, and the State Water Board~~,~~ at that time directed otherwise. Environmental groups and the discharger community were not in favor of this approach. In addition, USEPA did not support this approach. An attempt to amend the Ocean Plan may, again, engender major resistance from stakeholders.

S.5.3 NON-PREFERRED ALTERNATIVE: Implement Individual Exceptions for Each Storm Water and Nonpoint Source Discharger

The State Water Board has adopted seven individual exceptions to date for sewage treatment, desalination brine, public aquarium, and marine lab discharges. State Water Board staff intends to continue the approach of implementing and reviewing individual exceptions for these types of point source discharges, because each facility is sufficiently different to warrant individual exceptions with individual special conditions. Only three marine laboratories/public aquariums remain to be issued exceptions.

There are 27 applicants for an Ocean Plan exception being addressed by this proposed exception. These applicants have a variety of activities but all primarily have in common permitted storm water or nonpoint source discharges. As such, the same special conditions and prohibitions are generally applicable to all of these entities. Granting individual exceptions for each entity would entail developing, noticing, and adopting an individual CEQA document and exception for each entity. With current staff resources, it is estimated that such an approach would take at least an additional three years (from the date of this document) to complete. That approach would delay protecting natural water quality in the ASBS during the time it would take to adopt individual exceptions for each of the 27 applicants. Furthermore, adopting individual exceptions for storm water and nonpoint source dischargers would be inefficient, taking up significant staff and Board Member time and resources.

Because this alternative would delay the protection of water quality in ASBS, would be inefficient, and would not provide any advantages, staff does not support this alternative.

S.5.4 PREFERRED ALTERNATIVE: IMPLEMENT A GENERAL EXCEPTION FOR SELECTED DISCHARGERS (PREFERRED ALTERNATIVE)

Under this alternative, the State Water Board would adopt a general exception to the Ocean Plan discharge prohibition that would impose special conditions on the group of 27 storm water and nonpoint source dischargers who have applied for an exception. The proposed conditions could include: cessation of non-essential, non-storm water runoff; maintenance of natural water quality within ASBS, including during precipitation (design storm) events, by limiting wastes in storm water runoff and other activities that would otherwise cause a degradation of ocean water quality in the ASBS; and monitoring water quality and marine aquatic life within ASBS to ensure the protection of beneficial uses over time. Under this alternative, discharges must comply with all other applicable provisions of the Ocean Plan, including those provisions that maintain and protect natural ocean water quality and marine communities from pollution.

For dischargers subject to NPDES permits, prohibitions and special conditions collectively referred to as “Special Protections” for the ASBS, would be implemented through storm water management plans. For nonpoint source dischargers, the Special Protections would be implemented through a WDR, waiver, or conditional prohibition and a pollution prevention plan. All ASBS dischargers would continue to have three major requirements: (1) a continued prohibition of non-storm water discharges and runoff, with only certain exclusions; (2) wet weather runoff controlled so as not to violate “natural ocean water quality” in the ASBS receiving water; and (3) monitoring to ensure protection of beneficial uses. These three requirements of the Special Protections would be incorporated into each applicant’s permit or WDR.

The Special Protections are intended to maintain the natural hydrologic cycle and coastal ecology by allowing the flow of clean precipitation runoff into the ocean, while preserving coastal slope stability and preventing anthropogenic erosion. The 27 applicants for this exception provide essential public services, including flood control, slope stability, erosion prevention, maintenance of the natural hydrologic cycle between terrestrial and marine ecosystems, public health and safety, public recreation and coastal access, commercial and recreational fishing, navigation, and essential military operations (national security). Therefore, the exception and the terms, prohibitions, and special conditions embodied in the Special Protections for ASBS are not only protective of beneficial uses, but are in the public interest as well.

The State Water Board's effort to address storm water and nonpoint source waste discharges into ASBS using the Ocean Plan exception process is nearly complete. Applicants have now applied for exceptions, providing the necessary information for staff to proceed. In addition, the State Water Board has held three public scoping meetings, and several stakeholder meetings, for the exception and has initiated a stakeholder effort to collaborate on ASBS regional monitoring. Continuing with the general exception process for storm water and nonpoint sources would meet statutory and Ocean Plan regulatory requirements; because the process is ongoing, it would be practical and efficient to continue. Discharges authorized by an NPDES permit (and WDRs or waivers for nonpoint sources) would be allowed, but under strict limiting conditions aimed at ensuring protection of receiving water quality and marine life.

This alternative, that proposes to adopt a general exception with the Special Protections for the group of 27 storm water and nonpoint source dischargers who have applied for an exception is the alternative recommended by Staff. The remaining issues and alternatives address conditions associated with this general exception.

Continuing with the General Exception process would meet statutory and regulatory requirements for maintaining compliance with the Ocean Plan. This approach is practical and efficient, and will address all storm water and nonpoint source issues simultaneously. Terms and conditions, or "Special Protections", would be implemented through permits/storm water management plans. The General Exception approach would afford protection to the dischargers from protection from citizen suits, if the dischargers are in compliance with their permits. These permits/SWMPs/SWPPPs must conform to the Special Protections in the exception.

S.6 ENVIRONMENTAL IMPACTS AND MITIGATION

Chapter 6.0 of this FEIR evaluates in detail the environmental impacts that would result from implementation of the proposed project and sets forth mitigation measures required to avoid or reduce environmental impacts. Section 8.0 describes the potential for the proposed project to have growth-inducing impacts and potential cumulative impacts.

S.7 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

Section 15123 of the State CEQA Guidelines requires that a summary of an EIR identify areas of controversy known to the lead agency, including issues raised by agencies and the public. During the public comment period for the notice of preparation/initial study (NOP/IS), and in previous stakeholder meetings, various comments were received regarding the proposed project and Special Protections. In general, areas of potential controversy known to the State Water Board include:

► ASBS comprise 1/3 of the State's coastline. The concept of "special biological significance" recognized that certain biological communities, because of their value or fragility, deserve very special protection that consists of preservation and maintenance of natural water quality conditions. Preliminary findings from the recent submittal of ocean plan exception applications show ocean water quality conditions in many of the 34 ASBS not meeting the Ocean Plan levels necessary for the protection of marine life.

► State law (the Public Resources Code and the California Water Code) recognizes ASBS and the prohibition of waste discharges, and the need to provide special protections for water quality. Many of the ASBS are co-located with Marine Protected Areas (MPAs). The MPA Initiative is a major program of the current administration, being spearheaded by a Blue Ribbon Task Force and the Department of Fish and Game. Protecting water quality in ASBS and MPAs fits as an integral part of that process.

► Preliminary findings from the recent submittal of ocean plan exception applications show runoff to contain toxic levels of constituents, and receiving ocean water in some ASBS at times does not meet water quality objectives for the protection of marine life. Most of the significant discharges into ASBS are permitted storm water runoff (approximately 350). Hence certain developed ASBS are a more manageable microcosm of our greater ocean storm water issues. By focusing on ASBS storm water and certain nonpoint discharges, with comprehensive monitoring and control efforts, we will make measurable progress in solving the last great pollution problem in the coastal ocean.

► The costs associated with compliance with the Special Protections. There will be costs for controls, but there is a set-aside in Prop 84 ($35 million) to address ASBS discharges.

► Regulatory effects – additional workload for Regional Water Board and/or local agency staff that cannot be accommodated within existing budgets, concerns about impairing the ability of local agencies to protect water quality and implement Special Protections.

► Property development – concerns about whether siting requirements and Special Protections absolute restrictions on "no new outfalls" and discharge points to ASBS will limit property development.

These issues were considered in the preparation of this FEIR and, where appropriate, are addressed in the environmental impact analysis presented in Chapter 6.

Granting the general exception will not violate federal antidegradation requirements because water quality will not be lowered, but rather, will be improved within the ASBS affected. Further, adoption of the General Exception will not violate the State Water Board's antidegradation policy (SWRCB 1968) since water quality conditions are anticipated to improve; the discharges will not unreasonably affect present and anticipated beneficial uses; the discharge will not result in water quality lower than that prescribed in the Ocean Plan; and beneficial uses will be protected and potential impacts will be less than significant with mitigation incorporated.

It is anticipated that the applicants identified in this General Exception project will implement various individual or collaborative projects to comply with the terms and conditions or "Special Protections." As part of the scoping and environmental analysis conducted for the General Exception project, project types identified include: Low Impact Development (LID); dry-weather flow diversions; and Best Management Practices (BMPs), such as Pollution Prevention BMPs and Treatment BMPs, such as infiltration basins and Gross Solids Removal Devices (GSRDs).

S.8 PUBLIC PARTICIPATION AND ADDITIONAL STEPS IN THE CEQA REVIEW PROCESS

This FEIR is being circulated to local, state, and federal agencies involved with the project and is being made available to interested organizations and individuals who may wish to review and comment on the report. The public review period for the DEIR began on January 18, 2011, and ended on May 20, 2011. During that period, written comments on the environmental document were sent to the State Water Board at the following address:

Ms. Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
Division of Water
1001 I Street, 24th Floor
Sacramento, CA 95814

Copies of the FEIR can be reviewed at the following locations:

State Water Resources Control Board
1001 I Street
Sacramento, CA 95814
(916) 341-5280

The FEIR is available on the State Water Board's Web site at: http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.shtml.

Following the close of the public comment period, the State Water Board prepared this final EIR (FEIR) that provides responses to comments on environmental issues addressed in the FEIR. Proposed responses to comments will be circulated to public agencies for review. A public hearing on the FEIR will be held by the State Water Board in the hearing room at the California Environmental Protection Agency building, 1001 I Street, Sacramento, California. Public comments on the FEIR will be accepted at this hearing before the State Water Board decides whether to certify the EIR and approve the proposed project.

1.0 INTRODUCTION

The State Water Resources Control Board (State Water Board), under its Resolutions No. 74-28, No. 74-32, and No.75-61, designated certain Areas of Special Biological Significance (ASBS) in the adoption of water quality control plans for the control of wastes discharged to ocean waters. To date, thirty-four coastal and offshore island sites have been designated ASBS. The names of these ASBS were changed by the State Water Board in April 2005 (Resolution No. 2005-0035).

Since 1983, the California Ocean Plan (Ocean Plan) has prohibited the discharge of both point and nonpoint source waste to ASBS, unless the State Water Board grants an exception. The Ocean Plan allows the State Water Board to grant exceptions to plan requirements where the State Water Board determines that the exception "will not compromise protection of ocean waters for beneficial uses, and, [t]he public interest will be served." Prior to granting an exception, the State Water Board must hold a public hearing and comply with the California Environmental Quality Act, Public Resources Code §21000 et seq. (CEQA). In addition, the United States Environmental Protection Agency must concur.

ASBS are also accorded special protection under the Marine Managed Areas Improvement Act (Act), Public Resources Code §36600 et seq. Under the Act, ASBS are a subset of state water quality protection areas and, as such, “require special protection as determined by the [State Water Board]” pursuant to the Ocean Plan (Pub. Resources Code §36700(f)). In all state water quality protection areas, waste discharges must be prohibited or limited by special conditions, in accordance with state water quality law, including the Ocean Plan (*Id.* §36710(f)).

The Public Resources Code (PRC) defines six categories of Marine Managed Areas (MMAs). These six categories are Marine Reserves, Marine Parks, Marine Conservation Areas, Marine Recreation Management Areas, Marine Cultural Preservation Areas, and State Water Quality Protection Areas (SWQPAs). Under state law the Reserves, Parks and Conservation Areas are further categorized as Marine Protected Areas (MPAs).

The PRC states that ASBS are a subset of SWQPAs and require special protection as determined by the State Water Board pursuant to the Ocean Plan and the California Thermal Plan. Specifically, PRC section 36700 (f): “Areas of special biological significance are a subset of state water quality protection areas, and require special protection as determined by the State Water Resources Control Board pursuant to the Ocean Plan adopted and reviewed pursuant to Article 4 (commencing with Section 13160) of Chapter 3 of Division 7 of the Water Code and pursuant to the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (California Thermal Plan) adopted by the state board.”

Section 36710(f) of the PRC states as follows: "In a state water quality protection area, waste discharges shall be prohibited or limited by the imposition of special conditions in accordance with the Porter-Cologne Water Quality Control Act (Division 7 (commencing with Section 13000) of the Water Code) and implementing regulations, including, but not limited to, the Ocean Plan adopted and reviewed pursuant to Article 4 (commencing with Section 13160) of Chapter 3 of Division 7 of the Water Code and the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (California Thermal Plan) adopted by the state board. No other use is restricted." This language replaced the prior language that required point sources into ASBS to be prohibited or limited by special conditions, but allowed nonpoint sources to be controlled to the extent practicable. In other words, the absolute discharge prohibition in the Ocean Plan is maintained, unless an exception is granted.

It is important to note that many ASBS/SWQPAs occupy the same geographic areas as other State MMAs, including many MPAs. Furthermore, there are many ASBS that overlap Federal MPAs (e.g., National Marine Sanctuaries) and as of March 6, 2009, are now part of the National System of Marine Protected Areas.

The discovery of ASBS discharge prohibition violations began with the Irvine Coast ASBS, co-located with Crystal Cove State Park. On November 16, 2000, the Santa Ana Regional Water Quality Control Board (Regional Water Board) issued a cease and desist order (CDO) to the Irvine Company, the California Department of Transportation (Caltrans), and the California Department of Parks and Recreation. The CDO contains findings that the dischargers were violating or threatening to violate the discharge prohibition contained in the California Ocean Plan against discharges to the Irvine Coast ASBS. Caltrans petitioned the State Water Board to review the CDO. On April 26, 2001, the State Water Board decided Caltrans was in violation of the Ocean Plan ASBS discharge prohibition in that:

- there are waste discharges from Pacific Coast Highway,
- discharges on the beach above the high tide line do constitute discharges to the ASBS,
- the Ocean Plan does in fact regulate the discharge of wastes through storm water conveyances, and
- coverage under Caltrans' statewide NPDES permit for storm water discharges does not relieve the discharger from complying with the Ocean Plan prohibitions on discharges into the ASBS.

This finding prompted the Board to fund the Southern California Coastal Water Research Project (SCCWRP) to perform a statewide survey to assess the extent of these storm water and nonpoint source discharges. In SCCWRP, working with the

State Water Board's Ocean Unit, found 1,654 discharges to potentially be in violation (SCCWRP 2003).

To address these issues, on October 18, 2004, the State Water Board notified responsible parties to cease storm water and nonpoint source waste discharges into ASBS or to request an exception under the Ocean Plan. Several responsible parties submitted requests, or conditional requests, for exceptions. Subsequently, the State Water Board provided general instructions for exception application packages via its website. The State Water Board sent letters (in a few cases later in 2005) to responsible parties, providing specific instructions and a deadline for submission of the application package by May 31, 2006.

The State Water Board has received 27 applications for the general exception to the Ocean Plan prohibition against waste discharges to ASBS. The applications were filed by permitted storm water dischargers and nonpoint source dischargers, who are identified in Table 1.

The Ocean Plan also states that "The State Board may, in compliance with the California Environmental Quality Act, subsequent to a public hearings, and with the concurrence of the U. S. Environmental Protection Agency, grant exceptions where the Board determines: a) the exception will not compromise protection of ocean waters from beneficial uses, and b) the public interest will be served." In order not to compromise beneficial uses, natural water quality must be maintained in an ASBS. Examples of public interests are marine research, education, and flood control. The exception process, in compliance with the Ocean Plan, is the mechanism by which the Special Protections for the ASBS may be instituted.

The Project title is "Exception to the California Ocean Plan (Ocean Plan) for the City of Carmel-by-the-Sea, Connolly-Pacific Company, Department of Parks and Recreation, California Department of Transportation (Caltrans), U.S. Department of Defense (Air Force), Humboldt County, Humboldt Bay Harbor District, Irvine Company, City of Laguna Beach, Los Angeles County, City of Malibu, Marin County, City of Monterey, Monterey County, City of Pacific Grove, Pebble Beach Company, City of Newport Beach (and on behalf of the Pelican Point Homeowners), U.S. Department of Interior (Point Reyes National Seashore), City of San Diego, San Mateo County, Santa Catalina Island Company (and on behalf of the Santa Catalina Island Conservancy), The Sea Ranch Association, City of Trinidad, Trinidad Rancheria, U.S. Department of Interior (Redwoods National and State Park), and U.S. Department of Defense (Navy) storm water and nonpoint source discharges into ASBS. The following ASBS are included in this exception: Redwoods National Park, Trinidad Head, King Range, Saunders Reef, Del Mar Landing, Jughandle Cove, Gerstle Cove, Point Reyes Headlands, Duxbury Reef, James V. Fitzgerald, Año Nuevo, Pacific Grove, Carmel Bay, Point Lobos, Julia Pfeiffer Burns, Salmon Creek Coast, Laguna Point to Latigo Point, San Nicolas Island

and Begg Rock, Northwest Santa Catalina Island, Western Santa Catalina Island, Southeast Santa Catalina Island, Heisler Park, Robert E. Badham, Irvine Coast, La Jolla, and San Clemente Island. See Table 1. below.

Table 1. Applicants and Contact Persons

Applicant	Applicant Contact Person(s)
Carmel-by-the-Sea, City of	Ms. Heidi Burch, Assistant City Administrator Carmel-by-the-Sea City Hall P.O. Box CC Carmel-by-the-Sea, CA 93921
Connolly-Pacific Company	Mr. Ralph Larison Connolly-Pacific Company 1925 Pier D Street Long Beach, CA 90802
Department of Parks and Recreation	Mr. Theodore Jackson, Deputy Director Park Operations California Department of Parks and Recreation P.O. Box 942896 Sacramento, CA 94296-0001
Department of Transportation (Caltrans)	Mr. Scott McGowen Chief Environmental Engineer Division of Environmental Analysis Department of Transportation 1120 N Street, MS-27 Sacramento, CA 95814
Humboldt County	Ms. Ann Glubczynski, Environmental Analyst Department of Public Works County of Humboldt 1106 Second Street Eureka, CA 95501-0579
Humboldt Bay Harbor District	Mr. David Hull, Chief Executive Officer Humboldt Bay Harbor Recreation and Conservation District P.O. Box 1030 Eureka, CA 95502-1030
Irvine Company	Mr. Sat Tamaribuchi, Vice President Environmental Affairs The Irvine Company 550 Newport Center Drive P.O. Box 6370 Newport Beach, CA 92658-6370
Laguna Beach, City of	Mr. Will Holoman, Senior Water Quality Analyst City of Laguna Beach

Applicant	Applicant Contact Person(s)
	505 Forest Avenue Laguna Beach, CA 92651
Los Angeles County	Mr. Donald L. Wolfe, Director Department of Public Works County of Los Angeles 900 South Fremont Avenue Alhambra, CA 91803-1331
Malibu, City of	Mr. Jim Thorsen, City Manager City of Malibu 23815 Stuart Ranch Road Malibu, CA 90265-4861
Marin County	Ms. Elizabeth Lewis, Storm Water Manager Department of Public Works County of Marin P.O. Box 4186 San Rafael, CA 94913-4186
Monterey, City of	Mr. Fred Meurer, City Manager City of Monterey, City Hall Monterey, CA 93920
Monterey County	Ms. Elizabeth Krafft, Program Manager Monterey County Water Resources Agency P.O. Box 930 Salinas, CA 93902
Newport Beach, City of	The Honorable Steven Rosansky, Mayor City of Newport Beach, City Hall 3300 Newport Blvd. Newport Beach, CA 92658-8915
Newport Beach, City of, and on behalf of the Pelican Point Homeowners	Ms. Terri L. Vaccher, CCAM The Merit Companies Pelican Point Community Association 1 Polaris Way, 100 Aliso Viejo, CA 92656-5356
Pacific Grove, City of	Ms. Celia Perez Martinez, Public Works Superintendent City of Pacific Grove 2100 Sunset Drive Pacific Grove, CA 93950
Pebble Beach Company and on behalf of the Pebble Beach Stillwater Yacht Club	Mr. Mark Stilwell Executive Vice President and General Council Pebble Beach Company P.O. Box 1767 Pebble Beach, CA 93953
San Diego, City of	Mr. Jay Goldstone, Chief Operating Officer City of San Diego

Applicant	Applicant Contact Person(s)
	2392 Kincaid Road San Diego, CA 92101
San Mateo County	Mr. Thomas F. Casey, III County Counsel Hall of Justice and Records County of San Mateo 400 County Center, 6th Floor Redwood City, CA 94063-1661
Santa Catalina Island Company, and on behalf of the Santa Catalina Island Conservancy	Mr. Michael B. Whitby Director Real Estate Planning Santa Catalina Island Company P.O. Box 737 Avalon, CA 90704
The Sea Ranch Association	Mr. Bill Weimeyer, Director of Compliance and Environmental Management The Sea Ranch Association 975 Annapolis Road The Sea Ranch, CA 95497-0016
Trinidad, City of	The Honorable Stan Binnie, Mayor City of Trinidad 409 Trinity Street, P.O. Box 390 Trinidad, CA 95570
Trinidad Rancheria	Mr. Garth Sundberg Tribal Chair Trinidad Rancheria P.O. Box 630 Trinidad, CA 95570
U.S. Dept. of Interior, Point Reyes National Seashore	Mr. Don L. Neubacher, Superintendent United States Department of the Interior National Park Service Point Reyes National Seashore Point Reyes, CA 94956
U.S. Dept. of Interior, Redwoods National and State Park	Mr. Steve W. Chaney, Superintendent Redwood National and State Parks 1111 Second Street Crescent City, CA 95531
U.S. Dept. of Defense, Air Force, Pillar Point	Ms. Beatrice L. Kephart, Chief Environmental Flight Department of the Air Force 30 CES/CEV 1028 Iceland Avenue Vandenberg AFB, CA 93437-6010
U.S. Dept. of Defense, Navy, San Nicolas Island	Captain James J. McHugh Environmental Division Department of the Navy

Applicant	Applicant Contact Person(s)
	Naval Base Ventura County Complex 311 Main Road, Building 1 Point Mugu, CA 93042
U.S. Dept. of Defense, Navy, San Clemente Island	Mr. Brian Gordon, Water Program Director Department of the Navy 33000 Nixie Way, Building 50, Suite 336 San Diego, CA 92147

1.1 DEFINITION OF THE PROJECT UNDER CEQA

The proposed project under CEQA is the adoption and implementation of the proposed General Exception and a statewide Special Protections that establish minimum requirements for the permitting, monitoring, and continued operation of selected point and non-point discharges, as required by the California Ocean Plan (the related California Water Code section, included in Appendix 10).

The proposed General Exception would be adopted into the Ocean Plan (Water Quality Control Plan for Ocean Waters of California), in furtherance of legislative policy set forth in Section 1300 of Division 7 of the California Water Code (CWC)(Stats. 1969, Chap. 482). The Regional Water Boards would implement the Special Protections along with those authorized local agencies that would be given authority by the Regional Water Boards to implement and enforce the policy. See Section 2.0 "Project Description," for a more detailed description of the proposed special conditions and the project objectives. The proposed special protection is presented in Appendix 1.

1.2 LEAD AGENGY

Under CEQA, the lead agency is the public agency with primary responsibility over the proposed project. The State Water Board is the lead agency under CEQA for this project because of its regulatory authority over water quality in California and, as specified in the legislation, its lead role in adopting the new General Exception and Special Protections.

1.3 PURPOSE AND FOCUS OF THIS EIR

The purpose of an EIR is to disclose and mitigate impacts of a proposed project and determine feasible alternatives that could reduce those impacts. An EIR does not recommend either approval or denial of a project. An EIR is an informational document used in the planning and decision-making process by the lead agency and responsible and trustee agencies. It assists decision makers in fulfilling CEQA's requirement that they balance the benefits of a proposed project against its environmental effects in deciding whether to carry out a project.

If the lead agency decides to carry out a project addressed in an EIR, it prepares findings of facts that discuss the disposition of each of the significant environmental effects addressed in the EIR. If adverse environmental effects are identified as significant and unavoidable, the proposed project still may be approved by the lead agency if it finds that the social, economic, or other benefits of the project outweigh its unavoidable risks. The lead agency would then prepare a statement of overriding considerations, in addition to the findings, that discuss the specific reasons for approving the project, based on information in the EIR and other information in the record.

The overall purpose of this EIR is to fulfill the following CEQA objectives:

► identify the project's significant environmental effects on the environment,
► indicate the manner in which these significant effects can be mitigated or avoided,
► identify alternatives to the project,
► facilitate public involvement, and
► foster coordination among various governmental agencies.

This EIR is a program EIR intended to provide information at a general (or programmatic) level of detail on the potential impacts of implementing the proposed project. As described by Section 15168(a) of the State CEQA Guidelines, a program EIR is one that may be prepared on a series of actions that can be characterized as one large project and that are related (1) geographically; (2) as logical parts in a chain of contemplated actions; (3) in connection with the issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program; or (4) as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar effects that can be mitigated in similar ways.

Because the proposed project involves the adoption and implementation of special protections and a series of specific exceptions to the waste discharge prohibition that may be characterized as one large project and are related as individual activities carried out under the same authority and having similar environmental effects which can be mitigated in similar ways, a General Exception with special conditions associated with a statewide (coastal and waters surround islands) program, a program-level EIR is the appropriate framework in which to address the project's environmental impacts. Subsequent, project-level CEQA compliance and environmental analysis at a regional or local level may be required if subsequent actions implementing the Special Protections are proposed that do not fall within the scope of this EIR.

The focus of this FEIR is determining, on a broad scale, the potential environmental impacts of the proposed project and identifying mitigation measures for those impacts that may be significant. Additionally, although not required by CEQA, an analysis of fiscal and economic impacts is included in this EIR to assist in the process that is followed in the adoption of new exceptions to the Ocean Plan regulations.

1.4 EIR SCOPING PROCESS

The State Water Board held numerous meetings and discussions regarding the development of the Special Protections. Participating agencies and stakeholders and Responsible Parties included Natural Resources Defense Council (NRDC) California Coastkeeper, The California Stormwater Quality Association (CASQA), the California Coastal Commission (CCC) and the National Oceanic and Atmospheric Administration (NOAA). During 2005 through 2009, the stakeholders and Responsible Parties reviewed and provided input on the Draft Staff Proposal, Draft Special Protections and, Draft Data Report.

A Notice of Preparation of a Statewide Program Environmental Impact Report and Initial Study were prepared for the project and posted to solicit public input and comment on February 9, 2010. A 30-day public review period on the NOP began February 9, 2010, and ended on March 15, 2010. During that period, the public could submit written comments to the State Water Board on the NOP and issues to be evaluated in the EIR. Comments were received and are posted on the State Water Boards ASBS webpage - http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs_comments031510.shtml.

1.5 ORGANIZATION OF THIE DOCUMENT

This FEIR is organized into the following chapters:

- ► The Executive Summary summarizes the public review process, provides a brief overview of the project description, and describes the project alternatives.
- ► Chapter 1.0, “Introduction,” provides an overview of the proposed project and the intent of the Project, identifies the lead agency, describes the purpose and focus of this FEIR, describes the EIR scoping process, outlines the chapters of this FEIR.
- ► Chapter 2.0, “Project Description,” identifies existing Responsible Parties in violation of the ASBS waste discharge prohibition.
- ► Chapter 3.0, “Regulatory Setting,” presents an overview of existing government requirements affecting ASBS, representative requirements of Regional Water Boards that are already in effect and environmental protection requirements.
- ► Chapter 4.0, “Alternatives Analysis,” describes alternatives to the proposed project, including a no-project alternative; identifies the environmentally superior preferred alternative. Alternatives that have been proposed and rejected from further consideration are also identified in the chapter, along with the reasons for their rejection.

- Chapter 5.0, “Environmental Baseline,” includes sections on each of the ASBS environmental issue areas that may be significantly affected as a result of the General Exception Project and Special Protections are analyzed in detail in this EIR. For each issue area (e.g., water quality and marine life), the section describes the existing environmental setting, describes a range of representative conditions, presents thresholds for determining the significance of impacts, evaluates the environmental impacts associated with implementing the project~~,~~.

- Chapter 6.0, “Environmental Analysis,” includes sections on each of the environmental issue areas that may be significantly affected as a result of the Project and Special Protections and are analyzed in detail in this EIR. For each issue area (e.g., water quality and biological resources), the section describes the existing environmental setting and regulatory framework, describes a range of representative conditions, presents thresholds for determining the significance of impacts, and evaluates the environmental impacts associated with implementing the project.

- Chapter 7.0, “Economic Analysis,” discusses potential costs related to the implementation of the Special Protections and potential waste discharge prohibition management practices.

- Chapter 8.0, “Other Statutory Requirements,” presents a discussion of cumulative impacts that could result from implementation of the proposed project in combination with other past, present, and reasonably foreseeable future projects in the area; discusses the potential for growth-inducing impacts; discloses the significant and unavoidable impacts identified in the environmental impact analysis; and describes the significant and irreversible environmental changes associated with implementing the project.

1.7 AGENICIES THAT MAY USE THIS DOCUMENT

Regional Water Boards and local agencies, including counties and cities, may use the information provided in this EIR to assist them in assessing the environmental impacts of their point and non-point source discharges into ASBS, or in modifying local ordinances and land use plans to conform to the proposed special protections.

2.0 PROJECT DESCRIPTION

This chapter describes the proposed statewide general exception and Special Protections for storm water and nonpoint source discharges to ASBS. Prior to that, it provides an overview of information about the existing discharges into ASBS, provides background on the number and locations of these discharges throughout the State, information about the environmental concerns related to ASBS, and an overview of the existing Ocean Plan regulations in the State.

2.1 OVERVIEW OF THE DISCHARGES

PROJECT DESCRIPTION

(General Exception for ASBS Storm Water and Nonpoint Source Discharges, with Special Protections for ASBS)

The parties identified herein seek an exception from the Ocean Plan's prohibition of waste discharges into ASBS. The exception with conditions, if approved, would allow their continued storm water and nonpoint source discharge into the Redwoods National Park, Trinidad Head, King Range, Saunders Reef, Del Mar Landing, Jughandle Cove, Gerstle Cove, Point Reyes Headlands, Duxbury Reef, James V. Fitzgerald, Año Nuevo, Pacific Grove, Carmel Bay, Point Lobos, Julia Pfeiffer Burns, Salmon Creek Coast, Laguna Point to Latigo Point, San Nicolas Island and Begg Rock, Northwest Santa Catalina Island, Western Santa Catalina Island, Southeast Santa Catalina Island, Heisler Park, Robert E. Badham, Irvine Coast, La Jolla, and San Clemente Island ASBS. This would provide additional protections for beneficial uses that are not currently provided.

On October 18, 2004, the State Water Board notified applicants to cease storm water and nonpoint source waste discharges into ASBS or to request an exception under the Ocean Plan. Several applicants submitted requests, or conditional requests, for exceptions. Subsequently, the State Water Board provided general instructions for exception application packages via its web site.[4] The State Water Board sent letters to applicants, providing specific instructions and deadlines for submission of the application packages.

The State Water Board has received 27 applications for the general exception to the Ocean Plan prohibition against waste discharges to ASBS. The applications were filed by permitted and non-permitted storm water dischargers and nonpoint source dischargers, who are identified in Table 2. A map showing locations of the ASBS that are subject to the general exception is provided in Figure 2.1.

[4] http://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.shtml

Table 2. Applicants and ASBS Where Discharges Occur

Applicant	ASBS
Carmel-by-the-Sea, City of	Carmel Bay
Connolly-Pacific Company	Southeast Santa Catalina Island
Department of Parks and Recreation	Redwoods National Park, Trinidad Head, King Range, Jughandle Cove, Gerstle Cove, James V. Fitzgerald, Año Nuevo, Carmel Bay, Point Lobos, Julia Pfeiffer Burns, Laguna Point to Latigo Point, Irvine Coast
Department of Transportation (Caltrans)	Redwoods National Park, Saunders Reef, James V. Fitzgerald, Año Nuevo, Carmel Bay, Point Lobos, Julia Pfeiffer Burns, Salmon Creek Coast, Laguna Point to Latigo Point, Irvine Coast
Humboldt County	King Range
Humboldt Bay Harbor District	King Range
Irvine Company	Irvine Coast
Laguna Beach, City of	Heisler Park
Los Angeles County	Laguna Point to Latigo Point
Malibu, City of	Laguna Point to Latigo Point
Marin County	Duxbury Reef
Monterey, City of	Pacific Grove
Monterey County	Carmel Bay
Newport Beach, City of, and on behalf of the Pelican Point Homeowners	Robert E. Badham and Irvine Coast
Pacific Grove, City of	Pacific Grove
Pebble Beach Company and on behalf of the Pebble Beach Stillwater Yacht Club	Carmel Bay
San Diego, City of	La Jolla
San Mateo County	James V. Fitzgerald
Santa Catalina Island Company, and on behalf of the Santa Catalina Island Conservancy	Northwest and Western Santa Catalina Island
The Sea Ranch Association	Del Mar Landing
Trinidad, City of	Trinidad Head
Trinidad Rancheria	Trinidad Head
U.S. Dept. of Interior, Point Reyes National Seashore	Point Reyes Headlands, Duxbury Reef
U.S. Dept. of Interior, Redwoods National and State Park	Redwoods National Park
U.S. Dept. of Defense, Air Force	James V. Fitzgerald

Applicant	ASBS
U.S. Dept. of Defense, Navy	San Nicolas Island & Begg Rock
U.S. Dept. of Defense, Navy	San Clemente Island

Figure 2.1 Map of ASBS Sites and General Exception Applicants

The mitigating terms and conditions for the general exception are the Special Protections (Appendix 1) that will limit the storm water and nonpoint source waste discharges by the applicants to the affected ASBS. The intent is to ensure that such discharges will be controlled to protect beneficial uses within ASBS and to protect and maintain the natural hydrologic cycle and coastal ecology (e.g., the flow of clean precipitation runoff into the ocean, while preserving coastal slope stability, and preventing anthropogenic erosion). The fundamental requirements include: (1) Cessation of non-storm water runoff, (2) Maintenance of natural water quality within ASBS, including during precipitation (design storm) events, by limiting wastes in storm water runoff and other activities that would otherwise cause a degradation of ocean water quality in the ASBS, and (3) Adequate Monitoring to assure that beneficial uses are protected.

3.0 REGULATORY SETTING

3.1 OVERVIEW OF EXISTING FEDERAL AND STATE REGULATIONS AFFECTING ASBS

This section describes current federal and state laws, the regulations and practices that govern California's coastal water quality in consideration of the Special Protections. These laws, programs, and practices represent the regulatory setting for measuring incremental impacts of the Special Protections.

3.1.1 Porter-Cologne Water Quality Control Act and Federal Clean Water Act

3.1.1.1 <u>Porter-Cologne Water Quality Control Act</u>

The Porter-Cologne Water Quality Control Act (Porter-Cologne) is the State of California's primary water quality control law and addresses two key functions – planning and waste discharge regulation. Porter-Cologne provides the State Water Board and the nine Regional Water Boards the responsibility and authority necessary to protect and enhance water quality in California. Of these nine Regional Water Boards, six have jurisdictions that include the coastal waters of the State.

A. Water Quality Objectives and Water Quality Control Plans

Porter-Cologne requires the State Water Board to adopt state policies for water quality control and statewide water quality control plans, including a plan for ocean waters (Water Code §§13170, 13170.2, 13391). Water quality control plans designate beneficial uses of water, establish water quality objectives to protect those uses, and contain a program to implement the objectives. Statewide water quality control plans and policies are binding on the Regional Water Boards. The plan adopted by the State Water Board to protect ocean waters is designated the Water Quality Control Plan for Ocean Waters of California, referred to as the California Ocean Plan (Ocean Plan). Each Regional Water Board is also required under Porter-Cologne to adopt and implement water quality control plans (basin plans) which recognize the unique characteristics of each region with regard to natural water quality, actual and potential beneficial uses, and water quality problems.

B. Authority to Regulate Point and Nonpoint Sources

Porter-Cologne establishes a program to regulate waste that could affect water quality through waste discharge requirements (WDRs), conditional waivers of WDRs, or prohibitions (see Water Code §§13243, 13263, 13269). The term "Waste" is broadly defined in Porter-Cologne and includes toxic pollutants, as well as other waste substances [Id. §13050(d)]. "Waters of the state" is similarly broadly defined to include all surface waters, including bays and estuaries, and California's coastal ocean waters up to the State's three nautical-mile boundary.

Porter-Cologne also authorizes the Water Boards to investigate water quality and to require waste dischargers to submit monitoring and technical reports (Id. §§ 13267, 13383). In addition, Porter-Cologne gives the Water Boards extensive enforcement authority to respond to unauthorized discharges, discharges in violation of applicable requirements, discharges that cause pollution or nuisance, and other matters. The enforcement options include, among others, cleanup and abatement orders, cease and desist orders (CDOs), and administrative civil liability orders (Id. §§13301, 13304, 13323).

Under Porter-Cologne, all waste discharges, that could affect water quality, including nonpoint source discharges of waste, must be regulated. Nonpoint source (NPS) pollution, unlike point source pollution from industrial and sewage treatment plants, comes from many diffuse sources. Some types of NPS pollution are caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, depositing them into lakes, rivers, wetlands, coastal waters, and groundwater. NPS pollution may originate from several sources, including agricultural runoff, forestry operations, urban runoff, boating and marinas, active and historical mining operations, atmospheric deposition, and wetlands.

Nonpoint sources in California must be regulated under WDRs, conditional waivers of WDRs, or basin plan prohibitions. However, WDRs need not necessarily contain numeric effluent limits. The state's Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program (NPS Policy) provides guidance regarding the prevention and control of nonpoint source pollutant discharges and enforcement of nonpoint source regulations (e.g., WDRs). In practice, the Regional Water Boards do not usually impose numeric effluent limits on nonpoint pollution sources; rather, they primarily rely on implementation of Best Management Practices (BMPs) to reduce pollution.

3.1.1.2 Federal Clean Water Act

The Water Boards are also required to implement the federal Clean Water Act (CWA). Under section 303(c) of the CWA, the Water Boards adopt water quality standards for waters of the United States. The beneficial use designations and water quality objectives (together with an antidegradation policy) constitute water quality standards for purposes of the CWA (See Clean Water Act § 303(c) (2) (A); 40 C.F.R. §§131.3(i), 131.6). All water quality control plans, which include the water quality standards, must be approved by the U.S. Environmental Protection Agency (U.S. EPA).

Pursuant to Section 402 of the CWA, the Water Boards issue National Pollutant Discharge Elimination System (NPDES) permits. Section 402 of the CWA requires that all point source discharges of pollutants to waters of the United States be regulated under a NPDES permit. Typical discharges that are regulated under NPDES permits include discharges from publicly owned treatment works (POTWs) and industrial facilities. In addition, certain storm water discharges are regulated under the NPDES permit program.

In accordance with Section 401 of the CWA, the Water Boards also assess the potential effects of federally permitted or licensed projects that could harm beneficial uses. Under section 401, the State can issue water quality certifications to ensure that water quality is not degraded due to the action. The Water Boards also implement the total maximum daily load (TMDL) program, which is required under section 303(d) of the CWA.

3.2 CALIFORNIA OCEAN PLAN AND ASBS

The Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for regulation of wastes discharged into the State's coastal waters through control of point and nonpoint source discharges. The State Water Board adopts the Ocean Plan, and both the State and the six coastal Regional Water Boards implement and interpret the Ocean Plan. The Ocean Plan consists of an Introduction, Sections I thru III, and supporting tables and appendices.

The introduction describes the purpose of the plan, the State Water Board's authority to develop, adopt, and implement the plan, applicable waters, wastes, and discharges, and the principles guiding the development and interpretation of the plan.

Section I identifies the applicable beneficial uses of marine waters including: protection and enhancement of marine life, ASBS, fish migration, fish spawning, shellfish harvesting, rare and endangered species, recreation, industrial water supply, commercial and sport fishing, mariculture, aesthetic enjoyment, and navigation.

Section II presents narrative and numerical water quality objectives adopted by the State Water Board to protect these beneficial uses. Chapter III describes the controls and prohibitions applicable to ocean discharges and the process for preparing waste discharge requirements for permittees discharging into ocean waters.

Section III includes:

- The criteria that each discharger must meet before a new discharge can be permitted,
- Technology based effluent limitations as well as a method for translating water quality objectives into discharge specific water quality based effluent limits,
- The process for nominating and designating ASBS for consideration and approval,
- Discharge prohibitions (e.g., municipal or industrial sludges, bypassing, discharge into ASBS, and others) and general provisions,
- A mandate that requires dischargers to monitor their discharges, and
- Provisions for allowing exceptions to the Ocean Plan under special circumstances, as discussed below.

3.2.1 Areas of Special Biological Significance

Appendix I of the Ocean Plan defines ASBS as those *areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable*. Section II of the Ocean Plan designates the preservation and enhancement of ASBS as a beneficial use of ocean waters.

The State Water Board first established the concept of "areas of special biological significance" in the 1972 Ocean Plan and the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan). The coastal Regional Water Boards identified candidate areas and recommended the areas to be designated as ASBS to the State Water Board. Following those recommendations, on March 21, 1974, the State Water Board, in Resolution No. 74-28, Designation of Areas of Special Biological Significance, decided that: *"The list of Areas of Special Biological Significance will be used to identify for planning purposes, those areas where the regional water quality control boards will prohibit waste discharges...."* Thirty-one ASBS were designated at that time. Two more ASBS were designated later in 1974, in Resolution No. 74-32, and in 1975 another ASBS was designated in Resolution No.75-61. As of 2010, there are 34 ASBS.

The most recent amendment to the Ocean Plan that addresses ASBS occurred in 2005 when the State Water Board adopted Resolution No. 2005-0035 to conform to the nomenclature adopted by the Legislature within the Marine Managed Areas Improvement Act, as described in Section 1.3.

3.2.2 Discharge Prohibition into ASBS

Since 1983, the Ocean Plan has prohibited waste discharges to ASBS (SWRCB 1983); however, earlier versions of the Ocean Plan did not. The 1972 Ocean Plan required that waste be discharged *"a sufficient distance from areas designated as being of* *special biological significance to assure maintenance of natural water quality conditions in these areas."* State Water Board guidance issued in the early 1970's advised the Regional Water Boards that sewage or industrial point source discharges that would alter water quality in an ASBS should be prohibited. Nonpoint source waste discharges, including storm water runoff, would be controlled to the extent practicable. At that time, the Water Boards focused primarily on discharges from traditional point sources, such as sewage treatment plants, into ASBS.

The 2005 Ocean Plan, in Section III. E., Implementation Provisions for Areas of Special Biological Significance, states that "*Waste* shall not be discharged to areas designated as being of special biological significance. Discharges shall be located a sufficient distance from such designated areas to assure maintenance of natural water quality conditions in these areas".*

The 2005 Ocean Plan does allow the Regional Water Boards to approve *"limited term"* (i.e., weeks or months) activities as described in Section III. E. Limited-term activities include, but are not limited to, activities such as maintenance/repair of existing boat facilities, restoration of sea walls, repair of existing storm water pipes, and replacement/repair of existing bridges. Limited-term activities may result in temporary and short-term changes in existing water quality. Water quality degradation shall be limited to the shortest possible time. The activities must not permanently degrade water quality or result in water quality lower than that necessary to protect existing uses, and all practical means of minimizing such degradation shall be implemented.

Despite the prohibition against waste discharges into ASBS, a survey identified approximately 1,658 outfalls (SCCWRP 2003). Storm water and nonpoint source discharges make up the majority of the discharges identified. In response, the State Water Board initiated a concerted effort to address the discharges and to bring them into compliance with the Ocean Plan. This effort includes addressing storm water and nonpoint source discharges and developing an exception for these discharges that achieves and maintains the natural water quality of the receiving water in the ASBS. A General Exception for 27 applicants is the subject of this document which focuses on permitted storm water and nonpoint source discharges into ASBS.

Historically, the State Water Board has applied the prohibition to "direct discharges" regardless of whether the discharge represents point or nonpoint source. The prohibition does not apply to upstream discharges to rivers that flow into ASBS. These indirect discharges into naturally occurring streams are regulated under the Basin Plans by the Regional Water Boards to protect downstream beneficial uses.

3.2.3 ASBS and Exceptions to the California Ocean Plan

Section III (I) (1) of the 2005 Ocean Plan states:

> *"The State Board may, in compliance with the California Environmental Quality Act, subsequent to a public hearing, and with the concurrence of the U.S. Environmental Protection Agency, grant exceptions where the Board determines:*
>
> *a. The exception will not compromise protection of ocean waters for beneficial uses, and,*
>
> *b. The public interest will be served."*

In order to initiate the exception process, an applicant must prepare and submit an application requesting an exception to the appropriate Regional Water Board and the State Water Board. The application should include information and data to enable the State Water Board to make the appropriate determination in regard to the request for the exemption and compliance with CEQA.

In order to be granted an exception, the application and supporting documentation must support a finding that the discharge has not resulted in the alteration of natural water quality in the receiving waters. The application must also support a finding that the public interest will be better served by granting the exception. An example of relevant factors might include the degree of environmental damage that would occur if the discharge were moved (e.g., if the discharge were in a particularly fragile area and moving it would cause greater damage than leaving it). When considering an exception, the State Water Board must comply with CEQA in the consideration of environmental impacts, preparation of environmental documents, and comply with Porter-Cologne, the Federal Clean Water Act, and the State Water Board's policies and procedures relating to Water Quality Planning.

If the State Water Board acts to approve an exception, the submittal package and State Water Board documents are submitted to U.S. EPA for concurrence. Although an exception grants permission to discharge into an ASBS, the exceptions are generally subject to review every 3 years during Ocean Plan Triennial Reviews. Exceptions do not function as permits (WDRs or waivers). In order to legally discharge into an ASBS, the discharger must obtain both a permit and an approved exception.

Four ASBS exceptions were issued between 1975 and 1990. These were for the following single point source discharges: (1) the Navy's waste water treatment plant outfall at San Clemente Island, (2) the Humboldt County Resort Improvement District waste water treatment plant outfall at Shelter Cove, (3) the Carmel Sanitary District (currently Carmel Area Wastewater Treatment District) outfall, and (4) the Navy desalination plant discharge at San Nicolas Island. Since 2004, three additional exceptions were issued by the State Water Board (see section 3.4.1 below) for a current total of seven exceptions to allow discharge into an ASBS.

3.3 MARINE MANAGED AREAS IMPROVEMENT ACT

Assembly Bill 2800 (Chapter 385, Statutes of 2000), the Marine Managed Areas Improvement Act, was approved by the Governor on September 8, 2000. This law added sections to the Public Resources Code (PRC) that are relevant to ASBS (36602(d)(6). The act defines six categories of marine managed areas (MMAs). These six categories are marine reserves, marine parks, marine conservation areas, marine recreation management areas, marine cultural preservation areas, and state water quality protected areas (SWQPAs). Section 36700(f) of the PRC defines a SWQPA as "a non-terrestrial marine or estuarine area designated to protect marine species or biological communities from an undesirable alteration in natural water quality, including, but not limited to, areas of special biological significance that have been designated by the State Water Resources Control Board through its water quality control planning process." Section 36710(f) of the PRC stated: "In a state water quality protection area, point source waste and thermal discharges shall be prohibited or limited by special conditions. Nonpoint source pollution shall be controlled to the extent practicable. No other use is restricted." The classification of ASBS as SWQPAs went into effect on January 1, 2003 (without State Water Board action) pursuant to section 36750 of the PRC (SWRCB 1979).

Senate Bill (SB) 512 (Chapter 854, Statutes of 2004) amended the MMAs portion of the PRC, effective January 1, 2005, to clarify that ASBS are a subset of SWQPAs and require special protection as determined by the State Water Board pursuant to the Ocean Plan and the California Thermal Plan. Specifically, SB 512 amended the PRC section 36700 (f) definition of SWQPA to add the following: "Areas of special biological significance are a subset of state water quality protection areas, and require special protection as determined by the State Water Resources Control Board pursuant to the California Ocean Plan adopted and reviewed pursuant to Article 4 (commencing with Section 13160) of Chapter 3 of Division 7 of the Water Code and pursuant to the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (California Thermal Plan) adopted by the state board."

Section 36710(f) of the PRC was also amended as follows: "In a state water quality protection area, waste discharges shall be prohibited or limited by the imposition of special conditions in accordance with the Porter-Cologne Water Quality Control Act [Division 7 (commencing with Section 13000) of the Water Code] and implementing regulations, including, but not limited to, the California Ocean Plan adopted and reviewed pursuant to Article 4 (commencing with Section 13160) of Chapter 3 of

Division 7 of the Water Code and the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (California Thermal Plan) adopted by the state board. No other use is restricted."

This language replaced the prior wording stating that point sources into ASBS must be prohibited or limited by special conditions, and that nonpoint sources must be controlled to the extent practicable. In other words, the absolute discharge prohibition in the Ocean Plan stands, unless an exception is granted.

3.4 REGULATORY ACTIONS AND RELATED TECHNICAL EFFORTS

3.4.1 State Water Board Evaluation of Discharges into ASBS

In 2000, the State Water Board received a petition from California Department of Transportation (Caltrans) that questioned the applicability of the ASBS discharge prohibition to storm water discharges. The petition sought review of a CDO issued by the Santa Ana Regional Water Board to the Irvine Company, Caltrans, and the California Department of Parks and Recreation. The CDO found that the dischargers were violating or threatening to violate the prohibition against discharges to the Irvine Coast ASBS. In 2001, the State Water Board adopted Order WQ 2001-08 in which the State Water Board held that the ASBS discharge prohibition in the Ocean Plan applies to storm water discharges. The State Water Board also held that Caltrans coverage under a storm water permit did not relieve the discharger from complying with the Ocean Plan prohibition. These findings prompted the State Water Board to fund a statewide survey by the Southern California Coastal Water Research Project (SCCWRP) to assess the extent of storm water and nonpoint source discharges into ASBS as described in Section 3.2. In 2003, SCCWRP, working with the State Water Board's Ocean Unit, found 1,654 discharges without Ocean Plan exceptions. Waste discharges identified as draining (or having drained) into ASBS include point sources of waste water (fish cleaning stations, marine labs and aquaria, wastewater treatment plants), sanitary sewer system overflows, permitted storm water discharges and associated dry weather flows, and nonpoint sources including marina and boating operations, military operations, septic seepage, and runoff from golf courses and other sources. A majority of the discharges into ASBS were identified as nonpoint source and permitted storm water discharges.

Staff then began the effort to address ASBS waste discharges, where appropriate, under the Ocean Plan exception process. The proposed exceptions generally fell into two categories. The first category consists of individual exceptions for marine laboratory discharges. The second category constitutes a group exception for storm water and nonpoint source runoff discharges into ASBS by identified responsible parties. For the first category, the State Water Board has adopted three individual exceptions for marine lab waste seawater and storm water runoff. The exceptions were for the Scripps Institute of Oceanography (SIO) in La Jolla, USC's Wrigley Institute on Santa Catalina Island, and the UC Davis Bodega Marine Laboratory.

The second category covers entities with storm water and nonpoint source runoff discharges into ASBS. To address these discharges, State Water Board staff sent letters in late 2004 notifying ASBS dischargers that they must cease discharging or apply for an Ocean Plan exception. Another round of letters was sent in August 2005 to those respondents who requested exceptions, further describing the data that must be submitted to proceed with the exception process. For storm water and nonpoint source applicants, the original deadline for submitting that data was May 31, 2006, but the State Water Board staff has allowed late applications to be accepted.

All of these discharges are currently in violation of the Ocean Plan ASBS waste discharge prohibition because they lack an exception. Twenty-seven parties with either nonpoint source or permitted storm water discharges have applied for an exception from the Ocean Plan ASBS waste discharge prohibition. Due to the large number of discharges and responsible parties, staff developed several alternative approaches for addressing these discharges as described in Section 4.0. Alternatives under consideration include no action, relocation of all discharges, and proposing a General Exception which serves as the basis of this document. As described in Section 4.0, staff believes that a general exception is the most effective means to regulate discharges into ASBS.

3.4.2 Natural Water Quality

SIO operates and maintains the outfalls into the La Jolla ASBS. The State Water Board issued the first Ocean Plan exception (after the SCCWRP survey) to SIO (Resolution No. 2004-52). The San Diego Regional Water Board subsequently issued an NPDES Permit to SIO. As part of the SIO exception, State Water Board directed staff to create an ASBS Natural Water Quality Committee (NWQC) to define natural water quality in the San Diego-Scripps ASBS in La Jolla. The NWQC had a three-year mission to advise State Water Board staff regarding impacts of SIO's discharges into an adjoining ASBS. While the committee focused on SIO and other relevant data in the vicinity of SIO, they also recognized the importance of their work in the greater context of the ASBS, Ocean Plan, and storm water issues.

In September 2010 a final report from the NWQC was presented to the State Water Board, which included a definition of Natural Water Quality. The definition states that natural water quality is "That water quality (based on selected physical chemical and biological characteristics) that is required to sustain marine ecosystems, and which is without apparent human influence, *i.e.*, an absence of significant amounts of:

a) man-made constituents (*e.g.,* DDT);

b) other chemical (*e.g.,* trace metals), physical (temperature/thermal pollution, sediment burial) and biological (*e.g.*, bacteria) constituents at levels that have been elevated due to man's activities above those resulting from the naturally occurring processes that affect the area in question; and

c) non-indigenous biota (*e.g.,* invasive algal bloom species) that have been introduced either deliberately or accidentally by man."

The definition also states that: "it is not practical to identify a unique seawater composition as exhibiting *natural water quality*. Nevertheless, the committee believes that it is practical to define an *operational natural water quality for an ASBS*, and that such a definition must satisfy the following criteria:

- it should be possible to define a *reference* area or areas for each ASBS that currently approximate *natural water quality* and that are expected to exhibit the likely natural variability that would be found in that ASBS,

- any detectable human influence on the water quality must not hinder the ability of marine life to respond to natural cycles and processes."

The NWQC's complete definition of Natural Water Quality and their other findings may be found in the Summation of Findings, Natural Water Quality Committee 2006-2009, in Appendix 8.

3.4.3 Storm Water and NPS Discharges

Most of the discharges currently discharging into ASBS are either storm water or nonpoint source discharges. The means by which these discharges are regulated is described below.

A. Storm Water

The NPDES Storm Water Program implemented by the Water Boards has three distinct components – municipal, industrial, and construction.

1) Municipal Discharges

The State Water Board regulates storm water discharges from municipal separate storm sewer systems (MS4s). The MS4 program issued permits in two phases, Phase I and Phase II. Under Phase I, which started in 1990, the Regional Water Boards have adopted NPDES permits for medium (serving between 100,000 and 250,000 people) and large (serving more than 250,000 people) municipalities. Most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area. These permits are reissued as the permits expire. As part of Phase II, the State Water Board adopted a General Permit for the Discharge of Storm Water from Small MS4s (WQ Order No. 2003-0005-DWQ) to provide permit coverage for smaller municipalities, including non-traditional Small MS4s, which are governmental facilities such as military bases, public school campuses, and prison and hospital complexes. The State Water

Board has also adopted a statewide permit which addresses the storm water discharges from the California Department of Transportation (Caltrans) right-of-way.

The MS4 permits require the discharger to develop and implement a Storm Water Management Plan/Program (SWMP) with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). MEP is the performance standard specified in Section 402(p) of the CWA. The management programs specify what BMPs will be used to address certain program areas. The program areas include public education and outreach; illicit discharge detection and elimination, construction and post-construction and good housekeeping for municipal operations. MS4 permits also require permittees to reduce the discharge of pollutants so that water quality standards are met. In general, medium and large municipalities are required to conduct chemical monitoring, though small municipalities are not. Also, the Small MS4 General Permit provides that the SWMP must be available for public review and comment, and must be approved by the appropriate Regional Water Board, or its Executive Officer, prior to permit coverage commencing.

2) Industrial Discharges

Under the industrial program, the State Water Board issues a General NPDES Permit that regulates discharges associated with ten broad categories of industrial activities. This Industrial General Permit requires the implementation of management measures that will achieve the performance standard of best available technology economically achievable (BAT) and best conventional pollutant control technology (BCT), and achieve compliance with water quality standards. The permit also requires that dischargers develop a Storm Water Pollution Prevention Plan (SWPPP) and a monitoring plan. Through the SWPPP, dischargers are required to identify sources of pollutants, and describe the means to manage the sources to reduce storm water pollution. For the monitoring plan, facility operators may participate in group monitoring programs to reduce costs and resources.

3) Construction Discharges

The construction program requires dischargers whose projects disturb one or more acres of soil (or whose projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres) to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit). The Construction General Permit requires the development and implementation of a SWPPP that lists the BMPs the discharger will use to control storm water runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program, a chemical monitoring program for non-visible pollutants to be implemented if there is a failure of BMPs, and a sediment monitoring plan if the site discharges directly to a water body impaired for sediment.

Consistent with federal law (See, 33 U.S.C. §§ 1311(b) (1) (C), 1342(p) (3) (A); *Defenders of Wildlife v. Browner* (9th Cir. 1999) 191 F. 3d 1159, 1165-1166), the Construction General Permit and Industrial General Permit contain provisions requiring compliance with applicable water quality standards.

4) Caltrans

In 1996, Caltrans requested that the State Water Board consider adopting a single NPDES permit for storm water discharges from all Caltrans properties, facilities, and activities, which would encompass both the MS4 requirements and the statewide construction general permit requirements. The State Water Board issued the Caltrans general permit in 1999, requiring Caltrans to control pollutant discharges to the MEP for the MS4s and to the standard of BAT/BCT for construction activities through BMPs. The State Water Board also required Caltrans to implement more stringent controls, if necessary, to meet water quality standards.

B. Nonpoint Sources

Under Porter-Cologne, all waste discharges that could affect water quality must be regulated, including nonpoint source discharges of pollution. Nonpoint source (NPS) pollution, unlike point source pollution from industrial and sewage treatment plants, comes from many diffuse sources. Some types of NPS pollution are caused by rainfall or snowmelt moving over and through the ground. As the runoff moves, it picks up and carries away natural and man-made pollutants, depositing them into lakes, rivers, wetlands, coastal waters, and groundwater. NPS pollution may originate from several sources, including agricultural runoff, forestry operations, urban runoff, boating and marinas, active and historical mining operations, atmospheric deposition, and wetlands.

Nonpoint sources in California must be regulated under WDRs, conditional waivers of WDRs, or basin plan prohibitions. However, WDRs need not necessarily contain numeric effluent limits. The state's NPS Policy provides guidance regarding the prevention and control of NPS pollutant discharges and enforcement of nonpoint source regulations (e.g., WDRs). In practice, the Regional Water Boards do not usually impose numeric effluent limits on nonpoint pollution sources; rather they primarily rely on implementation of management practices to reduce pollution.

In 1998, California began implementing its Fifteen-Year Program Strategy for the Nonpoint Source Pollution Control Program, as delineated in the Plan for California's Nonpoint Source Pollution Control Program (NPS Program Plan). The legal foundation for the NPS Program Plan is the CWA and the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), and state law. The agencies primarily responsible for the development and implementation of the NPS Program Plan are the State Water Board, the nine Regional Water Boards, and the California Coastal Commission (CCC). Various other federal, state, and local agencies have significant roles in the implementation of the NPS Program Plan.

The NPS Program Plan addresses six categories of nonpoint sources including agriculture, forestry, urban areas, marinas and recreational boating, hydromodification, and wetlands/riparian areas/vegetated treatment systems. For each category, the NPS Program Plan specifies management measures (MMs) and the corresponding management practices. The NPS Program Plan provides five general goals:

- Track, monitor, assess, and report NPS Program activities.
- Target NPS Program activities.
- Coordinate with public and private partners in all aspects of the NPS Program.
- Provide financial and technical assistance and education.
- Implement MMs and associated management practices.

3.5 REGULATORY SETTING BIOLOGICAL RESOURCES

This section addresses biological resources that could be affected with implementation of the proposed project. The information presented is based on literature reviews and a review of existing documentation and research prepared expressly for the project. As explained in the IS, impacts on marine biological resources range from “no impact” to “potentially significant. These issues are addressed in the impact analysis.

Biological resources in California are protected and/or regulated by a variety of federal and state laws and policies. In addition, in many parts of California, planning efforts are underway to conserve local or regional habitat and species. Many regulations applicable to biological resources do not include water quality issues; however, a number do, particularly those relating to fisheries and other aquatic resources. Key regulatory and conservation planning issues applicable to the proposed project are discussed below.

3.5.1 Federal Regulatory Setting

3.5.1.1 Federal Endangered Species Act

Pursuant to the federal Endangered Species Act (ESA, 16 U.S.C. §§ 1531 et. seq.) the U. S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries Service), formerly National Marine Fisheries Service (NMFS), have regulatory authority over federally listed species. Under ESA, a permit is required for any federal action that may result in “take” of a listed species. Section 1532 (19) of ESA defines take as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Under federal regulations, take is further defined to include the modification or degradation of habitat where such activity results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

3.5.1.2 Clean Water Act Section 404

Section 404 of the Clean Water Act (CWA) requires project proponents to obtain a permit from the U.S. Army Corps of Engineers (USACE) before performing any activity that involves the discharge of dredged or fill material into "waters of the United States," including wetlands. Dredge and fill activities range, but involve any activity, such as construction, that results in direct modification (e.g., alteration of the banks, deposition of soils) of an eligible waterway. Waters of the United States include navigable waters, interstate waters, and other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Many surface waters and wetlands in California meet the criteria for waters of the United States. In accordance with Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredged or fill material must obtain water quality certification from the State Water Board or the appropriate Regional Water Board indicating that the project will uphold state water quality standards.

3.5.1.3 National Marine Sanctuaries Act

The National Marine Sanctuaries Act (NMSA) authorizes the Secretary of Commerce to designate and protect areas of the marine environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or esthetic qualities as national marine sanctuaries. Day to-day management of national marine sanctuaries has been delegated by the Secretary of Commerce to NOAA's Office of National Marine Sanctuaries. The Channel Islands, Monterey Bay, and Gulf of the Farallones National Marine Sancturaries regulate the discharge of material or matter, including the discharging or depositing from beyond the boundary of the sanctuary any material or other matter that subsequently enters the sanctuary and injures a sanctuary resource or quality (See 15 CFR § 922.72, 922.82, 922.132 for specific regulatory language including exceptions).

3.5.2 <u>State Regulatory Setting</u>

3.5.2.1 California Endangered Species Act

Pursuant to the California Endangered Species Act (CESA), a permit from the California Department of Fish and Game (DFG) is required for projects that could result in take of a plant or animal species that is state listed as threatened or endangered. Under CESA, "take" is defined as an activity that would directly or indirectly kill an individual of a species. Authorization for take of state-listed species can be obtained through a California Fish and Game Code Section 2080.1 consistency determination or a Section 2081 incidental take permit.

3.5.2.2 Section 1600 of the California Fish and Game Code

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream or lake in California that supports wildlife resources is subject to regulation by DFG, under Sections 1600–1603 of the California Fish and Game Code. Section 1602 states that it is unlawful for any agency to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream or lake designated by DFG, or use any material from the streambeds, without first notifying DFG of such activity. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. Accordingly, a DFG Streambed Alteration Agreement must be obtained for any project that would result in diversions of surface flow or other alterations to the bed or bank of a river, stream, or lake.

3.5.2.3 California Ocean Plan for Areas of Special Biological Significance

Section 13170.2 of the California Water Code directs the State Water Board to formulate and adopt a water quality control plan for ocean waters of California. The State Water Board first adopted this plan, known as the California Ocean Plan, in 1972. Over the years, the plan and Public Resources Code have been amended to bolster the protection of important coastal and marine areas. The California Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for regulation of wastes discharged into the state's coastal waters. The plan applies to point and nonpoint source discharges and the plan provides numeric and narrative water quality objectives for discharges to marine environments, including bacterial, physical, chemical, biological, and radioactivity standards for offshore water quality. For the most part, these standards, which are intended to protect aquatic resources, are more stringent than those for contact recreation, but are less stringent than those applied to drinking water to protect public health.

Other water quality objectives that provide some protection of biological resources include thresholds established from baseline conditions, such as that dissolved oxygen content shall not be less than 10% of what occurs naturally, as well as the pH shall not be more than 0.2 units from what occurs naturally. Nutrients shall not cause objectionable aquatic growths or degrade indigenous biota. Numeric standards are set for a wide variety of constituents. For biological characteristics, the plan states that marine communities shall not be degraded and that shellfish and fish must be fit for human consumption. Both the State Water Board and the six coastal Regional Water Boards implement and interpret the Ocean Plan. The California Ocean Plan identifies the applicable beneficial uses of marine waters. These beneficial uses include preservation and enhancement of designated ASBS, rare and endangered species, marine habitat, fish migration, fish spawning, shellfish harvesting, recreation, commercial and sport fishing, mariculture, industrial water supply, aesthetic enjoyment, and navigation. To date, 34 ASBS are classified within the state. Thirteen occur north of the San Francisco Bay, seven along the Central Coast, and the remaining 14 occur in southern California, 10 of which are islands.

3.5.2.4 Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, “waters of the state” fall under the jurisdiction of the appropriate Regional Water Board. The Regional Water Board must prepare and periodically update water quality control plans (basin plans). Each basin plan establishes numerical or narrative water quality objectives to protect established beneficial uses, which include wildlife, fisheries and their habitats. Projects that affect wetlands or waters of the state must meet discharge requirements of the Regional Water Board, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

4.0 ISSUES AND ALTERNATIVES TO THE PROPOSED PROJECT

4.1 INTRODUCTION

This section describes the major policy related issues identified and alternatives that have been considered by staff during the development of the Special Protections for Selected Storm Water and Nonpoint Source Discharges into Areas of Special Biological Significance. Each issue analysis contains the following sections:

> **Issue:** The section describes the major policy related issues identified and alternatives that have been considered by staff during the development of the Special Protections.
>
> **Issue Description:** A description of the issue or topic and (if appropriate) any additional background information, list of limitations and assumptions, description of related programs, or other information.
>
> **Alternatives:** For each issue of topic, at least two alternatives are provided for consideration. Each alternative is evaluated with respect to the program needs under state law including the California Water Code and the Public Resources Code.
>
> **Staff Recommendation:** In this section, a recommended alternative (or combination of alternatives) is identified and proposed for adoption by the State Water Board.

4.2 PROJECT ALTERNATIVES TO ADDRESS EXISTING DISCHARGES INTO ASBS

How should the State Water Board address existing discharges into ASBS in light of the Ocean Plan's prohibition on discharges into ASBS?

Issue Description: The Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for controlling point and nonpoint source discharges into ocean waters of the State. As described in detail in Section 3.0, the Ocean Plan has contained a prohibition of waste discharged to ASBS. In response to a 2000 petition submitted by Caltrans questioning the intent of the prohibition to include storm water, the State Water Board adopted Order WQ 2001-08 in which the State Water Board held that the ASBS discharge prohibition in the Ocean Plan applies to storm water discharges. The State Water Board also held that Caltrans coverage under a storm water permit did not relieve the discharger from complying with the Ocean Plan prohibition. These findings prompted the State Water Board to fund a statewide survey to assess the extent of storm water and nonpoint source discharges into ASBS. The survey identified 1,658 discharges (SCCWRP 2003). A majority of the discharges into ASBS were categorized as nonpoint source and permitted storm water discharges. None of the identified nonpoint source and permitted storm water discharges had been granted exceptions to the Ocean Plan.

Since the initial survey, the State Water Board adopted three individual exceptions for marine lab waste seawater and storm water runoff. These exceptions were granted to Scripps Institute of Oceanography in La Jolla, the University of Southern California's Wrigley Institute on Santa Catalina Island, and the University of California at Davis Bodega Marine Laboratory.

The remaining dischargers were notified by a letter in 2004 that stated they must cease discharging or apply for an Ocean Plan exception. Follow-up letters were sent in August 2005 to those respondents who requested exceptions, describing the exception process in greater detail. Currently, 27 parties have applied for an exception from the Ocean Plan ASBS waste discharge prohibition. While the State Water Board has the authority to grant exceptions that meet the criteria described in Section 3.2.1, there are alternative approaches that could be considered to address these discharges. Several alternatives, including the staff recommended alternative to pursue a general exception for select storm water and nonpoint source discharges into ASBS, are presented below.

Alternative A: No-Project Alternative (i.e., No Exception)

CEQA requires that the Water Boards consider the "No-Project" alternative. Under this No-Project alternative, the Ocean Plan prohibition against waste discharges into ASBS would continue to apply to all discharges into ASBS. The discharger could comply by terminating the discharge or by relocating the discharge so that the receiving water quality is unaffected. These actions could potentially have far greater impacts on the biological integrity of the ASBS then the discharge itself through demolition, excavation, and construction required to remove the existing discharge and redirect it away from the ASBS. In addition, the impacts on air quality and increased green house gas emissions would also be significant. For those dischargers faced with few practical options, enforcement actions could lead to protracted litigation.

Currently, the 27 applicants applying for this exception provide essential public services, including flood control, slope stability, erosion prevention, and maintenance of the natural hydrologic cycle between terrestrial and marine ecosystems, public health and safety, public recreation and coastal access, commercial and recreational fishing, navigation, and essential military operations (national security).

This alternative would not result in better water quality protection, nor does it benefit the environment, public health and welfare, or the Water Boards' ability to protect and restore beneficial uses. As a result, staff does not recommend adopting the "No-Project" alternative.

Alternative B: Amend the Ocean Plan's Prohibition to Allow Existing Discharges into ASBS under Special Conditions

The State Water Board could consider amending the Ocean Plan prohibition to allow existing storm water and nonpoint source discharges that meet specific criteria to discharge into ASBS. Under this alternative, special conditions would be proposed as new provisions in the Ocean Plan. These provisions could include:

- A prohibition on new discharge points
- A prohibition on non-storm water discharges inclusive of those discharged into storm water conveyance systems that are not otherwise authorized
- Wet weather runoff controlled to be as similar to naturally occurring streams as possible, and not to alter natural water quality in the ASBS
- An accelerated iterative process specifically implementing management practices that fully address discharges into ASBS
- Specific monitoring requirements to ensure protection of beneficial uses

In 2003 and early 2004, staff proposed similar amendments to the Ocean Plan; however, the proposed amendments were met with severe criticism from the regulated community, environmental advocacy groups, and U.S. EPA. The concept of amending the discharge prohibition to allow select discharges to continue under specific conditions challenged the concept of designating ASBS as areas deserving of special protection. Others felt the regulatory requirements would be overly burdensome and too difficult to meet. State Water Board staff believes that this alternative would continue to face stiff opposition and, if proposed, would require a significant commitment of resources to prepare planning documents based upon the issues raised and the written comments previously received. As a result, staff does not support this alternative at this time. However, this approach may be considered in the future after the special conditions in the exception are fully implemented and evaluated.

Alternative C: Implement Individual Exceptions for Each Storm Water and Nonpoint Source Discharger

As mentioned above, the State Water Board has adopted seven individual exceptions to date for sewage treatment, desalination brine, public aquarium, and marine lab discharges. State Water Board staff intends to continue the approach of implementing and reviewing individual exceptions for these types of point source discharges, because each facility is sufficiently different to warrant individual exceptions with individual special conditions. Only three marine laboratories/public aquariums remain to be issued exceptions.

There are 27 applicants for an Ocean Plan exception being addressed by this proposed exception. These applicants have a variety of activities but all primarily have in common permitted storm water or nonpoint source discharges. As such, the same special conditions and prohibitions are generally applicable to all of these entities. Granting individual exceptions for each entity would entail developing, noticing, and adopting an individual CEQA document and exception for each entity. With current staff resources, it is estimated that such an approach would take at least an additional three years (from the date of this document) to complete. That approach would delay protecting natural water quality in the ASBS during the time it would take to adopt individual exceptions for each of the 27 applicants. Furthermore, adopting individual exceptions for storm water and nonpoint source dischargers would be inefficient, taking up significant staff and Board Member time and resources.

Because this alternative would delay the protection of water quality in ASBS, would be inefficient, and would not provide any advantages, staff does not support this alternative.

Alternative D: Implement a General Exception for Selected Dischargers (Preferred Alternative)

Under this alternative, the State Water Board would adopt a general exception to the Ocean Plan discharge prohibition that would impose special conditions on the group of 27 storm water and nonpoint source dischargers who have applied for an exception. The proposed conditions could include: cessation of non-essential, non-storm water runoff; maintenance of natural water quality within ASBS, including during precipitation (design storm) events, by limiting wastes in storm water runoff and other activities that would otherwise cause a degradation of ocean water quality in the ASBS; and monitoring water quality and marine aquatic life within ASBS to ensure the protection of beneficial uses over time. Under this alternative, discharges must comply with all other applicable provisions of the Ocean Plan, including those provisions that maintain and protect natural ocean water quality and marine communities from pollution.

For dischargers subject to NPDES permits, prohibitions and special conditions collectively referred to as “Special Protections” for the ASBS, would be implemented through storm water management plans. For nonpoint source dischargers, the Special Protections would be implemented through a WDR, waiver, or conditional prohibition and a pollution prevention plan. All ASBS dischargers would continue to have three major requirements: (1) a continued prohibition of non-storm water discharges and runoff, with only certain exclusions; (2) wet weather runoff controlled so as not to violate “natural ocean water quality” in the ASBS receiving water; and (3) monitoring to ensure protection of beneficial uses. These three requirements of the Special Protections would be incorporated into each applicant's permit or WDR.

The Special Protections are intended to maintain the natural hydrologic cycle and coastal ecology by allowing the flow of clean precipitation runoff into the ocean, while preserving coastal slope stability and preventing anthropogenic erosion. The 27 applicants for this exception provide essential public services, including flood control, slope stability, erosion prevention, maintenance of the natural hydrologic cycle between terrestrial and marine ecosystems, public health and safety, public recreation and coastal access, commercial and recreational fishing, navigation, and essential military operations (national security). Therefore, the exception and the terms, prohibitions, and special conditions embodied in the Special Protections for ASBS are not only protective of beneficial uses, but are in the public interest as well.

The State Water Board's effort to address storm water and nonpoint source waste discharges into ASBS using the Ocean Plan exception process is nearly complete. Applicants have now applied for exceptions, providing the necessary information for staff to proceed. In addition, the State Water Board has held three public scoping meetings, and several stakeholder meetings, for the exception and has initiated a stakeholder effort to collaborate on ASBS regional monitoring. Continuing with the general exception process for storm water and nonpoint sources would meet statutory and Ocean Plan regulatory requirements; because the process is ongoing, it would be practical and efficient to continue. Discharges authorized by an NPDES permit (and WDRs or waivers for nonpoint sources) would be allowed, but under strict limiting conditions aimed at ensuring protection of receiving water quality and marine life.

This alternative, that proposes to adopt a general exception with the Special Protections for the group of 27 storm water and nonpoint source dischargers who have applied for an exception is the alternative recommended by Staff. The remaining issues and alternatives address conditions associated with this general exception.

Staff Recommendation: Adopt Alternative D, the general exception for 27 specific parties, with Special Protections for ASBS. Eliminate the other alternatives, (Alternatives A, B, and C) from further consideration.

4.3 ALTERNATIVES TO THE CONDITIONS IMPOSED UNDER THE GENERAL EXCEPTION

This section describes the major policy issues associated with the conditions imposed through the general exception identified in Alternative 4.2.D described above. The proposed Special Protections define the terms and conditions that will limit the storm water and nonpoint source waste discharges by the applicants to the affected ASBS.

The intent is to ensure that such discharges will be controlled to protect beneficial uses within ASBS and to protect and maintain the natural hydrologic cycle and coastal ecology. The conditions include: cessation of non-essential, non-storm water discharges and runoff; maintenance of natural water quality within ASBS, including during precipitation (design storm) events, by limiting wastes in storm water runoff and other activities that would otherwise cause a degradation of ocean water quality in the ASBS; and monitoring water quality and marine aquatic life within ASBS to ensure the protection of beneficial uses over time.

Discharges must comply with all other applicable provisions of the Ocean Plan. Natural ocean water quality must not be altered as a result of the discharge(s), and marine communities must be protected from pollution.

These terms and conditions are designed to address the applicants' waste discharges in a practical framework, acknowledging that the first priority controls are for higher threat discharges to the beneficial uses of ASBS. The compliance schedule in the Special Protections (provision of these mitigating terms and conditions) provides an action strategy for the applicants to achieve compliance with these terms and conditions.

The proposed Special Protections cover only those applicants discharging waste into an ASBS, who submitted an approved or conditionally approved exception application; the proposed Special Protections cover only the applicants' permitted storm water discharges and nonpoint source discharges.

4.3.1 Conditions imposed on Storm Water and Nonpoint Source Discharges

Issue: What conditions should be imposed upon discharges under the general exception?

Issue Description: Completely ceasing all discharges would interrupt the hydrologic cycle by removing storm water runoff and therefore fresh water flows into large sections of coastline, a situation that would be inconsistent with the natural ecology of these areas. In addition, the immediate cessation of discharges without a reasonable alternative would not be in the public interest because it may result in flooding, endangering health, safety, and property. However, allowing these waste discharges under current conditions is also not protective of natural ocean water quality, due to the potential and sometimes actual presence of pollutants in the runoff.

Alternative A: Allow Permitted Storm Water and Nonpoint Source Discharges with No Additional Conditions Beyond those in Existing Permits

As discussed in Section 3.0 and Section 4.2 above, allowing discharges into the ASBS would conflict with the Ocean Plan ASBS waste discharge prohibition and increase the risk of degradation to natural water quality and marine communities. The storm water NPDES permits require the discharger to develop and implement a SWMP or SWPPP with the goal of reducing the discharge of pollutants to the maximum extent practicable (MEP). However, reduction of pollutants to MEP is not adequately protective of natural water quality in ASBS.

NPDES storm water permits do not cover nonpoint source discharges. Except for the agricultural discharges at the Año Nuevo ASBS in the Central Coast Region (covered under the conditions of an Agricultural Waiver of Waste Discharge Requirements), no other nonpoint source discharges into ASBS are currently covered under a WDR or Waiver. Even in the case of the Año Nuevo ASBS agricultural runoff via State Park property, the conditions in the waiver are not adequately protective of natural water quality in ASBS.

Staff does not support this alternative, which would allow all discharges into ASBS under existing conditions that are not adequately protective of natural water quality in ASBS.

Alternative B: Allow discharges if limited by prohibitions and other special conditions beyond those in existing permits.

As mentioned above, it is ecologically important to maintain the hydrologic cycle, specifically the flow of fresh water from the terrestrial environment into the ocean. Therefore, some amount of storm water runoff should be allowed to continue. However, that storm water runoff should be clean, i.e., controlled to prevent pollution and alteration of natural water quality in the ASBS.

As discussed in Section 5.8.1, many of the current storm water runoff discharges tend to meet Ocean Plan objectives in the receiving water at least some of the time. However, some measured sites did not meet objectives when sampled; for example, approximately 25% of ASBS waters had measured concentrations of copper above the six-month median objective. Therefore, focused efforts will be required to control certain discharges to meet natural water quality in ASBS receiving waters within the proposed implementation schedule. These focused efforts may involve the installation of structural BMPs at the mouth of these discharges.

In order to prevent pollution from entering the ASBS, certain waste prohibitions must be maintained (e.g., prohibition on trash, which can harm marine life due to ingestion and entanglement). Any proposed or new storm water runoff discharge must be routed to existing storm water discharge outfalls and must not result in any new contribution of waste to an ASBS. “Existing storm water outfalls” are those that were constructed or under construction prior to January 1, 2005. “New contribution of waste” is defined as any addition of waste beyond what would have occurred as of January 1, 2005. Other limiting conditions should include that:

- The existing discharges are authorized by an NPDES storm water permit, or under WDR, a conditional waiver of WDR, or a conditional prohibition;
- The existing discharges comply with all of the applicable terms and conditions contained in the Special Protections;
- The existing discharges must be essential for flood control or slope stability, including roof, landscape, road, and parking lot drainage, and are designed to prevent soil erosion;
- The existing discharges of runoff occur only during wet weather; and
- The existing discharges of runoff are composed of only storm water runoff.

Because this alternative provides greater protection for ASBS, staff is recommending this alternative.

Staff Recommendation: Alternative B - Allow discharges if limited by prohibitions and other special conditions beyond those in existing permits.

4.3.2 <u>Non-storm water runoff</u>

Issue: Should non-storm water runoff (e.g., dry-weather flows) be allowed under the Special Protections?

Issue Description: Generally, dry weather flow surface runoff accounts for a significant portion of the total mass of contaminants that enter the coastal ocean waters. Dry weather flows, which may occur during summer or winter dry seasons, often originate from multiple anthropogenic sources that may include groundwater from pumping and dewatering, swimming pool drainage, dehumidifier or HVAC condensates, and excess runoff from landscape irrigation. Such flows have the potential to mobilize household, industrial, and construction site wastes, used crankcase oil, pesticides, and bacteria and carry them untreated to the ocean through storm drains, streams and/or other conveyance systems. Thus, the potential for environmental impact is high. In addition, dry weather flow in storm drains and nonpoint source conveyances does not usually represent a natural hydrological condition in California.

Existing permitted storm water municipalities incorporating changes to address dry-weather flows can consider updating local ordinances and codes, reviewing and adjusting the General Plan, and updating existing policies and procedures. Additional funds and resources may also be required to ensure BMPs are maintained after the projects are complete through increases in inspections and education. BMPs that could trigger or benefit from ordinance modification in one or more agency jurisdiction include dry weather flow diversions. Dry weather flow diversion devices direct flow through a pipe or channel to a local municipal sanitary sewer system for conveyance and treatment at a local wastewater treatment plan during dry weather. Implementing dry weather flow diversions should be considered where the diversion is reasonably close to a sanitary sewer system, if cost effective to implement, and the sanitary sewer authority is willing to accept the flow during the dry season.[5]

Other measures could be implemented to prevent dry weather flows from permitted storm drain systems or nonpoint sources. These may include, but are not limited to, public education, installation of swales for intercepting flows prior to reaching the ASBS, and installation of other low impact development (LID) solutions.

Staff has also identified actual or potential situations in which groundwater seepage into storm drains may result in minor dry weather flows that are beyond the ability of the applicants to control. Staff believes that most, if not all, of this seepage is shallow groundwater resulting from precipitation infiltrating and raising the groundwater table. Inflow through cracks in drain pipes results in seepage into the storm drains. These flows are very minor and do not usually persist throughout the year.

Alternative A: Allow all non-storm water runoff.

Allowing all non-storm water runoff would conflict with the intent of the Ocean Plan to prevent the alteration of natural water quality within ASBS. Dry weather flows are frequently caused by human activities that can introduce pollutants into receiving waters, and in high-density areas result in significant waste discharge flows when not properly controlled. Staff does not support this alternative.

Alternative B: Do not allow non-storm water runoff.

Prohibiting all non-storm water runoff is impractical, especially when considering the number of discharges identified and the impact that this alternative could have on essential public utilities, emergency response actions, structural stability, or slope stability. Proposing this alternative would not benefit the public interest, because certain non-storm water runoff essential for environmental protection, public services, and public health and safety would be prohibited.

Alternative C: Allow only non-storm water runoff that is essential for emergency response purposes, structural stability, or slope stability, and discharge(s) associated with incidental groundwater seepage.

This alternative would allow only non-storm water runoff that is essential for environmental protection, public services, and public health and safety. This alternative

[5] Most Publicly Owned Treatment Works (POTWs) were not designed and constructed with sufficient excess dry weather flow capacity to accept dry weather flow discharges. Further, POTWs were constructed with development fees and operated and maintained with sewer connection charges. On-going operating and maintenance costs would need to be assessed to these dry weather diversion projects.

would define the discharges and those specific types that could be discharged through a storm water system in accordance with the general exception. All other discharges of non-storm water would be in violation.

Staff is proposing the terminology “Discharges of non-storm water runoff” that would be defined as: any waste discharge from an MS4 (or other NPDES permitted storm drain system), or from nonpoint sources, to an ASBS that is not composed of storm water. The following non-storm water discharges should be allowed, provided that the discharges are essential for emergency response purposes, structural stability, slope stability, or involve incidental groundwater seepage:

- Discharges associated with emergency fire fighting operations.
- Foundation and footing drains.
- Water from crawl space or basement pumps.
- Hillside dewatering.
- Naturally occurring groundwater seepage via a storm drain.

Authorized non-storm water discharges shall not be allowed to cause or contribute to a violation of the water quality objectives in Chapter II of the Ocean Plan nor alter natural ocean water quality in an ASBS. All other non-storm water runoff should be strictly prohibited.

A concern brought up in stakeholder meetings was construction dewatering. Upon consideration, staff does not believe that construction dewatering is essential for emergency response purposes, structural stability, or slope stability. Construction dewatering is a result of a coastal development project that would need to get permits and approvals, including coverage under an NPDES permit. This in turn would require compliance with water quality standards. Therefore, construction dewatering would continue to be prohibited from discharges into ASBS. Because this alternative attempts to balance the need for essential discharges with the intent to protect natural water quality, staff recommends this alternative for consideration by the State Water Board.

Staff Recommendation: Alternative C - Allow only non-storm water runoff that is essential for emergency response purposes, structural stability, or slope stability and incidental groundwater seepage.

4.3.3 <u>Military Training Discharges</u>

Issue: Should military training discharges be included in the exception?

Issue Description: The U.S. Navy operates at San Nicolas (SNI) and San Clemente (SCI) Islands for national security purposes, including training activities involving live ordinance. The use of military ordinance is obviously harmful to marine life, results in accumulations of pollutants on the sea floor, and may result in accelerated erosion from coastal cliffs. At SCI, training activities can involve explosives, naval gunnery target practice, discharges from small arms fire (collectively referred to as use of military ordinance), and amphibious vehicular/vessel activity on the shore. There are many places at SCI where this activity takes place, including but not limited to the Shore Bombardment Area (SHOBA) Operations and Basic Underwater Demolition/SEALs (BUD/S) locations. Missile launching is performed at SNI, and portions of the expended missiles are known to fall into the adjacent portion of that ASBS. All other locations on SCI and SNI are considered off limits for this type of activity as unexploded ordinance or off range live fire would represent a critical safety hazard to base personal.

Military operations have been ongoing at these islands before the ASBS were designated. These islands represent highly unique locations for many military test and training operations due to the close proximity to major bases located on the mainland while isolated far from large population centers to maintain public safety and national security. Currently, these islands are the only Navy facilities in the contiguous U.S. where these types of training activities can be conducted safely and routinely. As a result, these operations are considered essential to maintain operational readiness and national security.

Alternative A: Enforce the ASBS prohibition for all discharges of military ordinance for training purposes in ASBS waters. Staff does not recommend this alternative be pursued given the unique national security role these facilities provide.

Alternative B: Include the discharge of military ordinance in the exception, subject to prohibitions and limiting conditions. The discharge of explosives in ASBS waters at military closure areas in the vicinity of Wilson Cove and Castle Rock at SCI would be prohibited. At SNI, with the exception of discharges from missile operations, no other discharges of explosives or deposition of waste ordinance is allowed within ASBS waters. Discharges must not result in a violation of the water quality objectives, including the protection of the marine aquatic life beneficial use, anywhere in the ASBS.

Staff Recommendation: Alternative B, including discharges of military ordinance in the exception subject to prohibitions and limiting conditions. Military discharges would continue to be conditioned on compliance with water quality objectives everywhere in the ASBS.

4.3.4 Miscellaneous Point Source Discharges

Issue: Should point source discharges from sinks and fish cleaning stations be allowed under the General Exception?

Issue Description: Sinks and fish cleaning stations constitute non-storm water discharges, and are point sources of wastewater. Surface discharges of graywater and fish offal constitute waste discharges that alter natural water quality, and result in accumulations of organic matter in the ASBS. A fish cleaning station with a direct point source discharge of fish offal is located at Shelter Cove (King Range ASBS). Staff is also aware of a sink with a direct point source discharge at the marine mammal training Naval Ordnance Test Station (NOTS) pier on SCI. These discharges to ASBS surface waters are considered as non-essential because other options exist, such as collecting fish offal and transporting off-site for land disposal, and the use of onsite storage or treatment systems below ground for fish offal and graywater. This has been accomplished at Gerstle Cove ASBS, Salt Point State Park, that now utilizes a below ground storage tank.

Alternative A: Include point source discharges from sinks and fish cleaning stations into ASBS surface waters in the exception.

Alternative B: Do not include waste discharges from sinks and fish cleaning stations into ASBS in the exception.

Staff Recommendation: Alternative B, do not include waste discharges from sinks and fish cleaning stations into ASBS in the exception. This alternative will maintain the prohibition of waste discharges from sinks and fish cleaning stations into ASBS.

4.3.5 Monitoring and Compliance

Issue: How should ASBS monitoring be best performed?

Issue Description: Typically, major dischargers to coastal waters, such as POTWs, have provided the bulk of monitoring data on ocean receiving waters. Point source dischargers implement self-monitoring programs under NPDES permits that are designed to assess compliance with effluent and receiving water limitations. Resource agencies and some federal programs also provide monitoring data. Generally, these monitoring efforts have been the primary mechanism by which regulatory agencies, resource managers, and permitted dischargers have evaluated the condition of the ocean receiving water and effluent. However, this type of monitoring, with primary focus on major dischargers, has resulted in acknowledged data gaps and the lack of coordinated coast wide information. Further, these efforts in general were not designed to assess compliance with the Ocean Plan prohibition against waste discharge to ASBS and the goal to maintain natural water quality in ASBS.

Regional monitoring efforts, in contrast to individual discharger monitoring programs, can provide a greater awareness of the regional nature of environmental stressors and impact, and a greater knowledge of the interactions between localized sources of anthropogenic impact and larger-scale environmental processes (e.g., El Nino, Pacific Decadal Oscillation) and the role of terrestrial runoff and storm water plumes on the nearshore coastal zone. A regional scale monitoring program can provide information that focuses on key indicators and processes, and ensures a cost-effective approach to assessing conditions in the ASBS.

There are existing regional monitoring programs in the state. The Regional Monitoring Program in San Francisco Bay assesses each major permitted discharger into the Bay; fees are based on the dischargers' loadings to the Bay of key contaminants. These fees are combined and used to support the regional monitoring, data analysis, and reporting activities carried out by the San Francisco Estuary Institute.

The Central Coast Long-term Environmental Assessment Network (CCLEAN) program in Monterey Bay is currently funded by four POTW agencies with ocean discharges. One of these POTWs discharges into the Carmel Bay ASBS.

The Southern California Bight Program is coordinated by SCCWRP and is funded with a combination of in-kind support and monetary contributions from participants, much of which is made available as the result of periodic compliance monitoring offsets.

While the Ocean Plan gives background concentrations in Table C, these concentrations are intended to be representative of ocean water quality in deeper water where the POTW discharges are often located. Table C does not represent nearshore or surf zone natural water quality, especially during storm conditions with suspended bottom sediment and nearshore natural runoff. The State Water Board's Surface Water Ambient Monitoring Program (SWAMP) has provided funding to SCCWRP to determine the range of natural water quality in the nearshore environment, and to help develop statewide and regional efforts to monitor ASBS for comparison to those levels of natural water quality. To date, the groundwork has been set for regional monitoring in three sections of the state (southern, central, and northern), and regional ASBS monitoring has been initiated as part of the Bight 08 program. Furthermore, statewide random monitoring has been initiated in ASBS to determine water quality in ASBS areas with direct discharges and without.

Staff firmly believes that the best approach for understanding the effects of discharges is a regional monitoring approach using methods and protocols consistent with other regional efforts across the State. There are significant benefits associated with regional monitoring groups some of which include:

- Access to greater resources,
- Variety of expertise and experience amongst the members,
- Increased cost effectiveness through cost sharing and in kind services, and
- Greater flexibility or ability to respond to new findings or needs.

The use of consistent methods and protocols also provides many advantages. When consistent methods and protocols are employed, the resulting data can be compared and integrated across broad spatial scales and across programs, greatly increasing the overall utility of the data.

However, there may be some instances where an individual is unable or unwilling to join a regional monitoring group. Under this scenario, the individual discharger must adhere to prescriptive monitoring conditions in the Special Protections in order to assure the adequacy of that individual program.

Alternative A: Require all applicants to participate in a regional monitoring program. Under this alternative, all monitoring would occur under the Regional Monitoring Program. Each regional monitoring group would be responsible for sampling reference areas for natural water quality and, in addition, for evaluating the impact of discharges on the receiving water.

Alternative B: Allow applicants to choose either an individual monitoring program or to participate in a regional monitoring program. Although Alternative A, requiring participation in a regional monitoring group, provides many advantages over individual efforts, there may be some instances where an individual is unable or unwilling to join a regional monitoring group. As a result, staff believes that the type of receiving water monitoring, individual or regional, should be a decision made by the applicant.

However, if an individual monitoring program is chosen, the discharger must adhere to prescriptive monitoring conditions in the Special Protections in order to assure the adequacy of that individual program. Therefore, conditions contained in the Special Protections allow for the applicant to select an individual monitoring program or join a regional monitoring program.

Staff Recommendation: Alternative B, Allow applicants to choose either an individual monitoring program or to participate in a regional monitoring program.

4.3.6 Design Criteria for Structural Best Management Practices

Issue: What design criteria should be required of structural BMPs?

Issue Description: The cost of wet weather treatment systems and consideration that these systems may be physically incapable of handling some large wet weather events are major concerns. Engineers need a target control level to design a structural BMP to meet water quality needs.

Selecting the optimal storm size represents the first step toward the construction of effective structural BMPs. It is frequently impractical and not cost effective to plan and construct a structural BMP for the largest storm possible. Does one select the 100-year storm or the 1,000-year storm? In either case, such storm events do not have a high likelihood of happening in the near term. Staff believes that it is better to select a design storm that represents more typical conditions, so that runoff from the majority of storms is controlled to reduce waste discharges to minimal levels. A storm of one inch of precipitation per day should be the minimum design criteria, which would be consistent with design criteria in MS4s throughout the state. However, a BMP should not be constructed in such a way that will result in blockage at higher flows, divert water away from the main channel, or increase the risk of flood damage or loss of life.

BMP effectiveness is another important design consideration. Target concentrations could be obtained from the Ocean Plan. Those values presented in Table B, measured as instantaneous maximum chemical concentrations for the protection of marine life, are appropriate in this role, as these values were adopted to protect aquatic life in marine waters of California. Based upon baseline chemical water quality data evaluated to date, these targets appear achievable as most discharges sampled met those concentrations. Instantaneous maximums are appropriate because storm water runoff is highly episodic and brief in duration.

BMP effectiveness can also be evaluated by reduction of discharge flow. Dischargers have suggested that BMPs be designed to reduce flows by percolating the majority of the runoff into the ground; staff has considered this approach as well. This approach addresses overall pollutant loading by reducing flows rather than reducing concentrations. As design criteria, staff is recommending a reduction in flow equal to 90%.

Alternative A: Set a design criteria of Ocean Plan Table B for all storm events.

Alternative B: Set a design criteria of Ocean Plan Table B for typical storm events.

Alternative C: Set a design criteria of volumetric reductions for all storm events.

Alternative D: Set a design criteria of volumetric reductions for typical storm events.

Alternative E: Allow flexibility for the discharger to choose either Ocean Plan Table B or volumetric reductions for typical storm events. Staff believes that the goals of meeting compliance would be best served by allowing flexibility to address discharge conditions on a case-by-case basis. Therefore, staff recommends this alternative, to allow either a concentration approach using Table B Instantaneous Maximum or a volumetric reduction of 90% from baseline flow, and a design storm of one inch of precipitation per day, or in some instances, the design storm identified in MS4 permits as applicable to the Responsible Parties identified herein.

Staff Recommendation: Alternative E - Allow flexibility for the discharger to choose either Ocean Plan Table B Instantaneous Maximum concentrations or volumetric reductions of 90%, and a design storm of one inch per day.

4.3.7 Compliance Schedule

Issue: When should final compliance be determined?

Issue Description: Storm water management plans and other equivalent planning documents require considerable thought on the part of the discharger, considering a multitude of factors. Typically, these planning documents must then be approved by their respective management bodies, and approved by Regional Water Boards. Implementation of certain nonstructural BMPs may be relatively quick, but structural BMPs require further planning, design, permitting, and construction, and therefore may take some time to implement.

From an environmental protection perspective, it would be preferable for all ASBS discharges to achieve the condition to maintain natural water quality in ASBS immediately, but this could be difficult due to the reasons described above. The storm water and nonpoint source programs typically use an iterative approach to achieving compliance, which may last for more than one permit cycle. However, discharges to

ASBS are not typical discharges in that they clearly violate the Ocean Plan and put sensitive and significant biological communities at risk.

Staff does not believe that compliance should be required immediately nor does staff believe that an iterative approach is appropriate. Staff originally considered requiring the storm water management plans or other equivalent pollution prevention plans to be completed in six months, but staff has reconsidered based on comments received during stakeholder meetings. Staff has modified the draft Special Protections to allow one year for completion and submittal of the storm water and other pollution prevention planning documents.

Regarding final compliance, staff continues to believe that full compliance can be accomplished by addressing and controlling the highest threat discharges within a four-year period from the effective date of the General Exception.

Alternative A: Require immediate compliance.
Alternative B: Use an iterative compliance approach without fixed compliance deadlines.
Alternative C: Require compliance within a four year period.

Staff Recommendation: Alternative C - Require compliance within a four year period.

4.3.8 Compliance Monitoring

Issue: Should compliance monitoring rely on effluent or receiving water data, or both?

Issue Description: The special protections proposed for specific storm water discharges would allow some minimum amount of waste to be discharged during storm events, however, the discharges are required to maintain natural water quality. In order to evaluate a discharge's potential effect on receiving waters, samples may be collected of the effluent, described as "end of pipe", within the receiving water after mixing has occurred or through a combination of both. Staff held several stakeholder meetings, attended by the regulated community, environmental advocacy groups, scientists, and Regional Water Board staff, where considerable discussion occurred on the issue of how compliance should be measured. The stakeholders agreed that compliance should ultimately be measured in the receiving water by comparison to natural ocean water quality. Under this scenario, natural water quality is defined qualitatively and the range of concentrations and conditions is determined at reference stations, taking into account natural changes to water quality that occur as a result of the storm event.

However, there may be cases when the receiving water monitoring results indicate that natural water quality is not attained, but effluent monitoring indicates that the discharger is not causing or contributing to the receiving water exceedance. In such cases, when the discharger is not contributing to pollutant loading (i.e., discharging waste) into the ASBS, then the effluent monitoring data and oceanographic observations could be considered by Regional Water Boards to ascertain compliance.

Alternative A: Require each discharger to conduct effluent monitoring to determine compliance.

Alternative B: Require each discharger to comply by achieving natural ocean water quality as measured in the receiving water. Staff believes that compliance is best measured within the receiving water. However, staff recommends that core monitoring include effluent monitoring so that the loading and water quality characteristics of the discharges are well understood.

Staff Recommendation: Alternative B - Compliance with the ASBS special protections requiring each discharge to meet "natural ocean water quality" shall be measured in the ocean receiving water.

5.0 ENVIRONMENTAL BASELINE

This subsection presents the existing environmental conditions throughout the state as appropriate for the specific topic area, in accordance with California Environmental Quality Act Guidelines (State CEQA Guidelines) Section 15125. The discussions of the environmental setting focus on information relevant to the issue under evaluation.

5.1 ASBS DESCRIPTIONS

5.1.1. Redwoods National Park

The Redwoods National Park lies along the coast of northwestern California in Humboldt and Del Norte Counties. Inland, a series of overlapping jurisdictions include Federal Park Lands and three California State Parks: Jedediah Smith Redwoods State Park, Del Norte Coast Redwoods State Park, and Prairie Creek Redwoods State Park. The coastal boundaries of Redwoods National Park are just south of Crescent City in the north (41°44.1' north latitude, 124°9.5' west longitude) and just to the north of Stone Lagoon in the south (41°15.7' north latitude, 124°5.7' west longitude) (SWRCB 1981). The Redwoods National Park ASBS encompasses 62,643 acres (97.88 mi^2; 253,510,283 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 35.9 miles (57.826 km), encompassing about 2.31% of California's coastline[6].

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it has a variety of intertidal and subtidal habitats; (3) high turbidity of coastal waters has resulted in the development of an unusual assemblage of plants and animals unique to this area of the California coast; (4) this area has large stocks of annual flora; (5) sea stars *Solaster simpsoni* and *S. dawsoni* are common in this region, but no where else in California; (6) intertidal biota is transitional in character with both boreal and temperate marine elements.

5.1.2 Trinidad Head

The Kelp Beds at Trinidad Head ASBS is located at approximately 41°03'15" north latitude, 124°08'10" west longitude, which is 28 miles (45 km) north of Eureka, California

[6] The estimates of the areas, lengths, and percent of the coastline provided below are from the 1:24,000 scale coastline GIS layer "coastn27" from the State Lands Commission 1994, including the Northern and Southern Channel Islands, Ano Nuevo Island, Bird Rock, and the larger Farallon Islands. The estimates of percent of California coastline is based on a coast length of 1556 miles at a scale of 1:24,000, and does not include San Francisco Bay, other enclosed bays and inlets, or small coastal rocks/islands.

and encompasses areas both north and south of Trinidad Head. The northern area is fully exposed to winds and waves, while the southern area is semi-exposed because of the sheltering effects of Trinidad Head (SWRCB 1979). The ASBS encompasses 297 acres (0.46 mi^2; 1,201,206 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 1.8 miles (2.947 km), encompassing about 0.12% of California's coastline.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it has a diversity of intertidal habitat types, with close assemblage and association of seabirds, marine mammals, and intertidal plants and animals, and the dense beds of bull kelp; (3) there is an abundance of brown seaweed, *Cystoseira osmundacea*, a diverse population of intertidal algae and other major plant material producers in the nearshore zone; (4) a lack of abundant herbivore populations related to the presence of large amounts of silt in the water for a substantial period each year or lack of suitable habitat, particularly for juveniles within the ASBS; (5) the sea strawberry, *Gersemia rubriformis*, is commonly found, as well as intertidal presence of *Cnemidocarpa finmarkiensis*; (6) there are dense beds of *Nereocystis luetkeana*, which are uncommon in many areas of the State.

5.1.3 King Range

The King Range ASBS lies between the mouth of the Mattole River to the north (40°17'45" north latitude, 124°52'37" west longitude) and a point near Whale Gulch to the south (39°52' 37" north latitude, 123°58'34" west longitude). Most of the coastline is in Humboldt County, with approximately 4.5 miles (7.2 km) at the southern end of the area in Mendocino County. Two towns of small size are near the ASBS: Garberville, 18 miles (29 km) east of the coastline at Point Delgada, and Petrolia, 5.5 miles (8.8 km) from the mouth of the Mattole River (SWRCB 1979).

The coastline is impassible at several points during high tides, but can be negotiated at almost all points during low tides. Except for an all-weather road to the Shelter Cove development on Point Delgada, travel along the coastline is by foot or four-wheel drive vehicle. From the mouth of the Mattole River to the southern border, 30.2 miles (48.3 km) of coastline (exclusive of offshore rocks) lies within the King Range National Conservation Area (SWRCB 1979). The ASBS encompasses 25,055.5 acres (39.15 mi^2; 101,395,704 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 32.7 miles (52.621 km), encompassing about 2.10% of California's coastline.

A Marine Protected Area (MPA), the Punta Gorda State Marine Reserve, overlaps the King Range ASBS in about ¼ square-miles (0.64 km^2) in the northwest corner of the ASBS.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) this is a remote area with very little human activity present; (3) most of the coastal area is fully exposed to wave impact, causing only the hardiest intertidal species to be successful in survival in the littoral zone; (4) in Shelter Cove, a highly diverse intertidal biota is encountered; (5) mussel beds and associated intertidal habitats are more extensive and better developed than at any other location in Humboldt and Del Norte counties and also experience the most severe of impacts caused by human activities; (6) bladder kelp, *Macrocystis integrifolia*, is present both at the northerly intertidal limits and afloat at Shelter Cove.

5.1.4 Jughandle Cove

The Jughandle Cove ASBS is located in Mendocino County, California at approximately 39°22’45” north latitude, 123°49'15” west longitude, and is 5 miles (8.04 km) south of Fort Bragg on California State Highway 1 (Highway 1) (SWRCB 1981). The ASBS encompasses 203 acres (0.32 mi^2; 822,094 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 1.5 miles (2.479 km), encompassing about 0.10% of California’s coastline.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it may include the northern extent of the ranges of the puffball sponge, *Tetilla arb*, the honeycomb worm, *Phragmatopoma californica*, and the compound ascidian, *Polyclium planum*.

5.1.5 Saunders Reef

The Saunders Reef ASBS is located in southern Mendocino County along the northern coast of California (38°51' north latitude, 123°40' west longitude), 4.6 miles (7.5 km) southeast of the town of Point Arena. The small town of Anchor Bay is located 5 miles (8 km) to the south. The exposed portion of the reef occurs in the south-central portion of the ASBS, approximately 0.6 mile (1 km) west of Saunders landing and is marked by a navigation buoy. Cliffs, up to 100 feet (30 m) high, border the eastern mean high tide boundary and Highway 1 parallels the ASBS near the edge of the cliffs (SWRCB 1980). The ASBS encompasses 730 acres (1.14 mi^2; 2,953,786 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 1.6 miles (2.559 km), encompassing about 0.10% of California’s coastline.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) localized high population densities and large size of individual red abalone, offshore reef surrounded by a bull kelp, *Nereocystis luetkeana*, forest; (3) this area is relatively undisturbed by humans.

The designation was recommended by the Regional Water Board and supported by DFG. No opposition to this designation was submitted.

5.1.6 Del Mar Landing

The ASBS encompasses 53 acres (0.08 mi^2; 213,112 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 0.6 miles (0.961 km), encompassing about 0.04% of California's coastline. Del Mar Landing ASBS is entirely overlapped by Del Mar Landing State Marine Park.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) to preserve land, or land and water areas in a natural condition and to protect the aquatic organisms and wildlife found here for public observation and study. The designation was recommended by the Regional Water Board and supported by DFG. No opposition to this designation was submitted.

5.1.7 Gerstle Cove

The Gerstle Cove ASBS is located in Sonoma County at about 39°33'57" north latitude and 123°19'45" west longitude. The nearest towns are Gualala, located about 20 miles (32 km) north on Highway 1, and Jenner, located about 23 miles (37 km) south on Highway 1 (SWRCB 1979). The ASBS encompasses 10 acres (0.02 mi^2; 39,754 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 0.6 miles (0.961 km), encompassing about 0.04% of California's coastline.

The ASBS encompasses the Salt Point State Park and State Marine Conservation Area, a MPA designated by DFG.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it is a relatively pristine cove that is representative of the natural marine environment of Sonoma County.

The designation was recommended by the Regional Water Board and DFG. This is inclusive of a reserve and underwater park for the use of divers and nature observers.

5.1.8 Point Reyes Headlands

The Point Reyes Headlands ASBS is located in Marin County, California. The area is situated entirely within the boundary of the Point Reyes National Seashore Park. The Headlands site is 11 miles (17.6 km) from the nearest town, Inverness (SWRCB 1980). The ASBS encompasses 1,047 acres (1.64 mi^2; 4,237,491 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 4.8 miles (7.720 km), encompassing about 0.31% of California's coastline.

In 1972, DFG declared the Point Reyes Headlands as a Marine Life Reserve. Since then, the Point Reyes Headlands has had the reserve status protection and all marine life has been protected from human collecting and fishing activities. The Point Reyes State Marine Conservation Area is entirely overlapped by the Point Reyes Headlands ASBS. The MPA and ASBS share the same boundary along the coastline. The oceanic boundaries are parallel to the shore and to each other, though the MPA boundary extends about ¼ mile off the coast and the ASBS boundary extends about ½ mile off the coast.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) the subtidal community at the ASBS is one of the most diverse in the San Francisco Bay region; (3) the intertidal zone has great species diversity including California mussel, gooseneck barnacles, acorn barnacles, and red abalone.

The designation was recommended by the Regional Water Board and supported by the Point Reyes Bird Observatory. No opposition to this designation was submitted.

5.1.9 <u>Duxbury Reef</u>

The Duxbury Reef ASBS is located near the town of Bolinas in Marin County, approximately 14 nautical miles (26 km) northwest of San Francisco. The ASBS is located within 37°53' to 37°56' north latitude, 122°44' west longitude. The center of the municipality of Bolinas is located approximately ¾ mile (1.2 km) from the Agate Beach entrance to Duxbury Reef. Subdivisions extend much closer, with some homes actually overlooking the reef from the surrounding mesa. The reef lies at the base of a high headland, called the Bolinas Mesa. According to contours shown in the most recent geologic map of the Point Reyes Peninsula, there are at least 8,320 acres (33,669,845 m^2) of watershed providing drainage to the ASBS (SWRCB 1979). The ASBS encompasses 876 acres (1.37 mi^2; 3,543,446 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 3.4 miles (5.0 km), encompassing about 0.22% of California's coastline.

The Duxbury ASBS is almost entirely overlapped by the Duxbury Reef State Marine Conservation Area. The MPA and ASBS share most of their boundaries along the coastline, but the northern boundary of the ASBS extends about 1/16 mile north of the MPA boundary. The south-eastern coastal boundary of the MPA extends about 1/8 mile beyond the ASBS boundary. Oceanic boundaries are parallel to the shore and to each other, though the MPA boundary extends about ¼ mile off the coast and the ASBS boundary extends about ½ mile off the coast.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it contains a rich intertidal biota which has several unique components of sea slugs, rock inhabiting clams and worms, a rare burrowing anemone, and a unique acorn worm; (3) it is the largest shale reef in California.

The ASBS designation was recommended by the Regional Water Board and supported by DFG and Dr. Gordon Chang. No opposition to this designation was submitted.

5.1.10 James V. Fitzgerald

The James V. Fitzgerald ASBS is a strip of exposed coastline with adjacent intertidal reefs, extending from the westerly extension of the centerline of Fourth Street in Montara in the north to Pillar Point breakwater in the south (SWRCB 1979). The ASBS encompasses 518 acres (0.81 mi^2; 2,097,013 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 5.5 miles (8.784 km), encompassing about 0.35% of California's coastline.

The James V. Fitzgerald ASBS is entirely overlapped by the James V. Fitzgerald State Marine Park, though the southern ASBS boundary extends around Pillar Point, whereas the MPA boundary ends at the point.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) dense stands of bull kelp are found along with red algae; (3) there is a diverse array of invertebrates that inhabit the broad reefs such as sea stars, starfish, crabs, chitons, and purple urchins; (4) there are three types of subtidal habitat.

The ASBS designation was recommended by the Regional Water Board and supported by DFG, Department of Parks and Recreation (DPR), and the Sierra Club. No opposition to this designation was submitted.

5.1.11 Año Nuevo

The Año Nuevo ASBS is situated along the central California coast in San Mateo County (approximately 37°06' north latitude, 122°20' west longitude) near the San Mateo-Santa Cruz County Line. The nearest town, Davenport, is 9.7 miles (15.5 km) to the south of the ASBS. Pescadero is 14.4 miles (23 km) north of the ASBS. Other towns near the ASBS are Half Moon Bay, 35 miles (56 km) to the north and Santa Cruz, 25 miles (40 km) to the south. Within the ASBS boundary is the Año Nuevo State Reserve (SWRCB 1981). The ASBS encompasses 13,560 acres (21.19 mi^2;

54,875,399 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 4.9 miles (7.847 km), encompassing about 0.31% of California's coastline.

Approximately half of the Año Nuevo State Marine Conservation Area overlaps with the Año Nuevo ASBS. The ASBS, which extends about 3½ miles (5.63 km) offshore, is overlapped along ¾ of coastal boundary by the MPA, which extends about ¼ mile (0.4 km) offshore.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages, with large and highly diverse marine invertebrate populations that are very unique and not present at any other mainland ASBS site; (2) thousands of marine birds and mammals utilize the site as a breeding and feeding habitat.

5.1.12 <u>Pacific Grove</u>

The Pacific Grove ASBS is oriented in a northwest-southeast direction, adjacent to the town of Pacific Grove in Monterey County. For purposes of description, the ASBS is considered to lie along an east-west axis. The western seaward boundary of the ASBS is at 36°38'36" north latitude, 121°55'42" west longitude and is a seaward extension of Asilomar Avenue. The eastern seaward boundary is at 36°37'24" north latitude, 121°53'54" west longitude and is a seaward extension of Eardley Avenue. Land areas are only south of the ASBS, and offshore bay waters are north of the ASBS (SWRCB 1979). The ASBS encompasses 469 acres (0.73 mi^2; 1,898,526 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 3.2 miles (5.120 km), encompassing about 0.20% of California's coastline.

The ASBS overlaps with the Pacific Grove Marine Gardens State Marine Conservation Area.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it has dense beds of giant kelp *Macrocystis pyrifera*; (3) surf grass dominates large areas; (4) endangered sea otters forage in this area.

5.1.13 <u>Carmel Bay</u>

The Carmel Bay ASBS is located in Monterey County, immediately adjacent to the town of Carmel. The ASBS is south of the Monterey Peninsula, just north of the Santa Lucia mountain range, and west of the Carmel Valley. Pescadero Point, the northern boundary of the ASBS, is located at 36°34' north latitude, 121°57' west longitude; Granite Point, the southern boundary, is located just north of Point Lobos at 36°31' north latitude, 121°56' west longitude. The seaward boundary of the ASBS is formed by a straight line drawn between Pescadero and Granite Points; the landward boundary is the mean high tide line (SWRCB 1979). The ASBS encompasses 1,584 acres (2.48

mi^2; 6,411,404 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 6.7 miles (10.756 km), encompassing about 0.43% of California's coastline.

The Carmel Bay ASBS is entirely overlapped by the Carmel Bay State Marine Conservation Area.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) the intertidal zone is a valuable educational resource, due to the high biodiversity and excellent access.

5.1.14 Point Lobos

The Point Lobos ASBS is located at about 30°10' north latitude, 121°45' west longitude, within Monterey County, California. The closest town is Carmel, located immediately upcoast on Highway 1. The Point Lobos ASBS is adjacent to the Point Lobos State Natural Reserve (Park) and is entirely overlapped by the Point Lobos State Marine Conservation Area. The ASBS encompasses 691 acres (1.08 mi^2; 2,795,439 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 9.4 miles (15.131 km), encompassing about 0.60% of California's coastline.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) a variety of marine mammals are present within the ASBS throughout the year, including the threatened Stellar Sea Lion (*Eumetopias jubatus)*.

5.1.15 Julia Pfeiffer Burns

The Julia Pfeiffer Burns ASBS is located at about 30°10' north latitude, 121°45' west longitude, within Monterey County, California. The closest town is Carmel, located about 35 miles (56.327 km) up the coast on Highway 1 (SWRCB 1980). The ASBS encompasses 1,743 acres (2.72 mi^2; 7,052,623 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 3.7 miles (6.020 km), encompassing about 0.24% of California's coastline.

The Julia Pfeiffer Burns ASBS is entirely coincident with the Julia Pfeiffer Burns State Park.

The ASBS was designated for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it is a biologically rich portion of the California coast.

5.1.16 Salmon Creek Coast

The Salmon Creek ASBS is adjacent to the Los Padres National Forest at the southern end of the Big Sur area of central California's Coast Range. The ASBS encompasses 1,458 acres (5,898,623 m^2; 2.28 m^2) of coastal marine habitats. The length of coastline included in the ASBS is 3.4 miles (5.533 km), encompassing about 0.22% of California's coastline.

The ASBS was designated because it has a diversity of habitat and biological assemblages.

5.1.17 Laguna Point to Latigo Point

The eastern boundary of the Laguna Point to Latigo Point ASBS is Latigo Point (34°01'34" north latitude, 118 °45'20" west longitude) in Los Angeles County and the western boundary is Laguna Point (34°05'40" north latitude, 119°6'30" west longitude) in Ventura County. The ASBS lies in an approximate east-west orientation. Fifty-five percent (55%) of the shoreline (and area) lies in Los Angeles County and 45 percent lies in Ventura County. The eastern boundary is about 16.4 miles (26.4 km) from the City of Santa Monica and 4.1 miles (6.6 km) from Malibu Beach. The western boundary is about 6.5 miles (10.5 km) from Port Hueneme-Oxnard and 15 miles (24 km) from Ventura (SWRCB 1979). The ASBS encompasses 11,842 acres (18.50 mi^2; 47,923,090 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 24.0 miles (38.603 km), encompassing about 1.54% of California's coastline.

The Laguna Point to Latigo Point ASBS is overlapped by the Big Sycamore Canyon State Marine Reserve in about 1/8 of the ASBS area.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it has a healthy assemblage of giant kelp, *Macrocystis pyrifera*.

5.1.18 Santa Catalina Island

Santa Catalina Island is located at 33°22' north latitude, 118°25' west longitude and lies approximately 20 miles offshore of the Palos Verdes Peninsula. The island is 22 miles (35.4 km) long, 8 miles (12.9 km) across at its widest point, and is oriented in a general northwest to southeast direction. Santa Catalina Island is part of Los Angeles County. Avalon is the only city on the island. There is a community located between Catalina Harbor and Isthmus Cove, known as Two Harbors. Approximately, 100 permanent residents of Two Harbors maintain the local recreational facility utilized by vacationers, the area's primary industry (SWRCB 1979).

The Northwest Santa Catalina Island ASBS is located at the western end of the Island (33°27' north latitude, 118°33' west longitude). It includes most of the area west of Two Harbors (known locally as the Isthmus) (SWRCB 1979). The ASBS encompasses 13,235 acres (20.68 mi^2; 53,561,672 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 20.9 miles (33.599 km), encompassing about 1.34% of California's coastline. A small portion of the Northwest Santa Catalina Island ASBS overlaps all of the Arrow Point to Lion Head Point Invertebrate Area (MPA).

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it is possibly a transitional zone between subtidal area containing predominantly northern and southern species; (3) due to the proximity to University of Southern California's Catalina Marine Science Center, many scientific studies have yielded valuable information about the area.

The Western Santa Catalina Island ASBS begins at the north end of Little Harbor and extends south to Ben Weston Point. Its seaward boundary follows the 300-foot (91.4 m) isobath or a line one nautical mile offshore, whichever is more distant. The ASBS encompasses 2,247 acres (3.5 mi^2, 9.09km^2) of various coastal marine habitats. The length of coastline included in the ASBS is 0.26 miles (0.42 km).

The Southeast Santa Catalina Island ASBS extends from Jewfish Point to Binnacle Rock on the east end of Santa Catalina Island. Its seaward boundary follows the 300-foot isobath or a line one nautical mile offshore, whichever is more distant. Approximate coordinates of the center of the area are 33°18'30" north latitude, 118°18' west longitude (SWRCB 1979). The ASBS encompasses 2,756 acres (4.31 mi^2; 11,151,303 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 2.9 miles (4.628 km), encompassing about 0.18% of California's coastline.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it represents a warm water region of the Channel Islands. The physical and biological conditions are a marked contrast to the northern Islands, and are more similar to San Clemente Island.

5.1.19 Robert E. Badham

The Robert E. Badham ASBS extends along the coast of Corona del Mar in Orange County. The area is contained within the approximate map coordinates 33°34'50" to 33°35'25" north latitude, 117°51'10" to 117°52'20" west longitude (SWRCB 1979). The ASBS encompasses 220 acres (0.34 mi^2; 888,804 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 0.7 miles (1.113 km), encompassing about 0.04% of California's coastline.

A small portion of the Robert E. Badham ASBS overlaps all of the Robert E. Badham State Marine Conservation Area MPA. The MPA and ASBS share the same coastal boundary, though the MPA extends a very short distance from shore (less than ¼ mile). The northwestern corners of both Irvine Coast MPA and Crystal Cove MPA also overlap with the ASBS.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) offshore reefs provide abundant habitat for a variety of species.

5.1.20 Irvine Coast

The Irvine Coast Marine Life Refuge ASBS encompasses the nearshore waters between the southern border of Corona del Mar and Abalone Point in Orange County. Boundaries of the ASBS are contained within the approximate map coordinates 33°33'20" to 33°35'05" north latitude, 117°49' to 117°51'55" west longitude (SWRCB 1979). The ASBS encompasses 941 acres (1.47 mi^2; 3,806,657 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 3.4 miles (5.461 km), encompassing about 0.22% of California's coastline. The ASBS was designated because it has a diversity of habitat and biological assemblages.

The entire Irvine Coast ASBS is overlapped by MPAs. Crystal Cove State Park is adjacent to the ASBS, and the Irvine Coast State Marine Conservation Area and ASBS share coastal boundaries. The Marine Conservation Area extends about ¼ mile oceanward, into the ASBS, the oceanic boundary parallel to the coastal boundary. The Crystal Cove State Marine Conservation Area northeast boundary is shared with the oceanic boundary of the Irvine Coast State Marine Conservation Area. The Crystal Cove State Marine Conservation Area extends about ¼ mile beyond the oceanic boundary of the ASBS.

5.1.21 Heisler Park

The Heisler Park ASBS comprises the nearshore waters near the town of Laguna Beach, Orange County. The approximate map coordinates for the area's boundaries are 33°32'25" to 33°32'45" north latitude, 117°47'15" to 117°47'55" west longitude.

The Heisler Park ASBS is entirely overlapped by the Heisler Park State Marine Reserve and Laguna Beach State Marine Conservation Area, which overlap each other as well. Beyond the immediate coastal bluffs of the Reserve are located a public park and public beach access. The landward side beyond the park is fully developed with private residences and businesses. Access on foot to the Reserve is provided by paved paths and steps, and signs announcing the Reserve are posted on all of these accesses (SWRCB 1979). The ASBS encompasses 32 acres (0.05 mi^2; 129,456 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 0.5 miles (0.781 km), encompassing about 0.03% of California's coastline.

The ASBS was designated because it has a diversity of habitat and biological assemblages.

5.1.22 La Jolla

The La Jolla ASBS is located at 32°51'52" north latitude, 117°15'15" to 117°16'15" west longitude, in La Jolla Bay, adjacent to the town of La Jolla, in the City of San Diego in San Diego County. The shoreward boundary line is the mean high tide line from the south end of SIO to Goldfish Point. It is the south 1/6 of the San Diego-La Jolla Underwater Park, which was created in 1970 (City of San Diego Municipal Code). The Park itself extends from Point La Jolla westward, then northerly to the San Diego city limits, a north-south distance of approximately 7 miles (11.265 km) along a line about 1 mile out from the shoreline for a total surface area of 5,977 acres. The seaward boundaries are designated by a series of five orange-red marker buoys which are clearly identified; and the on-land accesses at Goldfish Point, the La Jolla Beach and Tennis Club, and the south end of Kellogg Park are visibly marked as entrances to the Ecological Reserve.

The northern shore is a fine sandy beach, whereas the southern shore is composed of rough boulders or ledges at the base of cliffs with one pebble beach in the Devil's Slide area. The northern three-fourths of the shoreline face westward while the southernmost one-fourth faces northward (SWRCB 1979).

The ASBS encompasses 453 acres (0.71 mi^2; 1,832,543 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 1.7 miles (2.714 km), encompassing about 0.11% of California's coastline.

The La Jolla ASBS is completely overlapped by the La Jolla State Marine Conservation Area MPA, which extends beyond the ASBS in the southwest corner.

The ASBS is included in this designation for the following reasons: (1) it has a diversity of habitat and biological assemblages; (2) it is in close proximity to SIO and is a desirable scientific study locale.

5.1.23 San Nicolas Island & Begg Rock

The ASBS encompasses 63,658 acres (99.47 mi^2; 257,615,348 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 26.9 miles (43.318 km), encompassing about 1.73% of California's coastline. The ASBS is included in this designation because it has a diversity of habitat and biological assemblages.

San Nicolas Island (SNI) is used by the U.S. Navy for shipboard launches of missiles and targets. The island is instrumented with metric tracking radar, electro-optical devices, and telemetry and communications equipment to support long-range and over-the-horizon weapons testing and fleet training.

5.1.24 San Clemente Island

San Clemente Island (SCI) is the southernmost of California's Channel Islands, located 78.3 miles (126.011 km) west of San Diego and 63.3 miles (101.871 km) south of Long Beach. It is the primary maritime training area for the U.S. Department of the Navy Pacific Fleet, and the Navy Sea, Air and Land (SEALS), and also supports the U.S. Marine Corps, the U.S. Air Force, and other users. SCI is used by the U.S. Navy to conduct readiness training, research, development, test and evaluation (RDT&E). Navy ownership of the island allows for fleet training, weapon and electronics systems testing, and research and development activities (U.S. Dept. of the Navy, 2007). It is also home to a variety of unique and rare ecological resources on land, and some of the richest marine communities in the world in adjacent waters. The island is approximately 24.1 miles (38.785 km) long and is 5.2 miles (8.368 km) across at its widest point (San Clemente Island website, www.scisland.org.) The ASBS encompasses 49,162 acres (76.82 mi^2; 198,952,668 m^2) of various coastal marine habitats. The length of coastline included in the ASBS is 58.5 miles (94.089 km), encompassing about 3.76% of California's coastline.

The ASBS was designated because it has a diversity of habitat and biological assemblages.

5.2 GEOLOGICAL SETTING

5.2.1 - Terrestrial Geological Setting

The terrestrial geological setting of the ASBS is important due to the influence of the topography, rock and soil on watersheds, runoff, and sediment deposition in the marine environment.

5.2.1.1. Redwoods National Park

The coastal geology of this ASBS is a mixture of three major components: the Franciscan Complex, Quaternary deposits, and modern beach sands. The Franciscan Complex consists mainly of chert, metavolcanics (greenstones) sandstones, shales, siltstones, and conglomerates that formed an accretionary wedge as ocean crust collided with the North American Plate. As a result, rocks of the Franciscan Complex are extensively folded, sheared, and metamorphosed, typical of a mélange. Most of the intertidal rocks and sea stacks are derived from Franciscan rock types. Differential weathering and erosion is prevalent within the Franciscan Complex as less competent beds composed of shales and siltstones are easily eroded when exposed directly to wind and wave action, resulting in unstable slopes.

The beach extending southward from Crescent City to Nickel Creek is composed entirely of geologically recent beach sands and is intermixed with boulders and rocks near White Knob at the south end of the beach (SWRCB 1981).

5.2.1.2 Trinidad Head

Similar to Redwoods National Park, surficial geology is also dominated by the Franciscan Complex, Quaternary marine deposits, and geologically recent beach sands. Highly resistant Trinidad Head consists of a metavolcanic, intrusive block of hornblende and diorite within the mélange. Greenstone and metavolcanic rocks are found around the base of Trinidad Pier and in the southern portion of the ASBS. Chert is found in the cobble field on the upper beach of the southern part of the ASBS. Most of the more resistant intertidal rocks and stacks are mineralized sandstone called "greywacke." The coastal bluff consists of a thick sequence of Quaternary deposits deposited during periods of marine inundation during the past 1 to 2 million years. The coast line has since been uplifted and eroded.

The present day geological picture is a result of differential weathering and erosion of the major components. Following winter storms, erosion of the Franciscan blue clays is particularly evident and results in increased turbidity of the nearshore zone. Coastal bluffs in the vicinity are relatively unstable and, as a result, the bluffs are currently designated as open space to lessen the possibility of increased erosion and damage to property (SWRCB 1979).

5.2.1.3 King Range

King Range consists largely of rocks in the ubiquitous Franciscan Complex formation, along with various metavolcanic intrusives or metamorphic rocks. However, greenstones and cherts typically characteristic of the Franciscan Formation are lacking for the most part. Metavolcanic intrusives, sometimes evident as pillow structures (indicating their origin underwater) are also found at Shelter Cove in the coastal bluffs.

Rocks of the King Range show evidence of persistent crustal deformation as evidenced by the numerous folds, thrust faults, reverse faults, and strike-slip faults initiated during the Tertiary period that have continued to develop into present times. The San Andreas Fault meets the Mendocino Fracture Zone just north of the ASBS; severe seismic hazard will continue to exist along this section of the coast (SWRCB 1979).

A high ridge runs parallel to the coast through the entire area. The slopes of this ridge drop precipitously into the intertidal zone along the coastline, and are cut by numerous small streams. The entire coastline is undergoing active uplifting as the Eastern Pacific Plate is moving under the Continental Plate.

Only three areas of relatively flat ground are found along the coast: (1) Shelter Cove, where the adjacent ridge line drops to gently rolling hills about 1/2 mile (0.8 km) from the coast; (2) Big Flat, an alluvial fan at the mouth of Big Flat Creek; and (3) Spanish Flat, a narrow terrace extending for 2 miles (3.2 km) from Randall Creek to Spanish Creek. Huge rock slides and talus slopes fall directly into the intertidal zone at several points.

The main fault in the area is the Point Delgada Fault, either a branch of the San Andreas Fault, or the main fault itself. At Shelter Cove, several surface breaks opened during the 1906 earthquake. Nowhere are the effects of local seismicity on intertidal substrates more evident than at the huge Kaluna Slide, just north of Shelter Cove. Fractured, broken rock extends from Kaluna Cliff directly into the intertidal zone. The main break of the Point Delgada Fault is exposed near the top of the cliff; movement along the fault apparently triggered the slide in 1906.

5.2.1.4 <u>Pygmy Forest Ecological Staircase</u>

The ASBS lies within the coastal belt of the Franciscan Formation, which reaches along the coast from Cape Mendocino to Point Arena. This section of the Franciscan Formation averages 15 miles (24 km) wide and consists primarily of greywacke. Subsequent and irregular uplifting in this portion of the Franciscan Formation resulted in the series of wave cut marine terraces that form the Pygmy Forest Ecological Staircase. Possibly, another terrace is still being formed subtidally (SWRCB 1981).

5.2.1.5 <u>Saunders Reef</u>

The Saunders Reef area is part of the Gualala Block, which comprises all the rocks west of the San Andreas Fault between Fort Ross and Point Arena. The block consists of over 3.8 miles (6 km) of Upper Cretaceous to recent marine sediments that are highly faulted and folded (Boyle, 1967). There are four major geological units in the area: (1) the German Rancho Formation; (2) the Iverson Basalt; (3) the Gallaway Formation; and (4) marine terrace deposits.

The German Rancho Formation outcrops only in the southern portion of the area near Iverson Point, where it underlies the marine terrace deposits. The sandstones of the

German Rancho Formation consist of medium to very coarse sand that is normally graded with sharp or erosional bases, deposited via turbidity currents in quite deep waters. The sands are mainly comprised of quartz and k-feldspar with muscovite and carbonaceous material. The mudstones in this formation contain muscovite, montmorillonite, kaolinite, feldspar, and quartz (SWRCB 1980).

The Iversen Basalt unit, stratigraphically, overlies the German Rancho Formation and underlies the Gallaway Formation. The Iversen Basalt comprises all of the sea stacks found in the southern part of the ASBS, and along most of the seacliffs.

The early-Miocene Gallaway Formation consists of cemented mudstones and occasional porcelanite, as well as some dolomite concretions and benitonite beds. The mudstones consist of quartz, feldspar, calcite, montmorillonite, pyrite, glauconite, and organic matter. The sandstones consist predominately of quartz and feldspar and are exposed in the intertidal only in the northern-most part of the ASBS study area. The broad, intertidal terrace in the northern portion of the ASBS study area is underlain by the Gallaway Formation.

On land, there are at least three marine terrace levels immediately adjacent to the Saunders Reef area. These Pleistocene terraces lie at elevations of up to 197 feet (60 m), providing evidence of the relatively recent tectonic uplifting which has occurred in this area.

Beaches along the Saunders Reef ASBS are cobble-boulder beaches with little sand. The sea cliffs at the northern-most part of the study area are of the Gallaway Formation. The remainder of the sea cliffs in the ASBS is composed of the massive Iversen Basalt. Consequently, the cliffs are steeper than they are to the north. Due to rock falls and fresh water runoff, the sea cliffs in the area appear to be retreating rapidly landward, undermining Highway 1 in some places (SWRCB 1980).

5.2.1.6 Gerstle Cove

Like the Saunders Reef ASBS described above, this ASBS is part of the Gualala Block, west of the San Andreas Fault. The geological units in the area are the German Rancho Formation; the Iverson Basalt; the Gallaway Formation; and marine terrace deposits described previously.

The adjacent land mass is emergent coast, featuring a series of wave-cut marine terraces produced by relatively higher sea levels (SWRCB 1979).

5.2.1.7 Point Reyes Headlands

Point Reyes Headlands lies west of the San Andreas Fault and consists largely of granodiorite, which are more closely associated with rocks from southern California that have traversed northwestward along the San Andreas Fault hundreds of miles (SWRCB 1980). Core samples have revealed that the granitic rocks extend 1,370 feet (417 m) below sea level. These rocks range in composition from quartz diorite to adamellite, containing more quartz and potash feldspar. Most of the granitic rocks of the Point Reyes Peninsula are deeply weathered. Overlying parts of the granite on the Point Reyes Headlands ASBS are large patches of conglomerate, a hard sedimentary rock composed of large and small-size pebbles and cobbles, all cemented together. From the Lighthouse area of the Headlands to the intertidal zone, there are large blocks of conglomerate. Giant sea caves have been etched into the conglomerates at the surf zone. These conglomerates are not found anywhere else on the Point Reyes Peninsula. The conglomerates are overlaid in an unconformed manner by basal glauconitic sand of the Drakes Bay Formation.

To the north of the Point Reyes granitic promontory are alignments of ridges and valleys that run approximately east to west. The ridges are harder layers of the Drakes Bay Formation and are folded into an anti-cline-syncline pattern. The valleys are remains of tributaries, which drain into the drowned-valleys of Drakes Estero and Estero de Limantour (Galloway 1977, cited in SWRCB 1980).

5.2.1.8 Duxbury Reef

This location is the southernmost point of the Monterey Shale Formation, which consists of chert, porcelanites, organic shales, and thin hard sandstones in considerable variation. The headlands are composed of sandstones that are undergoing continuous erosion by winds (SWRCB 1979).

Except for a small area of unconsolidated terrace deposits at the northern boundary of the ASBS, the whole of the area consists of Monterey shales. These shales cover most of the area from Duxbury Point to Double Point in the Point Reyes National Seashore, and extend as far north as some areas in the Tomales Quadrangle. The surfaces of outcrops are normally smooth and covered with vegetation, but where the shale is chert, a crag or pinnacle may be formed by differential erosion.

The headlands (Bolinas Mesa) overlooking the Duxbury Point area are composed of sandstones, which are undergoing continuous erosion by winds. The reef is composed of harder organic shales and some cherts. These harder rocks are continually being exposed by rapid erosion of the mesa.

The Monterey sandstones and mudstones are well bedded and dip at an angle 45° seaward. Thus when bedding planes are lubricated with rainwater or drainage, landslides are apt to occur at the sea cliff. Waves during high tides quickly move the material at beach level, with the slide gradually being eroded back to reach a stable angle of repose. Since 1859, Duxbury Point has eroded about 200 feet (60 m), Bolinas Point about 160 feet (50 m), and an unnamed point about 4,000 feet (1,200 m) north of Bolinas Point has eroded about 200 feet (60 m). Along the stretch of coast adjacent to the ASBS, the Monterey sandstones and mudstones are well bedded and dip seaward contributing to landslides at the sea cliff (SWRCB 1979).

A large slump block landslide is located north of Palomarin Beach, where beach erosion is undercutting the toe of the slide area (USGS, 2005). Between Bolinas and Duxbury points, the wave-cut platform and beach are also inundated by waves causing landslides by undercutting the base of the cliffs. Failure is facilitated by increased subsurface flow of water and saturation due to septic effluent from cliff-top homes as well as winter rainfall. Between Bolinas and Duxbury points, the average rate of recession along the cliff base ranges from 6 to 24 inches per year. Between Duxbury Point and Terrace Avenue, the mudstone is weathered and fractured, particularly near the San Andreas Fault. Numerous homes line the cliff edge and since the area was initially subdivided in 1927, many of these lots and Ocean Parkway have been damaged by cliff erosion; several homes have been removed from their foundations (Griggs et al, 2005).

Duxbury Reef is the largest exposed shale reef in California. Its prominences extend up to 1 mile (1.6 km) out to sea at Duxbury Point, and from 1/4 to 1/2 mile (0.4 to 0.8 km) from the high tide line in other areas. Wave action has carved channels and depressions in the rocks, but more resistant ridges have remained as high protrusions, resembling small islands (SWRCB 1979).

5.2.1.9 James V. Fitzgerald

The Fitzgerald Marine Reserve straddles the geologically active Seal Cove Fault, which extends northward to connect with the San Andreas Fault near Bolinas Lagoon in Marin County. The San Andreas Fault is probably responsible for the seismic activity of the Seal Cove Fault and secondary faults which diagonally transect the ASBS. Seismic activity at either the Seal Cove or Bay Area faults could result in surface rupture along the faults, high levels of ground shaking, ground failure (such as land sliding), and tsunami inundation (SWRCB 1979).

The trace of the Seal Cove Fault is exposed in the sea cliff just north of the reserve headquarters. The mouth of San Vicente Creek, which drains the San Vicente watershed, is located just south of the headquarters. South along the west side of Seal Cove Fault, bedrock and overlying marine terrace deposits are vertically lifted about 150 feet (45 m) to form the Pillar Point headland and ridge. It is the west face of this ridge which forms the sea cliffs south of the headquarters. The bedrock cliffs are composed of consolidated sandstone, siltstone, and mudstone, much of it embedded in clay, which together form the Tertiary (Pliocene) Purisima Formation. The overlying marine terrace deposits, which cap the Purisima bedrock, consist of weakly consolidated, slightly weathered sands and gravels of more recent (Pleistocene) origin. The cliffs gradually increase in height in the southerly direction and are being actively eroded over most of the length of the reserve. With little or no beach present, the most resistant subtidal and intertidal reefs offer only local resistance to wave action. As a result, land-sliding occurs along the length of this section of the ASBS (SWRCB 1979).

North of the marine reserve headquarters, the shoreline of Fitzgerald ASBS changes abruptly. This section of coastline is characterized by rugged rock outcrops and smaller reefs of granodiorite of Mesozoic origin (Geologic Map of California 1963). Elevation of these cliffs ranges from 25 to 50 feet (7.6 to 15 m) in most places. Occasional sandy or cobble beaches are present between rock outcrops (San Mateo County 1976, cited in SWRCB 1979).

5.2.1.10 Año Nuevo

The ASBS consists of a small rocky island lying about 0.5 miles (600 m) offshore from a low headland which juts about 1.5 miles (2 km) out into the Pacific Ocean from the general north-northwest trend of the coastline in San Mateo County. The surface of an emergent marine terrace forms the broad, nearly horizontal plain of Point Año Nuevo. The wave-cut platforms mantled with terrace deposits truncate folded beds of the Purisima (Pliocene) and Monterey Formations (Miocene) (Tinsley 1972, cited in SWRCB 1979). With the exception of the south shore of Point Año Nuevo where near vertical sea cliffs of 60 to 90 feet (20 to 30 m) are present, the coastline either lacks cliffs or has small cliffs, usually less than 6 to 10 feet (2 to 3 m) high. South of Point Año Nuevo, three major fault strands within the San Gregorio Fault zone intersect the coastline and the rather continuous Santa Cruz terrace sequence comes to an abrupt end. Lateral discontinuities and tilting of well-preserved marine terraces help define major structural blocks within the fault zone and document significant differential movement among these blocks from Point Año Nuevo north to San Gregorio Creek (SWRCB 1981).

Along the south shore of Point Año Nuevo, five faults exposed in the sea cliff clearly offset the 100,000 year-old marine terrace. The Frijoles Fault consists of a 300 foot wide zone of crushed and pervasively sheared sandstones and siltstones of the Pliocene Purisima Formation and is exposed in the sea cliff on the south shore of Point Año Nuevo. The competent rock of the Purisima Formation dips gently northeast and forms high vertical seacliffs, capped by the first marine terrace west of the fault zone. Lower cliff height and greater instability due to numerous landslides off the cliff face characterize the sea cliff in the fault zone.

Alluvial deposits consisting of interbedded clays, peats, silts, and poorly sorted sand and gravel, composed primarily of clasts of Santa Cruz Mudstone, are found east of the fault juxtaposed against the crushed Purisima Formation (Weber and LaJoie 1979, cited in SWRCB 1981).

There are two dune fields within this ASBS at Point Año Nuevo and Franklin Point. The 300 to 350 acre dune field at Point Año Nuevo consists of fine-to-medium grained sand derived from a windward beach. Along the north shore of Point Año Nuevo, beach sands are winnowed by the prevailing northwesterly winds and the finer grained sands are carried up onto the low terrace above the beach (SWRCB 1981).

5.2.1.11 Pacific Grove

The ASBS is located at the northern end of the Santa Lucia Mountains, where these mountains descend beneath Monterey Bay. The geology of the shoreline and nearshore waters of the ASBS is relatively simple, consisting only of Santa Lucia granodiorite. The rock is highly fractured and, therefore, weathers easily to sand size particles. The rock mass is cut by dikes, which are somewhat more resistant to weathering than the granodiorite. The rocks are extensively jointed in several directions, the most persistent being parallel to the shoreline; jointing frequently occurs perpendicular to this, thus producing a blocky pattern in the exposed outcrops best seen at Lucas Point and Otter Point.

The sandy beaches within and adjacent to the ASBS are derived entirely from the granodiorite. Arnal et al (1973) noted that Monterey Bay is a closed system with no sediment being transported into or out of the bay to the north and south. Also, the shoreline at Pacific Grove is situated such that longshore transport into the area from south bay beaches is highly unlikely (SWRCB 1979).

5.2.1.12 Carmel Bay

The ASBS coastline is characterized by alternating rocky points and extensive granitic sand beaches. The Carmel River drains into the ASBS just south of Carmel Point. San Jose Creek drains into the south end of the Carmel River State Beach, a steep sandy cove that encloses the Carmel submarine canyon.

Several distinct formations are found at different locations along the shoreline. The granite outcroppings represent the northwestern-most extension of the Santa Lucia mountain range, for which granodiorite is the basement rock. Subtidally, most of the floor and walls of the Carmel submarine canyon consist of granodiorite, which accounts for the unusually high visibility here. Intertidally, granodiorite occurs as promontories, boulders, and cobble at Pescadero Point, Carmel Point, in the vicinity of the buried sewer outfall, and at the north end of Hudson Cove. Inland of the ASBS, granite outcrops occur north of Stillwater Cove, in the Carmel Valley, and along San Jose Creek, extending south to Point Lobos (Simpson 1972, cited in SWRCB 1979).

The Carmelo series, also common in and adjacent to the ASBS, consists of sandstone, siltstone, conglomerate, and shale. The dominant rock type in the ASBS is a conglomerate, consisting of igneous pebbles embedded in a coarse-grained, well-cemented matrix. Subtidally, the Carmelo Formation consists of all four rock types and underlies Stillwater Cove; from here, it continues southward to a point 300 yards (274 m) seaward of Ocean Avenue at the north end of Carmel City Beach. In the intertidal zone, this formation is visible adjacent to Stillwater Cove, in the promontory just north of

Monastery Beach, and adjacent to Hudson Cove. Inland, the Carmelo Formation occurs north of the Carmel Mission (northeast of the Carmel River mouth).

The Tremblor Formation, consisting of a white to brownish sandstone intermixed with conglomerate occurs at several shoreline locations between the volcanics at Arrowhead Point and amongst the Carmelo Formation at Pebble Beach and Stillwater Cove. Inland, this formation occurs northeast of the Carmel Mission. Lava outcrops or extrusions occur both subtidally and intertidally at Arrowhead Point.

Quaternary rocks identified as Aromas Red Sandstone occur in cliff sides and along the beach from Arrowhead Point south to Carmel (Mission) Point. Recent unconsolidated sediments form terraces, which underlie the Pebble Beach Golf Course and are visible adjacent to the intertidal area. Submerged terraces of this composition also occur throughout Carmel Bay. Sand beaches occur frequently along the ASBS (SWRCB 1979).

5.2.1.13 Julia Pfeiffer Burns

The area is within the Coast Range Geomorphic Province and is classified as Mesozoic granitic rock. The coastline is very steep resulting in restricted watersheds that are drained by canyons. Within the ASBS, two small watersheds occur, Partington Creek draining into Partington Cove and McWay Creek Draining into Waterfall Cove (SWRCB 1980).

The geology, climate, and ecology make the Big Sur area landslide-prone. Landslides in frequently damage Coast Highway and may impact nearshore marine life. Rocks weakened by faulting and fracturing contribute to landslide conditions. During the storm season Big Sur experiences heavy rainfall and high wave energy, and during the fire season wildfires remove vegetation, making slopes vulnerable to erosion. In 1983 a landslide at Julia Pfeiffer Burns ASBS resulted in closure of the highway for more than a year and generated nearly 3 million cubic yards of debris (USGS, 2004).

5.2.1.14 Salmon Creek Coast

Salmon Creek is among the most southern of watersheds along the Big Sur coast. The eastern boundary of the watershed is the coastal ridge of the Santa Lucia Range. This area is underlain by rocks of the Franciscan Complex, which are known to erode more easily than rocks further north in the same mountain range. A major fault, the Sur-Nacimiento fault, traverses the area. There are an abundance of ultramafic rocks rich in magnesium and iron and there is more serpentine here than elsewhere in Big Sur. Soils derived from these rocks support an unusual flora, including a number of plants that grow only in serpentine (Henson et al., 1996).

5.2.1.15 San Nicolas Island

SNI topography was initially formed and subsequently shaped by changes in sea level and differential uplift of the island. The central portion of the island gently slopes upward (from north to south) to a height of 900 feet (274 m) above mean sea level. Cliffs along the northern perimeter of the island's central mesa lead to seven well-defined marine terraces visible on the north side of the island. The most notable geographic feature of SNI is the series of Eocene marine terraces. Terraces are covered by windblown sand (dune) deposits that decrease in depth from northwest to southeast. The average surface elevation is 500 feet (152 m) above mean sea level, with a maximum elevation of 908 feet (276 m) above mean sea level.

SNI is thought to be underlain by the Franciscan Formation, which consists of a variety of rocks including deep-marine sedimentary rocks as well as metamorphosed igneous rock. Underlying both dunes and marine terrace deposits are alternating layers of Tertiary marine sandstone and siltstone. All units have been folded into a broad anticline. The axis of this fold runs parallel to the length of the island, plunges slightly southeast, and is offset by several Pre-Quaternary faults. Marine terrace deposits are composed of unconsolidated clayey, silty sands, some of which are cemented together by caliche, a cement-like calcium carbonate deposit formed by the downward percolation of rainwater in dune and marine terrace deposits. Fossils occur throughout Eocene sedimentary units and marine terrace deposits on SNI, and occur extensively throughout surface and subsurface units. Fossils of marine terrace deposits consist of over 250 species of mollusks and other invertebrates. These assemblages are presumed to occur throughout marine terraces on SNI and are unique in their completeness (Vedder and Norris 1963 in US Navy San Nicolas Island Integrated Natural Management Resources Plan 2006-2010).

5.2.1.16 Laguna Point to Latigo Point

The Ventura-Oxnard plain lies at the north end of this ASBS and consist of a large alluvial deposit from the Ventura River, Santa Clara River, and Calleguas Creek drainages. Calleguas Creek drains into the ASBS through Mugu Lagoon. A barrier bar with a single tidal opening bounds the seaward side of the lagoon.

The Santa Monica Mountains rise steeply to the east of the Ventura-Oxnard plain. These mountains, part of the Transverse Ranges province, are primarily composed of sedimentary rocks. This region is characterized by steep mountain slopes and few offshore reefs. Along the coastal bluffs, the region is structurally the most complex within the ASBS. The rocks are highly folded and steeply dipping so that very different rock types lie next to one another. The western part of this bluff coast from Little Sycamore Canyon to Trancas Beach is made up of older Tertiary (Miocene) erosion resistant rocks of the Trancas Formation. The white cliffs of Paradise Cove are outcrops of the Miocene Age Modelo Formation, which forms steep inclined bids from Zuma Beach Eastward to Corral Beach (beyond the ASBS boundary). This formation is predominantly siliceous shale and was probably formed in the deep sea. The headland at Point Dume is a highly resistant igneous breccia that has protected the softer sedimentary shale behind it from erosion. In addition to the Miocene deposits, there is an irregular veneer of Pleistocene marine terrace deposits on the bluff, between the ocean and the mountains adjacent to the eastern section of the ASBS that tends to form steep-sided stream gullies and sea cliffs.

A major east-west low angle thrust fault, the relatively young Malibu Coast Fault, separates the Santa Monica Mountain escarpment from the central Malibu bluff coast. The fault generally can be traced in the central and eastern part of the land adjacent to the ASBS by the distinct change in slope between the terrace of the Malibu bluff and the rapidly rising Santa Monica Mountains behind. High angle faults tend to run north from this fault into the Santa Monica Mountains. The Malibu Coast Fault runs inland from offshore at Las Flores Canyon to the east of the ASBS, and re-enters the sea at Little Sycamore Canyon within the ASBS. Many smaller faults run roughly north-south in the Santa Monica Mountains and often provide the basis of the steep-sided canyons in the area. The largest of these faults is the Sycamore Canyon Fault. Additional faults may separate the Trancas and Modele Formations at the western end of Zuma Beach and another fault may exist offshore of Point Dume, separating the Point from the Modele Formation.

Between Point Mugu and Deer Canyon the shallow water areas off the headlands are regularly bordered by bedrock outcroppings and boulder fields that give way to sand beyond a depth of no more than 10-15 feet (3 to 4 m) (SWRCB 1979).

5.2.1.17 Santa Catalina Island

The major exposed rock on Santa Catalina Island is Catalina schist, a low-grade layered metamorphic rock. Landslides commonly occur where it forms steep slopes. To the northwest, the land adjacent to the ASBS is extremely rugged, with steep drop-offs to the ocean and narrow ravines.

The highest peak adjacent to the ASBS is Silver Peak, reaching an elevation of 1,804 feet (549 m). Adjacent to the Northwest Santa Catalina Island ASBS the isthmus is the land area with the lowest elevation (less than 20 feet; 6.1 m) and also has the narrowest width of any portion of the island (0.25 miles). The Isthmus area is geologically very active, as indicated by frequent landslides (SWRCB 1979).

Approximately 59% of the island's surface drainage enters Western Santa Catalina Island ASBS; streams include Big Springs and Little Springs Canyon, Fern Creek, Cottonwood Creek, Sweetwater Canyon, Cape Creek, Middle and Bullrush Canyons. Only Cottonwood and Middle Canyons have perennial flow into the ASBS. Runoff and erosion during the storm season is known to cause road damage on the road to Ben Weston Beach.

The southeast portion of the island is mountainous with steep, rocky cliffs. A large industrial quarry operation is located adjacent to the Southeast Santa Catalina Island ASBS (SWRCB 1981).

5.2.1.18 San Clemente Island

SCI is the exposed portion of an uplifted fault block composed primarily of a stratified sequence of submarine volcanic rock (andesite, dacite, and rhyolite) and volcanic rocks of Miocene age (12 to 15 million years old). The volcanic rock is over 1,969 feet (600 m) thick and is overlain and interbedded with localized sequences of Miocene and Pliocene marine sediments, many of which contain microfaunal and megafaunal fossils. The highest point on the island is about 2,000 feet (610 m) above sea level, in an area southeast of the island's center. Elevations gradually slope toward the north and south ends of the island (Olmsted 1958 in US Navy, 2008). Several steep, narrow canyons are located throughout SCI, with some over 500 feet (152 m) deep and drop sharply into the sea (SCS 1982 in US Navy, 2008).

The steep east-facing cliffs of the northeastern portion of the island are part of a continuous escarpment along the eastern side of the island, from Pyramid Head to Wilson Cove; there is also an isolated segment of the escarpment from Wilson Cove to Lighthouse Point (Dolphin Bay). Elevations of the eastern escarpment range from sea level to 1,965 feet (599 m) above mean sea level. The coastal and upland marine terraces dominate the western side of the island, as well as the northern and southern ends; the terraces are considered among the most well-defined examples of such features (Yatsko 1989 in US Navy, 2008).

5.2.1.19 Robert E. Badham

The ASBS is fronted by sandstone bluffs that slough rubble at their base. Several small drainages enter the beach zone in the northern portion of the ASBS forming marshy areas (SWRCB 1979). One of these drainages is Buck Gully.

5.2.1.20 Irvine Coast

The Abalone Point region is composed of a siltstone bench that is easily accessible from the adjacent beach only at times of low spring tides. The benchwork is part of a several hundred foot high cliff that also helps to limit access to the area. Just north of Abalone Point is a broad sand beach that stretches the entire length of the reserve. This sandy beach, over 3 miles (4.8 km) long, is interrupted by small rocky outcroppings only twice, at Reef Point and at a small rocky bight just south of Crystal Cove. Sandstone bluffs line the entire beach; erosion of these bluffs is particularly noticeable in the Scotchman's Cove region. The bluffs appear less eroded in the area around Pelican Point, where fossil-bearing rocks are found (SWRCB 1979).

5.2.1.21 La Jolla

The La Jolla ASBS is a small alluvial basin bounded on the south by the westward-trending sides of the Soledad Mountain, which reach the sea at Devil's Slide to Point La Jolla (commonly called Alligator Head). To the east and north, the basin is bordered by a high ridge that forms the cliffs north of SIO. The alluvial fill of this basin rests on a seaward sloping basement Eocene sandstone and shale with a thickness of 30 to 40 feet (10 to 12 m) (SWRCB 1979).

5.2.2 - Intertidal and Subtidal Topography and Substrate

The intertidal and subtidal geological setting provides habitat for benthic marine life. Different substrates (e.g., mud, sand, and various types of hard rock) and topographic features (e.g., slope, orientation, etc.) represent different habitats and therefore are inhabited by different biological communities.

5.2.2.1 Redwoods National Park

A variety of subtidal substrates exist within the ASBS. North of the Klamath River, substrates are composed of sands, gravels, and rocks ranging in size from boulders [5 feet (1.5 m) or greater in diameter] to giant sea stacks. South of the Klamath River, substrates appear to be composed mostly of sands and finer sediments (SWRCB 1981).

5.2.2.2 Trinidad Head

On the South Side of Trinidad Head, the substrate is rocky. Typical profiles include sheer rock faces from three to 14 meters deep. When surveyed in the late 1970s rock substrate was generally clean to about four meters deep; below that depth there was progressively more silt deposition to the bottom at about 14 meters deep. On the East Side of Trinidad Head, to about two meters deep, rocky substrates are generally either vertical or steeply inclined. Deeper than two meters, piles of boulders slope to the bottom between approximately three to six meters. On the East Side of Trinidad Rock, the bottom consists of well-worn boulders of low relief. Immediately east of Trinidad Rock, the area consists of irregular bedrock and boulders to a depth of about six meters. Obtrusive bedrock extends upward and often above datum. Patches of gravel also occur in the ASBS (SWRCB 1979).

5.2.2.3 King Range

The submarine topography off the coastline is complex and varied. Tidally emergent rocks are common within a quarter of a mile (400 m) of the shore, usually surrounded by coarse sand bottoms. The continental shelf (200 m depth) is apparently quite near the shoreline, within 4 to 5 miles (6.5 to 8.0 km), at several points. Three submarine canyons approach the shore along the coast: the Delgada Canyon just north of Point Delgada, the Spanish Canyon off Spanish Flat, and the Mattole Canyon just north of Punta Gorda.

Flat, shelf-like intertidal rock formations are absent along the coast except at two points. The first, about 1.1 miles (1.8 km) north of Punta Gorda, is a sedimentary (probably Franciscan) formation extending into the intertidal zone for approximately 40 yards (38 m) perpendicular to the sand beach. The second, at Point Delgada, is a well developed series of bench formations (clearly Franciscan) extending 80-90 yards (70-80 m) from the coastal bluffs to a drop-off into the subtidal zone. The intertidal rock formations at Point Delgada are extensive, with evidence of weathering by surge channels and wave action. Boulders 0.5-2 meters in diameter are scattered through the intertidal zone and have fine to medium grain sands around their bases. The stable substrate and modest protection from predominantly northwest waves have resulted in the establishment of a geologically amenable intertidal habitat (SWRCB 1979).

5.2.2.4 Jughandle Cove

Areas to 10 feet (3 m) deep within the small northern cove consist of boulders and interspersed sand. Beyond this depth, the bottom is bedrock, boulder, and some localized cobble and gravel patches. A series of offshore rocks extend northwesterly from the southern border of the cove. Their faces are roughly vertical and descend 10 to 35 feet (3 to 11 m) to the bottom (SWRCB 1981).

The headlands north of Jug Handle Creek Cove drop vertically, as an irregular and often overhanging wall, to about 15 feet (5 m) deep, where the bottom is dominated by large boulders and submerged pinnacles. The bottom of Jug Handle Creek Cove is filled with clean medium-grained sand, which continues offshore to beyond 60 feet (18 m) deep. Boulders emerge from the sand on the borders of the cove (SWRCB 1981).

A series of rocks extend northwestward from the southern border of Jug Handle Creek Cove. From 10 to 30 feet (3 to 9 m) emergent rocks rise from the sand to the surface. Further offshore, to 45 feet (14 m) deep, the series continues as isolated submerged rocks rising out of the sand (SWRCB 1981).

The extreme southern cove within the ASBS has a gently sloping bedrock and boulder bottom. Nearshore emergent rocks in the northerly portion of this cove are in places surrounded by sand and cobble bottoms. Bedrock dominates deeper areas within the cove and offshore the bottom is similar to that off the northern headlands (SWRCB 1981).

5.2.2.5 Saunders Reef

Rock samples obtained by SCUBA divers indicate Saunders Reef is part of the Gallaway Formation. The reef is actually a complex of low parallel ridges and outcrops from 1.5 to 39 feet (0.5 to 12 m) high. Some of these are exposed at low tide. The bottom between the ridges and outcrops is composed of rock, cobble, and coarse sand. Large ripple marks were found in this area indicating very high surge velocities (SWRCB 1980).

5.2.2.6 Gerstle Cove

The submarine topography within the ASBS is extremely irregular, probably owing to exposure of the coastline to wave action, and concomitant erosion of the shoreline. The hardness of the sedimentary rock is highly variable, resulting in differential erosion producing a wave-cut and indented coastline. Thus, large slump blocks and boulders are continually being supplied to the marine environment. Large to small boulders dominate most of the gently sloping subtidal terrain. Slump blocks, wash rocks, and emergent sea stacks also occur immediately offshore and constitute the only other topographic features in and adjacent to the ASBS (SWRCB 1979).

5.2.2.7 Point Reyes Headlands

The Point Reyes Headlands ASBS extends from the intertidal zone out to 2,000 feet (609 m). At the south face of this 2,000 foot line, the depth is about 100 feet (30 m). However, at the western boundary of the ASBS zone, the depth probably is greater than 150 feet (45 m), while at the eastern boundary, at the Chimney Rock area, the depth is less than 60 feet (18 m) (SWRCB 1980).

The submarine topography consists of large granitic boulders throughout the shallow water zones with large amounts of sand interspersed between the boulders. At the west end, almost directly below the lighthouse, is “The Wall" - a vertical granitic face which drops 60 feet (18 m) to the sloping sandy bottom at 85 feet (26 m) (SWRCB 1980).

In contrast to “The Wall" of the western side of the ASBS, the submarine topography at Chimney Rock consists of large boulders 3 to 8 feet (1 to 2.4 m) in diameter. Sand surrounds these boulders and gently slopes out to the 60-foot isobath line. Large, vertical intertidal sea caves are also located amidst the conglomerate rocks about 150 feet (45.7 m) east of the Lighthouse (SWRCB 1980).

Chimney Rock: At the east end of the ASBS is a large granitic sea stack with a single 50 foot (15 m) pinnacle that resembles an isolated chimney. This stack was a part of the main cliff during the past; erosion divided the section from the eastern promontory. Surrounding Chimney Rock are large boulders which make up the intertidal and subtidal configuration. Sand surrounds these granitic rocks and continues in a gentle slope out beyond the 60 foot (18 m) isobath. Since the refractory waves sweep around the Chimney Rock area, there is movement of sand throughout the year (SWRCB 1980).

Pelican Arch: This unique granitic rock is 30 feet (9 m) in height and is a sea arch that is a frequent habitat of the Brown Pelican, Pelecanus occidentalis. The birds often perch on the arch while resting from their feeding activities within the area (SWRCB 1980).

Saddle Cove: The cliffs between Chimney Rock and Saddle Cove are nearly vertical, rising from sea level to about 190 feet (58 m). A small beach at the base of a sloping grade illustrates much erosion (SWRCB 1980).

Split Rock: Massive granitic rocks which have split off from the south cliffs provide the name of this area as Split Rock Cove. The waters of this cove are much deeper than that of the major coves within these southern-facing cliffs. The 30 foot (9 m) isobath bends deeply into Split Rock Cove. The deep water enables large waves to come very close to the area which gives Boulder Beach a steep profile with rounded cobbles and boulders (SWRCB 1980).

Sea Lion Cove: Granitic rocks, large and small, are scattered throughout the area west of Split Rock Cove. The smooth surfaces of these rocks enable many sea lions to haul out in this area. Coarse sand surrounds these granitic stacks. Sea Lion Cove is the major area for the California Sea Lions. Two sandy beaches in Sea Lion Cove enable hundreds of these mammals to haul out (SWRCB 1980).

Sea Caves: The conglomerates of the Point Reyes Headlands ASBS extend from the highest point of the cliff at 612 feet (186 m) to the surf zone where the depth is 30 feet (9 m). The waves erode these conglomerates, etching out giant sea caves. Large conglomerate boulders and coarse sand make up the benthic substrate at the base of these cliffs, which are a favorite niche for the Common Murre, Uria aalge (SWRCB 1980).

“The Wall”: It is a 60 foot submarine cliff just below the Lighthouse at the western edge of the ASBS. The base of “The Wall" is 85 feet (26 m) below sea level with sand and rocks sloping out beyond 100 feet (30 m). This unique vertical wall is probably a result of faulting action of the Headland (SWRCB 1980).

Ideal diving conditions are almost impossible to realize as giant waves smash across this western promontory year-round. The underwater surge from the refractory wave trains is severe, preventing divers from maintaining a fixed position on the wall. Moreover, the water visibility is extremely poor, at best about 30 inches (76 cm), both from the sediments stirred up by the wave-surge and by the darkness of these depths (SWRCB 1980).

Murre Rock: Just west of the Lighthouse, outside of the ASBS boundary, are two large granitic sea-stacks, which are the main nesting sites for thousands of Common Murre, Uria aalge. These birds reside at the rock year-round (SWRCB 1980).

5.2.2.8 Duxbury Reef

Duxbury Reef is also the largest exposed shale reef in California. The bottom topography immediately offshore from the ASBS consists of eroded reef remnants interspersed with sand bottoms. Depth increases to 30 feet (9.1 m) about ½ mile (0.8 km) from shore and to 60 feet (18 m) at a distance of 1 mile (1.6 km). The bottom types in this outer area beyond the ASBS were not investigated, but probably consist of sand (SWRCB 1979).

Duxbury Reef's prominences extend up to 1 mile (1.6 km) out to sea at Duxbury Point, and from ¼ to ½ mile (0.4 to 0.8 km) from the high tide line in other areas. Wave action has carved channels and depressions in the rocks, but more resistant ridges have remained as high protrusions, resembling small islands. Most of these islands or prominences can be reached by foot at very low tides, but intervening channels are often deep and treacherous. Presumably, as the waves erode the outer reef rocks, new areas are continuously being exposed at the base of the cliffs. The reef, then, is slowly moving in a northeasterly direction as new rocks are exposed by wind erosion and old rocks are eroded down by waves. The rocks making up the reef itself contain calcium carbonate. Boring organisms, such as clams and worms, also contribute to the destruction of carbonate in the reef as do humans who chip away the rocks to extract the clams (SWRCB 1979).

5.2.2.9 James V. Fitzgerald

The overlying marine terrace deposits consist of weakly consolidated, slightly weathered sands and gravels of more recent origin. The reefs in the southern section are comprised of Pliocene shale or mudstone. These flat shale beds form a discontinuous rocky intertidal area.

The flat shale beds in the southern section of the ASBS form a discontinuous rocky intertidal area almost 3 miles (4.8 km) long. During low tides [below mean lower low water (MLLW)], much of the outer edge of the reefs, 500 to 1,000 feet (150 to 300 m) offshore, may be reached from shore. The reefs are broken up by numerous tidal channels with steep or overhanging sides, which run perpendicular to the shoreline, and by protected lagoons with rock/cobble bottoms, as at Seal Cove where a sand beach also occurs. Most of the reefs are fairly flat, but often exhibit greater relief toward the inner edge next to the cliffs. Tidepools of varying size and at varying tidal heights are abundant throughout the reefs. South of Frenchman's Reef and Whaleman Harbor, intertidal reefs are largely replaced by a wider sandy beach. Another extensive intertidal reef occurs south of Pillar Point. The southernmost edge of the Pillar Point Reef is marked by Sail Rock, which rises 32 feet (9.7 m) out of the water.

Approximately 1,000 feet (300 m) offshore to the south of Frenchman's Reef and 650 feet (200 m) southwest of the Pillar Point, there are extensive subtidal reefs adjacent to the intertidal reefs at depths of 20 to 35 feet (6 to 11 m). Due south from Sail Rock (on the Pillar Point Reef), the intertidal and subtidal reefs are continuous with one another at least for a distance of 250 feet (80 m) offshore. The subtidal reefs at Pillar Point occur as a series of urchin-pitted shelves extend into gradually deepening water. The reefs here, as at the dive site off Frenchman's Reef, exhibit great relief, rising as high as 10 to 15 feet (3 to 4.5 m) from the bottom. The reefs are frequently broken by narrow surge channels, which run roughly perpendicular to the shore.

Seaward of the exposed rock to the northwest of Frenchman's Reef, similar subtidal reefs and outcrops occur, which are of lower relief (5 to 10 feet or 1.5 to 3 m) than those south of Frenchman's Reef and the Pillar Point Reef. Large boulders protruding from the base of the reefs and outcrops are common. Away from the rock, the reef drops off to what appears to be the end of the reef system in that immediate vicinity. Approximately 300 feet (100 m) from the rocks is a broad, flat sandstone bottom at a depth of approximately 35 feet (11 m). Very little sand was present. The sandstone was devoid of macroscopic organisms.

About 300 feet (100 m) off the southern tip of Seal Cove, for at least 150 feet (50 m) to the north, the bottom consists of small reefs, large outcrops and associated boulders at an average depth of 20 feet (6 m). Large sandy areas were not encountered; increasing surge indicated the presence of shallower reefs to the north.

Further evidence of continuity between the intertidal and subtidal reef systems was indicated by the presence of broad 30 to 50 feet (10 to15 m) flat reefs about 1,000 feet. Moss Beach has similar flat reefs (350 m) offshore of Moss Beach. In this area, the subtidal reefs are at a depth of about 30 feet (9 m) and typically rise 3 to 7 feet (1 to 2 m) off the bottom.

Extensive subtidal reefs were not found in the northern end of the ASBS, though small reefs and rock outcrops appeared to be prevalent close to shore. Deeper water occurs closer to shore in the northern section of the ASBS than in the south. For the Reconnaisance Survey (SWRCB 1979), a dive was made approximately 1,300 feet (400 m) offshore of the Montara sewage outfall line, which existed at that time but has since ceased operation. At a depth reading of 70 feet (21 m), the bottom had not yet been reached, so the dive was terminated. Small reefs and outcrops were located at a depth of about 40 feet (12 m) around 500 feet (150 m) offshore. These were similar in size and relief [5 to 10 feet (2 to 3 m) high] to those found northwest of Frenchman's Reef. Similarly, large boulders were often found at the base of the outcrops. At this northern site, proportionately more of the bottom is comprised of wider sandy surge channels at the base of the rocky areas (SWRCB 1979).

5.2.2.10 Año Nuevo

The region of Año Nuevo Island to Año Nuevo Creek is characterized by very irregular bottom topography with shoals and stacks rising vertically from the ocean floor (Arnal et al., 1978 in SWRCB 1981). An average depth of approximately 29 feet (10 m) was found for the submarine plateau (SWRCB 1981).

Beach sediments are coarser in the winter than in the summer. Beach sediments found at Waddell Creek, Greyhound Rock, and Elliott Creek are coarser than those of the Año Nuevo area. Very coarse sediments are present only in the winter and are probably due to the high energy of the storm waves. Waddell Creek and Greyhound Rock receive the direct impact of wave energy, as the prevailing direction of waves is from the northwest and the Año Nuevo area has a southern shore exposure. For Point Año Nuevo, the coastal erosion due to wave energy from 1603 to 1970 was found to be 25,000 cubic yards/year (SWRCB 1981).

5.2.2.11 Pacific Grove

The ASBS is located in Monterey Bay, a wide-mouthed, deep bay which is bisected by an extensive submarine canyon. The canyon, as delineated by the 100-fathom curve, occupies 19% of the Bay's area. It drops off most steeply near shore and is 100 fathoms deep only 1½ miles (2.4 km) offshore. At the mouth of the Bay, the canyon is about 450 fathoms deep and 5 miles (8.0 km) wide (SWRCB 1979).

The canyon is aligned in a northeast-southwest direction, so at the mouth of the Bay the canyon is much closer to the southern headlands (4.1 miles, 6.5 km) than it is to Santa Cruz, at the north end of the bay. The south canyon wall is also steeper, dropping from 100 to 900 fathoms in 1½ miles (2.4 km) off Point Pinos (SWRCB 1979).

The ASBS lies within the southern "shallows" of the bay, a water area enclosed by the Monterey Peninsula on the west side. Within the ASBS, depth contours are more compressed than in the rest of the southern shallows. The 40 fathom curve is 1 mile (1.6 km) offshore at Pacific Grove, but 3 miles (4.8 km) offshore at Monterey (SWRCB 1979).

The subtidal topography of the ASBS consists of shallow water reefs, interspersed with fields of coarse-grained sand. Kelp beds generally mark the location of reefs during the summer. There are also numerous shallow submerged rocks in the ASBS near Point Pinos, Lucas Point (Aumentos Rock), Lovers Point, and Point Cabrillo (SWRCB 1979).

5.2.2.12 <u>Carmel Bay</u>

The submarine topography of the ASBS is dominated by the Carmel Canyon, a major tributary of the Monterey submarine canyon. The Monterey canyon, one of the largest in the world, originates just offshore from Moss Landing, and extends into the center of Monterey Bay. The Carmel Canyon originates about ¼ mile offshore from the mouth of San Jose Creek in the ASBS. It extends offshore in a westerly direction for about 3 miles (6 km), then turns abruptly and continues to the northwest for 12 miles (19 km) before joining the Monterey canyon. The Carmel Canyon drops off steeply, reaching a depth of 1,200 feet about 1 mile (200 fathoms, 1.6 km) offshore and a depth of 3,000 feet about 6 miles (500 fathoms, 9.7 km) offshore. The 120 foot (20 fathom) contour generally separates the canyon from shallower regions of the bay. In most locations, the 120 foot (20 fathom) curve is less than ½ mile offshore; the canyon widens quickly so that it includes most of southern Carmel Bay.

It is thought that fault lines determined the orientation of Carmel Canyon (Martin and Emery, 1967). The nearshore 3 mile portion of the canyon is aligned with the westward trending Carmel Valley fault; the offshore 12 mile portion is aligned with the northwesterly feeding Carmel Canyon fault (a seaward extension of the Sur and Palo Colorado faults) (Moritz, 1968 in SWRCB 1979).

5.2.2.13 <u>Point Lobos</u>

Vertical rocky walls are associated with coastal cliffs, promontories, offshore rocks, and submerged reefs with overhangs, crevices, and seams as additional features. Boulders ranging up to 10 feet (3 m) or more in diameter are common. Reefs occurred to at least 60 feet (18 m) deep and rose 30 feet (9 m) from the bottom. Reef tops are of low relief. Gravel and sand are found at all depths on horizontal surfaces, and play a role in scouring rock and, therefore, changing topography. No bathymetric information is available for the ASBS or surrounding areas (SWRCB 1979).

5.2.2.14 <u>Julia Pfeiffer Burns</u>

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5.2.2.15 Salmon Creek Coast

A dive survey was recently conducted by Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) researchers at a location ½ mile (2.4 km) north of Salmon Creek. The subtidal habitat was characterized as gravel and small cobble at 60 feet (18 m) deep. There were also boulder fields and sand-filled channels (Carr et al., 2006).

5.2.2.16 Laguna Point to Latigo Point

The Laguna Point to Latigo Point ASBS extends from the intertidal zone seaward to the 100 foot contour line, except at the head of Mugu Canyon, where it includes depths of, at most, 125 feet (38.1 m). Except near the canyons, the bottom slopes off gently with a gradient of about 1.7% to 3% and consists primarily of medium to very fine, well sorted sand, especially below 60 feet (18.28 m) depths.

Nearshore areas, particularly between Bass Rock, just west of Deer Canyon, Lechuza Point, and between Point Dume and Latigo Point, have a variable relief where the sand is replaced by extensive rock reefs. These reefs show a high degree of variability, ranging from cobble fields on a sand base to towering and precipitous bedrock ridges and gigantic boulders up to 30 to 40 feet (9 to 12 m) in diameter. The soaring reefs and ridges between Bass Rock and Lechuza Point generally lie parallel to shore and consist primarily of an erosion resistant brecciated rock. The more inclined reefs between Point Dume and Latigo Point generally run perpendicular to or at an angle away from the shore and consist of a more erosive sandstone. A few small reefs of this latter type run parallel to shore off Zuma Beach. Point Dume itself is of a mixed igneous brecciated rock origin. Just off the point, a few sea stacks terminate in sand.

The generally gentle sand slope of the ASBS is interrupted at two locations by submarine canyons: Mugu Canyon to the west and Dume Canyon to the east. Both are steep walled canyons of very fine sand to mud. These canyons are primarily offshore from the ASBS. They begin at about 50 to 60 foot depths, 500 to 800 feet (154 to 244 m) offshore, and rapidly descend with a slope of 8 to 33%. In the deeper parts of both canyons (beyond the ASBS), poorly described rock outcrops apparently occur (Shepard and Dill, 1966 in SWRCB 1979).

Beyond the boundary of the ASBS, the ocean floor continues to slope off gradually as the continental shelf. Below a depth of about 300 feet (91.4 m) (ca. 2 to 3 miles offshore), the bottom drops off more steeply as the continental slope. The slope terminates in the enclosed Santa Monica Basin at a depth of about 1,500 feet (457 m).

There is a large submarine ridge about 5 miles offshore due south of La Jolla Beach, which projects out from the shelf. It rises to within 250 feet (76 m) of the surface.

There are two old artificial reefs within the ASBS. The one off Paradise Cove was installed by DFG in 1959. It is in 60 feet (18 m) of water, is composed of old autos, and covers an area of about one-tenth of an acre. This reef has largely deteriorated. The second reef, at about a 45 foot depth, is off the County Lifeguard Headquarters at Zuma Beach. It is small and composed of old toilets, bathtubs, etc. Both reefs are surrounded by sand (SWRCB 1979).

5.2.2.17 Santa Catalina Island

Northeast Santa Catalina Island: Sand and mud comprise the majority of the subtidal substrate from the outer boundary of the ASBS to within approximately 500 yards (457 m) offshore. Nearshore, the main subtidal substrates in the ASBS are boulder slopes and sandy slopes, with a few rocky reefs. Cliffs are rare.

In general, the subtidal area of the ASBS is rimmed with boulder slopes to a depth of 50 to 100 feet (30 m). Boulder size varies with depth. Shallow sloped areas often have a narrow band of medium-sized boulders (1 m diameter) interspersed with coarse sand closer to shore. Cactus Bay exemplifies this type of substrate. Larger boulders (4 - 8 m diameter), also interspersed with sand, are found from 10 to 50 foot (15 m) depths. With increased depth, the number and size of boulders decreases and the percentage of sand increases. In most areas surveyed, sand comprised nearly 100% of the substrate beyond 100 foot (30 m) depths.

Sandy substrate is rare in water shallower than 40 feet (12 m) between Catalina Head and Arrow Point, with the exception of Starlight Beach and Parson's Landing. However, from Arrow Point to Blue Cavern Point there are many coves, such as Emerald Bay, Howland's Landing, and Isthmus Cove, with sandy subtidal substrate. These coves are enclosed by rock outcroppings and boulders extending to a depth of approximately 40 feet (12 m).

There are three types of nearshore sediments: (1) Lithic sediment composed of rock particles; (2) organic sediment composed of biological fragments such as shells and sea urchin tests; and (3) calcareous sediment composed of $CaCO_3$ primarily from coralline algae.

Areas with heavy runoff, such as Parson's Landing and Cactus Bay, have lithic sediments, usually grading from coarse to fine sands as depth increases. Catalina Head and West End areas, which have large populations of mollusks and relatively heavy wave action, have organic sediments. Sediments found in some of the coves from Emerald Bay to Big Fisherman Cove contain a large percentage of calcareous debris.

The intertidal area of the ASBS is not extensive. The shoreline is extremely rugged, with the main landmass rising steeply out of the ocean. Consequently, intertidal habitats are quite restricted in vertical range. The southwest (windward) side of the island is exposed to wave action and, in certain areas, minimal intertidal areas exist (e.g., Catalina Head). However, the leeward side does not benefit from wave activity, and the combination of steep slopes and low wave action results in poor intertidal habitats. Relatively good intertidal habitat, characterized by gently sloping solid substrate, can be found only at Ship Rock, Bird Rock, and Big Fisherman Cove Point.

Approximately 40% of the ASBS intertidal area consists of solid rock walls, and about 45% consists of various-sized boulders. The majority of these habitats are extremely steep in profile. The remaining 15% of the intertidal area consists of sandy or cobble beaches. Virtually no beaches exist from Catalina Head to the West End, with the exception of Sandy Beach. Between Catalina Head and Arrow Point boulders occupy most of the intertidal habitat. Many small coves and sandy beaches occur along the northeast (leeward) coast from Arrow Point to Blue Cavern Point, although cliffs and boulder areas predominate in this region as well (SWRCB 1979).

Western Santa Catalina Island: Intertidal geomorphology ranges from fine sand beaches to bedrock outcrops often forming boulder aprons. About 20% of the beaches are sandy and 80% are rocky. Little Harbor is the most protected from wave action and therefore the sandy beach has a slightly higher organic content. The nearshore substrate ranges from sandy areas offshore sandy beaches to high relief boulder fields near rocky headlands. Approximately 55 % of the nearshore subtidal substrate is sandy bottom. Grain size in these soft bottom areas decreases with depth, with muddy bottom in some areas on the shelf. Large exposed offshore rocks structures are located off of Ben Weston Point, the rocky headlands between Shark Cove and Beach, and between Beach and Ben Weston Beach (Sentinel Rocks) (SWRCB 1981).

Southeast Santa Catalina Island: The ASBS is fully exposed to south swell and steep, rocky cliffs limit the extent of the intertidal area. Binnancle and Church Rock are the most exposed; Jewfish Point is somewhat protected. About 60% of the intertidal zone is rocky substrate.

In the western portion of the ASBS about 80% of the subtidal habitat is composed of sandy sediment, but the subtidal substrate near headlands are characterized by exposed bedrock, sometimes with pockets of sand. Boulders are also common in the nearshore subtidal. Rocky bottom becomes less common with increased depth and distance from the shore. Sediments grain size in soft bottom areas decreases with depth, with muddy bottom in some areas on the shelf.

In the eastern portion of the ASBS a shallow, flat shelf extends from the shore to a depth of about 15 feet (4.5 m). The shelf is composed entirely of gravel and cobble. Beyond the shelf, the substrate slopes sharply into deeper water.

The intertidal area of the eastern portion of the ASBS has been highly modified by the quarry operations there. Most of the intertidal zone there consists of large boulders, and smaller areas have gravel or small boulders as intertidal substrate. Subtidally within the quarry area the substrate has been modified by quarry operations as well. Occasionally, boulders are dislodged by waves and are deposited subtidally, and the quarry operators replace these boulders in the intertidal zone. In addition small amounts of rock debris is lost to the subtidal zone during barge loading operations (SWRCB 1981).

5.2.2.18 La Jolla

The general submarine topography in the La Jolla Basin area can be described as a narrow (about 2 miles; 3.2 km) continental shelf, traversed submarine canyon that approaches to within about 300 m of the shore. The canyon empties into the broad San Diego Trough, which is a part of the irregular submarine region of deep basins and intervening ridge termed the Continental Borderland.

The substrate in the northern half of the Reserve is fine sand mixed with varying amounts of silt and/or mud. Surveys on sandy substrates, both on the northern sand shelf and inshore of the head of Jolla Canyon, describe this sand as fine and white, interspersed with occasional patches of mud. Presumably, this mud is derived from storm water runoff. The mud is never so abundant that the sand appears a thing other than clean, white sand on superficial glance. The fine sand is well sorted, with median grain diameters of: 0.20 mm in samples from the beach; 0.12 mm in samples from 5 to 10 meters depth; and 0.09 mm in samples from 30 meters depth. The sand grains are fairly uniform in size, with 90% of the 5 to 10 meter samples in the 0.08 to 0.19 mm size. The sand is mainly quartz, although 5% is heavy minerals, 3% micaceous materials, and less than 3% silt (Fager, 1968). According to Fager, this silt/mud content from storm water runoff is insignificant, but this area was close to the end of the SIO pier. The silt/mud concentration or deposition is probably considerably 9 as one moves southward, approaching the offshore area of the largest storm drain located at the foot of Avenida de la Playa.

The sandy bottom in the northern third of the Reserve slopes evenly and gently seaward down to depths of 100 feet (30 m) at a distance 1200 to 1300 feet (365 to 396

m) from shore. The slope steepens somewhat so that depths of 400 to 500 feet (122 to 152 m) are reached in the next 500 meters. This broad sandy shelf is bordered on the north and south by the two branches of the La Jolla branch of the La Jolla Submarine Canyon. The shore-most 300 meters consists of a fine, white sandy substrate that is similar to the sandy shelf immediately north. At a depth of ca. 30 feet (9 m), however, the slope steepens noticeably and there is a 4 to 5 feet (1 to 2 m) clay bank that distinguishes the canyon at a depth of 50 feet (15 m). The canyon head itself is characterized as a wide bowl-like structure, rimmed by a basement of Eocene sandstone/shale. The sides are extremely steep (nearly vertical) in some areas, whereas other areas have a gradual sloping side. There are occasional small rock outcroppings, but these are rare and this branch of the canyon is much less spectacular in its steepness and undercut ledges than the head of the more northern SIO branch. The biota reflects the difference between the physical structures of these two heads.

The southern third of the ASBS is much more diverse in substrate than the others. The area immediately inshore of the southern wall of the canyon is sandy, at least to depths of 35 feet (10 m). Flat sandstone ledges are exposed in much of the Devil's Slide corner of the Ecological Reserve, extending as far northward as the southern end of the La Jolla Beach and Tennis Club. These ledges are found from shore to depths of at least 25 to 30 feet (7.5 to 9 m). In the subtidal areas offshore from the westward-facing section of shoreline, these flat ledges are a reflection of the intertidal and cliff strata, being tipped up some 20 to 30° northward. This allows for undercutting along the northern ledges of these reefs, and it is along these northern, undercut ledges of the larger reef formations that many of the marine animals concentrate. Offshore from the northward-facing shoreline, this pronounced tipping becomes less and less distinguishable, especially with the shallow substrate along this section of the shoreline. At depths between 20 and 35 feet, there is a series of more or less parallel ridges made up of mudstone boulders. These ridges point shoreward toward the corner between Devil's Slide and La Jolla Caves and trend seaward on a northwesterly direction where they cross the Ecological Reserve boundary depths of 35-50 feet (10-15 m).

There is a small deposit of cobbles offshore from the La Jolla Beach and Tennis Club that becomes exposed during the winter months some years after a period of heavy surf; this patch extends for about 100 meters along a front parallel to the shoreline and at depths of 40 feet (3 to 12 m) (SWRCB 1979).

5.2.2.19 <u>San Nicolas Island</u>

SNI is farthest offshore and is more exposed to open ocean conditions than any of the Channel Islands. Its orientation with respect to the prevailing swell patterns create exposure to more severe sea states and wave conditions along both sides of the island. There are few coves and wave protected areas on San Nicolas Island (MLPA SAT

2009). Little else is known by staff about the subtidal and intertidal geology at San Nicolas Island, except that the presence of rocky intertidal and kelp forest communities (see biological baseline section) indicate the presence of rocky substrate.

5.2.2.20 San Clemente Island

The bathymetry surrounding SCI is irregular in shape, with Catalina Basin to the east and San Nicolas Basin to the west. A narrow island shelf extending to a depth of about 330 ft (100 m) surrounds SCI, extending from 0.3 to 3 nm (0.5 to 5.5 km) from the island's coast. Offshore relief east of SCI is extreme due to San Clemente Escarpment, leveling off at a depth of about 3,280 ft (1,000 m) below Mean Sea Level (MSL) in Catalina Basin. Offshore relief south and west of SCI is more gradual, though depths reach a maximum of about 5,900 ft (1,800 m) in San Nicolas Basin (CDMG 1986 in US Navy 2008).

The eastern shoreline of SCI is protected from most prevailing swell patterns and generally receives little wave exposure. This "lee" effect results in the structuring of species assemblages and relatively warm-water, wave-protected communities. The western or windward side of SCI includes substantial bedrock, has a more gradual slope, and receives more wave exposure compared to any other site in its bioregion (MLPA SAT 2009). Little else is known by staff about the subtidal and intertidal geology at SCI, except that the presence of rocky intertidal and kelp forest communities (see biological baseline section) indicate the presence of rocky substrate.

5.3. METEOROLOGICAL AND OCEANOGRAPHIC CONDITIONS

5.3.1 - Climate

Climactic conditions influence ASBS habitat conditions. For example, precipitation is the major factor influencing runoff quantities, and air temperature can influence intertidal life.

5.3.1.1 Northern Coast ASBS

The northern California climate is characterized by a mild maritime climate. In the summer months, a region of high pressure lies off the coast, generating the prevailing northwesterly winds and coastal fog. In winter, this high pressure zone moves southward and is replaced by a low pressure zone off the coast. Storms are common in the fall and winter. Cool, moist air masses move toward the coast during winter months and on contacting the coastal hills, are uplifted, cool, and drop their moisture as rain. The highest average monthly temperatures occur in late summer and fall, and the lowest in December and January. During the day, cool ocean air moves onshore as air heated over the land rises; at night, air tends to move from the cooler land masses toward the warmer ocean. In general, the seaward night flow is best developed in

January (winter months) and least developed in July (summer). This seaward night flow is primarily from the northeast and flows down the canyon slopes to the ocean (SWRCB 1979) (Felton 1965, cited in SWRCB 1980).

5.3.1.2 <u>ASBS at Point Reyes Peninsula and Near the Entrance to San Francisco Bay</u>

The area of the Point Reyes Peninsula and the entrance to San Francisco Bay are characterized by cool, dry, foggy summers and cool, rainy winters. This coastal climate keeps summer temperatures well below those found a few miles inland. The Pacific Ocean tends to reduce the seasonal temperature range. Wind patterns reflect seasons. During winter storms, winds originate from the south, while high pressure systems generally bring brisk northwesterly winds in the spring and summer. Offshore breezes are warmer (SWRCB 1979).

5.3.1.3 <u>Central California ASBS</u>

In general, the climate of the central California coast is characterized throughout the year as having moderate temperatures controlled by the circulation patterns of the North Pacific Ocean (SWRCB 1981). Wind direction varies seasonally with the location of the Pacific High pressure cell. When this cell is centered over the North Pacific, generally between April and September, the coast catches the eastern edge of the gyre, and prevailing winds are from the northwest. These winds are deflected down the coast by the coastal mountain ranges. Upwelling begins and the cooler water brought to the surface creates a cold zone near the coast. The interior valleys begin to heat up and the rising air creates a thermal low pressure area that draws cold air in from the ocean. Water vapor then condenses to produce the fog and low cloud-cover. In the late summer and early fall, the Pacific high-pressure system moves offshore and the interior valleys cool down (SWRCB 1979).

5.3.1.4 <u>Southern California Bight ASBS</u>

Southern California is characterized by a Mediterranean climate with mild temperatures and seasonal winter rainfall. Weather in this area is largely controlled by the Eastern Pacific high, which is located off the coast of Northern California during the spring and summer months; this high pressure cell prevents low pressure systems from moving down the coast into southern California. The summers are warm and without precipitation but moderated by prevailing westerly winds from the ocean and typical summer coastal fogs (SWRCB 1979).

5.3.2 - Oceanographic Conditions

The physical and chemical oceanography in each coastal region represents the habitat that determines the type and abundance of marine life in ASBS. The following information is intended to provide a generalized description of oceanographic conditions that influence ASBS along the California coast.

Seasonal changes in wind direction commonly create seasonal patterns for the currents off of the California Coastline. For much of the year, the California Current brings colder northern waters southward along the shore as far as southern California (MLPA 2006). The California current is the eastern leg of the North Pacific Gyre, a massive, clockwise-moving current system which encompasses the entire North Pacific Ocean (SWRCB 1979). The California Current is a wide, slow moving southeastward flow between 48°N and a southern limit of 23°N. The western limit of the California Current is the boundary region between sub arctic water and eastern north Pacific central water, which at 32°N is about 434.9 miles (700 km) from the coast. The western edge is often set at 621.4 miles (1,000 km) offshore. The majority of the water movement to the south occurs between 124.3 and 310.7 miles (200 and 500 km) offshore, maximum water speeds are shallower than 0.12 miles (200 m). The upper waters of the transition area are more influenced by sub arctic water than the waters below 0.06 miles (100 m) (Allen et al. 2006).

The flow off of the northern California coast is strongest nearshore during the spring and early summer and offshore during the late summer and early fall (Allen et al 2006). Most of the California coast north of Point Conception is dominated by the southward flowing California Current (SWRCB 1980).

The seasonal presence of the California Current corresponds with that of the Pacific high-pressure cell, which is responsible for prevailing northwest winds that blow of the north and central coast. Beginning in March, as the California Current travels south along the coast, surface waters are driven to the right, or offshore, by the combination of northwesterly winds and the Coriolis force. This triggers the upwelling of cold, nutrient-rich water from the depths along the coast, causing this oceanographic season to be termed the Upwelling Period. By September, as the northwesterly winds die down, upwelling ceases and warmer waters return to the coast making way for the Oceanic Period (SWRCB 1979).

The Oceanic Period lasts into October, when the predominant winds move to the southwesterly direction. Close to shore, the California Undercurrent carries equatorial water northward along the Baja California and California coasts beneath the California Current, at depths greater than 655 feet (200 m) (SWRCB 1979). North of Point

Conception in late fall and winter, its core gradually rises from 200-300m to the surface and becomes known as the Davidson Current (MLPA 2006). This current reverses direction intermittently even in surface waters during the winter (SWRCB 1979), and may be continuous with the California countercurrent during this period (Allen et al 2006). It carries equatorial Pacific water of higher salinity and temperature than generally exists at this latitude, and has an important moderating effect on winter ocean temperatures (SWRCB 1979).

The Southern California Bight is the 300 km of recessed coastline between Point Conception in Santa Barbara County and Cabo Colnett, south of Ensenada, Mexico. The dramatic change in the angle of the mainland coastline creates a large backwater eddy in which equatorial waters flow north near shore and subartic waters flow south offshore. This unique oceanographic circulation pattern creates a biological transition zone between warm and cold waters that contains approximately 500 marine fish species and more than 5,000 invertebrate species (SWRCB 1979).

The water transport in the Southern California Bight is influenced by the California Current and the Southern California Counter Current (SWRCB 1980). The prevailing direction of swell in the California Bight is from the west (SWRCB 1979). The California Current flows southward along the coast (Michaels 2005). The California Current is generally located at the surface over the seaward slope, well outside of San Clemente Island and several hundred kilometers offshore of the mainland; it flows toward the equator. Within the Bight a large scale eddy effect takes place and surface water is transported poleward by the Southern California Counter Current. The Southern California Countercurrent occurs in the upper half of the Southern California Bight throughout the year except during April. It occurs in the southern half of the Bight from April to December. Around Point Conception, the Southern California Countercurrent meets with the California Current, creating a rich transition zone. Counterflow north of Point Conception occurs during the fall and winter months (Allen et al 2006). Closer to shore, the current over the coastal shelf, in depths up to 60 meters, flows toward the equator (Dailey et al 1993). In very shallow water adjacent to the surf zone, the longshore current has a net southward flow and deposits sand into the heads of submarine canyons (SWRCB 1980). Upwelling also takes place in the Southern California Bight, in which nutrient rich bottom water rises to the surface.

When the California Current reaches Point Conception, it continues south well off the coast of the Southern California Bight and even beyond the outer islands. However, some of the California Current is diverted eastward at San Miguel Island. This water flows along the north coast of the northern Channel Islands and then splits into three parts and becomes the Southern California Countercurrent. One segment continues eastward along the northern Channel Islands and escapes into the Santa Monica Basin off Anacapa Island. Another segment moves northward across the channel at about the latitude of Santa Barbara. As it nears the coast, it divides into the other two parts: a westerly flowing current along the coast from Santa Barbara to Point Conception (thus forming a counterclockwise gyre in the Western Santa Barbara Basin) and an easterly flowing and weaker portion of the current moves along the coast from Santa Barbara to Port Hueneme, where it also enters the Santa Monica Basin. The eastern arm of the Southern California Countercurrent forms a counterclockwise gyre in Santa Monica Bay, which flows northerly and then westerly along the Malibu Coast from El Segundo all the way to Point Dume; here it rejoins the offshore eastward flowing current. The combined water mass moves primarily southward off the coast from Santa Monica Bay to well beyond the Mexican Border, where it finally rejoins the California Current (SWRCB 1979).

Laid over this general pattern throughout California are both short-term and long-term changes. Local winds, topography, tidal motions, and discharge from rivers create their own currents in nearshore waters. Less frequently, a massive change in atmospheric pressure floods the eastern Pacific with warm water, which suppresses the normal pattern of upwelling. These short-term climatic changes, called El Niño, reduce the productivity of coastal waters, causing some fisheries and seabird and marine mammal populations to decline and others to increase. For instance, warm waters that flow north in an El Niño carry the larva of California sheephead and lobster from the heart of their geographical range in Mexico into the waters off California (MLPA 2006).

Other oceanographic changes last for a decade or more and these natural fluctuations can have significant impacts on the health and composition of marine life. In these regime shifts, water temperatures rise or fall significantly, causing dramatic changes in the distribution and abundance of marine life. The collapse of the California sardine fishery occurred when heavy commercial fishing pressure on sardine populations coincided with population reductions in response to cooling of offshore waters in the late 1940s and early 1950s. In response to the decline in sardines, California law severely curtailed the catch. In 1977, waters off California began warming and remained relatively warm. The warmer water temperatures were favorable for sardines, whose abundance greatly increased. But the warmer waters also reduced the productivity of other fish, including many rockfishes, lingcod, sablefish, and those flatfishes that favor cold water for successful reproduction (MLPA 2007).

Currents and other bodies of water may differ dramatically in temperature and chemistry, as well as speed and direction. These factors all influence the kinds of marine life found in different bodies of water. In general terms, geography, oceanography, and biology combine to divide California marine fisheries and other marine life into two major regions north and south of Point Conception. Within each region, other differences emerge (MLPA 2007).

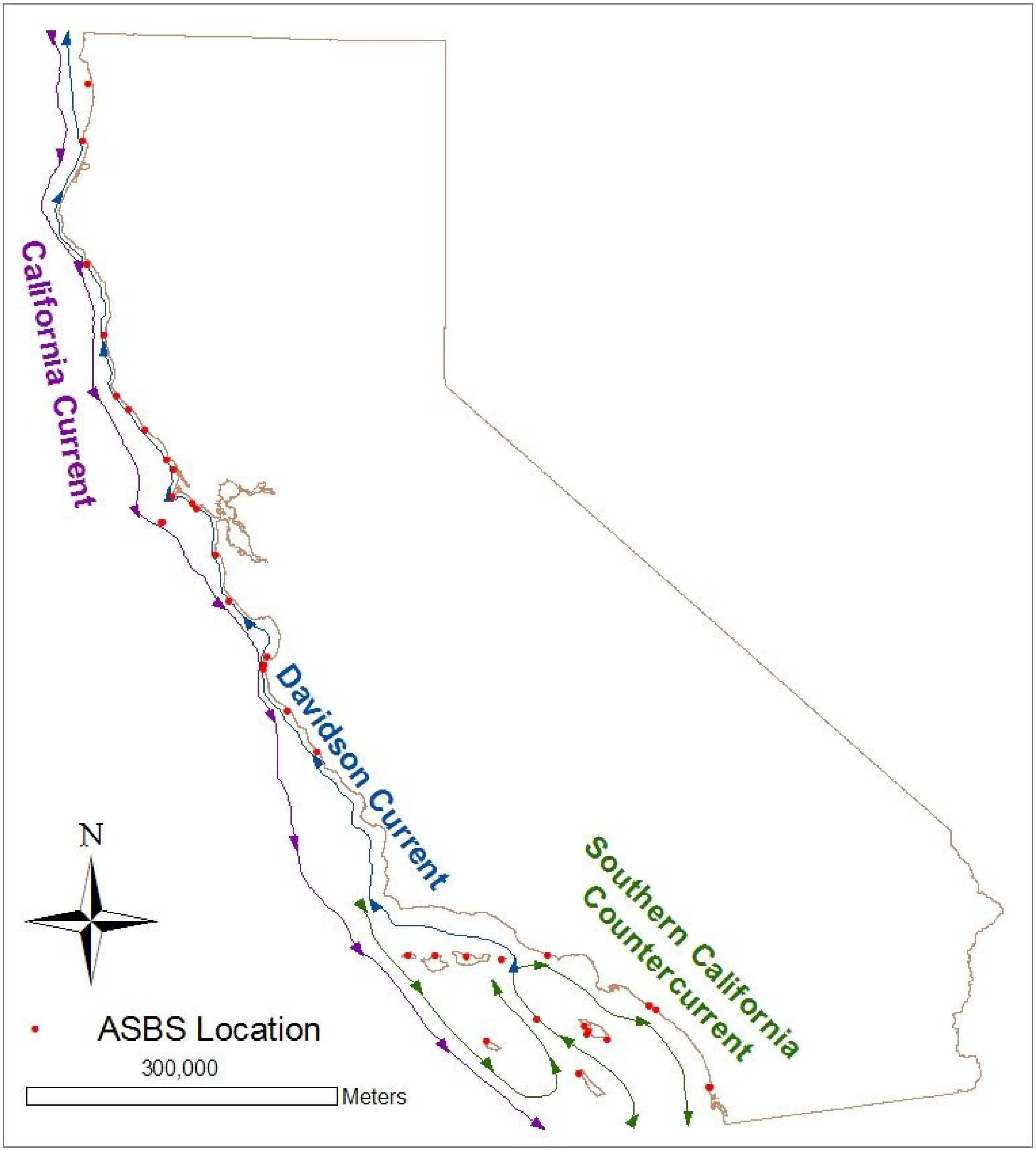

Figure 1. Generalized Major Surface Currents in California Coastal Waters.

5.4. WATERSHED AND LAND USE CHARACTERIZATIONS

State Water Board staff analyzed watersheds adjacent to ASBS for impermeability (impervious surfaces) based on land use data [Calwater 2.2]. The results are presented in Table 5.4.1. Impervious surface greater than 50% was found in watersheds draining to the Pacific Grove, La Jolla, Robert E. Badham, and Irvine Coast ASBS.

Table 5.4.1. Percent Impervious Surfaces adjacent to ASBS

ASBS Name	%
Redwoods National Park	7.61
Trinidad Head	8.55
Kings Range	2.46
Jughandle Cove	28.04
Saunders Reef	10.59
Del Mar Landing	29.69
Gerstle Cove	8.69
Point Reyes Headlands	4.03
Duxbury Reef	5.37
James V. Fitzgerald	24.73
Año Nuevo	4.86
Pacific Grove	64.52
Carmel Bay	25.57
Point Lobos	11.05
Julia Pfeiffer Burns	5.62
Salmon Creek Coast	4.77
Laguna Point to Latigo Point	18.05
North West Santa Catalina Island	4.05
Southeast Santa Catalina Island	4.05
Robert E. Badham	72.50
Irvine Coast	53.73
Heisler Park	28.19
La Jolla	91.64
San Nicholas Island and Begg Rock	6.24
San Clemente Island	5.15

Specific watershed land uses and conditions adjacent to ASBS are as follows:

5.4.1 - Redwoods National Park

Most of the land adjacent to this ASBS is occupied by Redwoods National Park and is jointly managed by the National Park Service and the California State Parks. Rugged cliffs and sparse primitive campgrounds are the primary land use, in addition to limited recreation hiking trails. There are 27 streams emptying into this ASBS mostly carrying runoff from rural and wilderness watersheds. The Klamath River and Redwood Creek are impaired by NPS pollutants attributable mainly to agricultural, timber harvesting, and urban land uses. This watershed is also impacted by hydro modification and removal of riparian vegetation.

Caltrans classified and mapped the land use and summarized population density within ASBS tributary drainage areas (TAS). Sixty-nine point nine percent (69.9%) of the TAS is open space-public land, 17.5% is agricultural land, and 7.8% is very low density-residential. The remaining land use type is less than 2% each of medium and low density-residential, water, and urban reserve. Population density in the TAS is less than 100 people per squared mile.

5.4.2 - Trinidad Head

This watershed encompasses both urban and rural watersheds. Trinidad Bay has marina facilities including mooring field, vessel haulout, maintenance facilities, and commercial crabbing/fishing pier facilities. Bleach and other detergents are known to still be in use by boat owners within the ASBS mooring field. The City of Trinidad's main storm drain discharges directly into the ASBS. Sources of other NPS pollutants arise from vehicle and boat parking directly on the beach, and runoff originating from the adjacent asphalt parking lot. Humboldt State University Marine Lab is located near the headlands. Residences and commercial structures in Trinidad are served by septic systems. Timber harvesting is also a major land use in the watershed and may contribute sediment and related silviculture chemicals.

5.4.3 - King Range

The northern part of this watershed is mostly wilderness managed by the Bureau of Land Management. The town of Shelter Cove is in the southern part of this ASBS on approximately 2 miles (3.2 km) of developed coastline, including houses, businesses, a golf course, a paved airstrip and parking lots along the shore. There is also a fish cleaning station and boat launch. Shelter Cove is primarily residential, with some commercial development to support the local tourism industry. Immediately north of the ASBS is the mouth of the Mattole River, which is impaired by sediment and temperature resulting from livestock agriculture, timber harvesting, and urban land uses.

5.4.4 - Jughandle Cove

The watershed of the Jughandle Cove ASBS is the California State Parks Jug Handle State Reserve. This largely natural watershed, located about 5 miles (8.04 km) south of Fort Bragg, is natural open space and undeveloped. The primary use is dedicated to the Ecological Staircase hiking trail, with a visitor parking area adjacent to Highway 1. The watershed includes Highway 1, which crossed over Jughandle Creek approximately 100 meters upstream of the ASBS. Jughandle Creek may be a source of sediment load in the winter, due to past logging operations. Homes in the area have septic systems, and there is also a lumber mill that may contribute pollutants to the watershed. With the exception of NPS runoff from the Reserve's parking lot and associated access trail, there are no other potential sources of pollutants known to drain directly into the ASBS.

5.4.5 - Saunders Reef

The watershed of this ASBS has about 1.6 miles (2.57 km) of coastline that runs parallel to Highway 1 along a fairly rural part of Northern California. A residential area is located inland of the southern end of the ASBS, directly adjacent to the southern boundary point. These homes are served by septic tanks, and due to the soil conditions, drainage from these septic tanks may escape into this ASBS. There are also two parking lot turnouts with the boundaries of the Saunders Reef ASBS coastline.

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Fifty-seven point seven percent (57.7%) of the TAS is open space-public land and 41.5% is low density-residential. The remaining land use is undetermined. Population density in most of the TAS is less than 100 people per squared mile.

5.4.6 - Del Mar Landing

The watershed immediately adjacent to this ASBS is a part of the Sea Ranch private community, which has residential development, storm drains, and walking trails along the coastline. The watershed includes Highway 1, which is less than ½ mile from the coast. With the exception of four nonpoint source and storm water conveyances, there are no other sources of pollutants known to drain directly into the ASBS; however, eight ephemeral streams draining into or near the ASBS potentially carry pollutants from upstream sources. Homes in the project study area are serviced by a sanitary wastewater treatment system. A golf course is located approximately ½ mile north of the ASBS.

At The Sea Ranch Association (TSRA), nearly 60% of land use is common area, of which the primary use is open space dedicated to the preservation of the natural environment. A small percentage of commons at TSRA is used for roads, recreation facilities, and community facilities. Remaining land use consists of residential and commercial areas. The County of Sonoma limits lot coverage (building footprint) to no more than 35% of the lot area. As a result, impervious surfaces are reduced by lot coverage limitations and by paving restrictions of TSRA's design review body. Of the 58 lots in the study area, most have gravel drives and only a few have paved drive surfaces.

5.4.7 - Gerstle Cove

The watershed of Gerstle Cove ASBS is primarily State Parks recreational open space, with Highway One located in the watershed as well. State Parks facilities include a public restroom, fish cleaning station, campground, roads, multiple parking lots, and a visitor's center. There are six ephemeral watercourses and seven groundwater seeps along the coast.

5.4.8 - Point Reyes Headlands and Duxbury Reef

The surrounding land mass of the Duxbury Reef ASBS has at least 8,320 acres (33,669,845 m^2) of drainage leading into several streams. During storm events, it is common to see small waterfalls in the Bolinas Point area, flowing directly into tide pools on the reef. At various points along the ASBS, groundwater is observed seeping from the cliffs into the beaches or over the rocks.

The largest Bolinas Mesa drainage network includes Alder Creek and several tributary drainages to the north and south. Storm water runoff flows overland or through groundwater seepage within a system of roadside ditches and culverts to the major drainages on the Mesa. The majority of the land use draining to the discharge point and into Alder Creek is single family residential served by septic systems; however, there are several agricultural operations (commercial gardens); a variety of commercial sole proprietorships (Dentist offices, massage offices, etc.); and certain ranching/livestock operations—most notably a small portion of Niman Ranch (cattle) and the Vanishing Point Ranch (horses). Due to the rural nature of the area, many Bolinas Mesa residents have chickens, goats, horses, and/or other livestock property.

Approximately 250 developed properties drain into the Alder Creek watershed. An estimated 79% of the roads within the Alder Creek watershed are unpaved and are not maintained by Marin County. The remaining 21% of roads are County maintained, paved roads. The area of land that drains to Alder Creek is 275 acres (1.11 km^2).

5.4.9 - James V. Fitzgerald

This watershed encompasses an array of land uses such as residential, rural residential including horse properties, and agricultural. The beaches are well visited by the public. Half Moon Bay Airport is directly east of the ASBS and Pillar Point Harbor marina is located immediately south of the ASBS. San Vicente Creek drains a developed portion of the watershed directly to the ASBS and is chronically contaminated with coliform bacteria and is 303d listed.

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Seventy-two point six percent (72.6%) of the TAS is low density-residential, 17.8% is medium density-residential, 8.7% is agricultural, and 0.8% is industrial. Population density varies from 100 to 5,000 people per squared mile.

Pillar Point Air Force Station (AFS) occupies the land at the southern end of the ASBS. There are about 10-15 site personnel employed there. The storm water runoff discharge into the ASBS originates from Pillar Point AFS tracking station on the bluff. Storm water runoff at Pillar Point AFS either infiltrates into site soils, sheet flows over the cliff side into the ocean, or is channeled off-site through engineered drainages. Storm water runoff from the developed areas, approximately 8.3 acres (33,589 m^2) of Pillar Point AFS, collects in a small concrete drainage channel adjacent to the circular facility perimeter road and is directed towards a sump near the guardhouse. Runoff is then discharged to the north through a culvert and subsequently conveyed through an engineered concrete drainage channel down the cliff face to the beach below. The watershed draining to the ASBS is composed of approximately 36% impervious surface (includes pavement and building coverage) and the remaining 64% is composed of vegetated hillsides. The land use is primarily characterized by open space, as well as administrative and industrial land uses.

County of San Mateo properties north of Pillar Point AFS within the Fitzgerald ASBS watershed are approximately 4.5 square miles (11.65 km^2) and are located in unincorporated San Mateo County. The dominant land uses are residential, park/open space, ranching and equestrian facilities, a sewage pumping facility, small-scale agriculture, and light commercial/industrial. Three residential communities are located in the watershed; Montara, Moss Beach, and Seal Cove. The community of El Granada is also located in the southern end of the ASBS and drainage from the area flows to Pillar Point Harbor, discharging at a point located just outside of the ASBS boundary.

As of 2000, the combined population of Montara and Moss Beach was less than 5,000. The Half Moon Bay Municipal Airport majority of storm water runoff from this facility flows to the Pillar Point Harbor, which is located outside of the ASBS boundary.

5.4.10 - Año Nuevo

The watershed adjacent to the Año Nuevo ASBS is the Año Nuevo State Preserve, managed by California State Parks. Access to beaches is limited and most visitors to the park are confined to marked footpaths, and trail bypasses are sources of erosion and downstream sedimentation. There are 17 natural streams or gullies that drain into the ASBS; the most significant are from the rural watersheds of Año Nuevo Creek to the south, and Cascade Creek to the north. Highway 1 is also a source of road runoff, and is located in those watersheds. Farming (primarily artichokes, brussel sprouts, and flowers) is conducted adjacent to and within the reserve boundaries. There are direct nonpoint source discharges into the ASBS from those agricultural fields, and agricultural discharges may influence the streams as well.

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Sixty point nine percent (60.9%) of the TAS is low density-residential, 24.4% is open space-public lands, and 14.5% is agricultural. Population density in the TAS is less than 100 people per squared mile.

5.4.11 - Pacific Grove

Flows originating from this Monterey County watershed arise primarily from urban runoff. The Hopkins Maine Laboratory and the adjacent Monterey Bay Aquarium have several point sources of laboratory and aquarium waste seawater that discharge into the ASBS. These two institutions will be covered under an individual exception, and not part of this General Exception.

The only somewhat natural drainage into the Pacific Grove ASBS is from Greenwood Creek, which runs through Greenwood Park. Upstream from the park, the creek again becomes part of the storm drain system. All other freshwater discharges to the ASBS are from storm drains (SWRCB 1979).

Within the jurisdiction of the City of Pacific Grove, this area of watershed adjacent to the ASBS comprise of a total of approximately 940 acres (3.80 km^2), predominately residential. The downtown retail sector comprises 30 acres (121,405 m^2). The Pacific Grove Golf Links contribution is approximately 43 acres (174,014 m^2) in size. Parks, open space, and a recreational trail system border the entire length of the ASBS.

5.4.12 - Carmel Bay

The watersheds adjacent to the Carmel Bay ASBS include the city of Carmel-by-the-Sea and Pebble Beach Golf Course. Approximately 60% of the urban runoff from Carmel-by-the-Sea flows through storm drains directly into the ASBS, and 40% drains directly into the Carmel River, which also flows into the ASBS. The Carmel Area Wastewater District sewage treatment plant has an existing exception and discharges treated wastewater at a submerged location offshore of the Carmel River. The other discharges drain runoff from the Pebble Beach golf course, streets, highways, and private homes. And there are ten springs/seeps that may drain nonpoint source pollutants into the ASBS.

Eight natural streams also drain the golf course and Carmel-by-the-Sea before flowing into the ABSS. There are several watersheds adjacent to the Carmel Bay ASBS; however, all freshwater discharges are seasonal. Pescadero Canyon drains into the ASBS at the north end of Carmel City Beach, and San Jose Creek drains into Monastery Beach. The principle drainage is the Carmel River Basin, which covers a total of about 225 square miles (585 km^2) (Army Corps of Engineers, 1974) in a northwest-southwest direction. Carmel Valley, the lower portion of the watershed, extends eastward about 15 miles (24 km) from the river mouth.

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Twenty-nine point one percent (29.1%) of the TAS is low density residential, 28.5% is agricultural, 25.2% is open space-public lands, and 14.6% is medium-residential. The remaining land use type is less than 2.0% each of urban reserve, low density commercial and high density residential. Population density of about half of the TAS is less than 100 people per squared mile. Population density in the remaining area of the TAS ranges from 100 to 10,000 people per squared mile, though, it should be noted that density exceeds 5,000 people per square mile in the city of Carmel-by-the-Sea.

5.4.13 - Point Lobos

Located just south and adjacent to the Carmel Bay ASBS, inland in the Point Lobos State Reserve, managed by State Parks. The State Reserve is regularly visited by a large number of day hikers and scuba divers, and included several small campgrounds and a small boat launch ramp at Whalers Cove. Land use outside of, but near, the State Reserve is primarily rural residential. There are 39 streams or natural gullies that drain small watersheds and walking paths along the coastline. To the south there are residences and a hotel.

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Eighty-two point nine percent (82.9%) of the TAS is open space-public land, 13.8% is low density-commercial, and 2.3% is medium density-residential. Population density of the TAS is less than 100 people per square mile.

5.4.14 - Julia Pfeiffer Burns

Cliffs along this stretch of Big Sur Coastline are rugged and steep, greatly limiting access to the shoreline. Inland is the Julia Pfeiffer Burns State Park, which has a small campground and parking area near McWay Falls. Most drainage into the ASBS is runoff from rural and wilderness watersheds, but there are 25 discharge locations from Highway 1. After a large landslide triggered by heavy rains during the winter of 1982-83, Caltrans road-clearing operations on Highway 1 resulted in the deposition of massive amounts of sediment into the ASBS, completely filling McWay Cove. The cove had been populated by diverse rocky intertidal and subtidal marine life; now McWay Falls flows onto a sandy beach. As a result, sediment erosion and downstream deposition into the ASBS is a continuing concern as deposition of sand, and scour, associated with the currents transporting that sand is known to impact marine life there.

Within the Julia Pfeiffer Burns ASBS, two small watersheds occur, Partington Creek draining into Partington Cove and McWay Creek draining into Waterfall Cove (SWRCB 1980). Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Ninety-nine point two percent (99.2%) of the TAS is open space-public lands and 0.7% is low density-residential. Population density of the TAS is less than 100 people per square mile.

5.4.15 - Salmon Creek Coast

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Ninety-nine point seven percent (99.7%) of the TAS is open space-public lands and the remaining land is agriculture. Population density of the TAS is less than 100 people per square mile.

5.4.16 - Laguna Point to Latigo Point

This watershed is located in both Ventura and Los Angeles counties. It is the largest mainland ASBS in southern California. State Parks administers many beaches and campgrounds in the northern and central sections along the coast, and Los Angeles County administers the beaches in the southern portion. About 31 natural streams drain into the ASBS. Point Mugu Naval Base occupies the northern portion of the watershed and surrounds Mugu Lagoon, which is an estuary of Calleguas Creek. Calleguas Creek is impaired by a variety of pollutants. The land in the northern section of the watershed is otherwise largely undeveloped, and the majority of the direct discharges into the ASBS are from the pipes leading to the beach from Highway 1. The southern and central sections of the watershed lie in Los Angeles County and include the populated portion of Malibu developed with beachfront homes. A large number of direct discharges in this area are from roads including Highway 1, and urban landscape runoff from homes and small businesses. Most of the residential sited and commercial buildings are on septic systems or are served by small secondary treatment systems. Effluent from the septic or secondary treatment systems is discharges to land via leach fields or spray irrigation. Some of the leach fields are located on or near the beach. Several beaches along the coast are CWA Section 303d listed for beach closures and high coliform counts.

Within the City of Malibu jurisdiction the watershed environment westward of Malibu Canyon Road to the Ventura County line is in a relatively undisturbed state. The slopes and hillsides are dominated by coastal sage scrub and chaparral vegetation, and large areas of riparian habitat in the canyons. The natural environment from the Civic Center and eastward has suffered some biological degradation. Grading and development eliminated some native hillside vegetation in some areas, portions of creeks have been channelized, and kelp beds have largely diminished or disappeared, but reef and rock zones still provide habitat for many species of fish.

More than 15% of the total land in Malibu is public open space. One thousand eight hundred and sixty-nine point nine (1,869.9) acres (7.57 km^2) of open space are used for public recreation, including regional parks, local parks, beach parks, and general open space. Local and regional parks make up 743.7 acres (3.0 km^2) of the open space in Malibu. Vacant, undeveloped private land comprises 60.4% of all land in the City

(7578.3 acres; 30.66 km^2), most of which is in its natural state containing tree, brush, shrub, and grassland vegetation. With a majority of the land in Malibu still sitting as undeveloped open space, it is evident that the general character of the land has changed little since 1974, when the ASBS was first designated.

Eight small watersheds totaling 33,000 acres (133.5 km^2) drain into the ASBS along the County of Los Angeles coastline. This area consists of the unincorporated County of Los Angeles, City of Malibu, State Parks, National Parks, and Caltrans roadways. The County of Los Angeles has jurisdiction over approximately 12,300 acres (49.7 km^2) of the total drainage area. The land use is almost entirely natural open space. Small portions of the drainage area also include low density residential developments, small agriculture plots, and beach parking areas.

Within the State Department of Parks and Recreation jurisdiction, Point Dume is comprised of 31 acres (125,452 m^2) of parkland. There are 2,972 lineal feet (905.8 m) of beach associated with this unit; about half of that is isolated from the unit with a parking area that is administered by the County of Los Angeles. There are other State Parks with associated infrastructure located at this ASBS.

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Eighty-six point one percent (86.1%) of the TAS is open space-public lands, 4.9% is low density-residential, 4.8% is very low density-residential, and 2.6% is medium density-residential. The remaining land use type is less than 1.0% each of low density commercial, industrial, high density residential, planned development, high density commercial, water, urban reserve, and mixed use. Population density of the TAS varies from less than 100 to 10,000 people per square mile, and in a few relatively small areas, reaches 20,000 people per square mile.

5.4.17 - Northwest and Western Santa Catalina Island

Within the Northwest portion of the Island, there are 17 natural streams and gullies draining into the ASBS. Drainage from the community of Two Harbors consists of small gullies and pipes used mainly for storm water runoff. Two Harbors also has marina facilities consisting of mooring field and pier facilities. Youth camps with structures for camping, picnicking, and recreational use much of the coastline in this area. Adjacent to the Blue Cavern Cove are the intake line for the University of Southern California (USC) Wrigley Catalina Marine Science Laboratory and the leach field for the treated domestic wastewater from the Marine Science Center. USC has a waste seawater discharge covered under an existing exception.

Western Catalina is used primarily by boaters, the island residents and tourists, and has areas for camping, picnicking, hiking, and surfing. There are five natural streams draining this area. A road runs along part of the coastline of the ASBS, and may contribute to storm water runoff, portions of the road are annually paved with oil slurry that may be discharged into the ASBS.

Santa Catalina Island Company (SCICO) occupies the majority of the land adjacent to the ASBS, Open Space Easement and Conservancy Area. The Two Harbors area and Little Geiger Cove to Howland's Landing are the Non-Easement, Non-Conservancy areas owned by the SCICO. The land use is dominated by residential areas, view corridors/public uses, campgrounds/hostels, and lodges/inns. The SCICO has two secondary stage wastewater treatment plants with land disposal near the ASBS. Additionally, SCICO has removed the underground fuel storage tanks previously located at the vehicle fueling facility, located adjacent to the beach.

The high use visitor period runs roughly from Memorial Day in May through Labor Day in September. During that time, the City of Avalon, as well as other recreation areas and summer camps on the island, are generally filled to capacity. During the remaining months, the population drops to a fairly constant level of permanent residents while other areas retain a minimum number of more-or-less permanent, maintenance-type personnel (Los Angeles County, Department of Regional Planning. 1983. Local Coastal Plan, Santa Catalina Island).

5.4.18 - Southeast Santa Catalina Island

The City of Avalon is located on Santa Catalina Island and is relatively close to but not immediately adjacent to the ASBS.

This watershed has two direct discharges and three natural streams draining to the ASBS. The major source of anthropogenic impact is associated with a large quarry. The Connolly-Pacific Company (Connolly) facility is located in the Pebbly Beach Extractive Use Zone in the Santa Catalina Island Local Coastal Plan. Connolly leases the property from the Santa Catalina Island Company. There is a jetty constructed at the quarry. Connolly must maintain the natural shoreline contours, meaning some rocks are added periodically to areas where storms have caused slippage. Connolly is also required to reconstruct a "natural" hillside topography upon reclamation. The facility is approximately 248 acres (1 km^2) and is completely pervious (i.e., no paved roads or parking areas).

5.4.19 - Robert E. Badham

Uses of the watershed, nearshore and offshore, areas in this ASBS include industrial service supply, navigation, recreation, commercial, sport fishing, and shellfish harvesting. Three natural streams flow into the ASBS which carry urban runoff from the Corona Del Mar area of Newport Beach. Urban runoff may be contributing toxic pollutants such as pesticides and other organics, and some impacts are also resulting from hydromodification in the upstream portions of one of the streams, Buck Gully, which is CWA Section 303d listed.

The land immediately behind the coastal bluffs of the Robert E. Badham ASBS is nearly completely developed, and private homes line most of the cliff edge. Public access to the Refuge is provided by a large, partially paved walkway at Poppy Avenue and by climbing over the rocks along shore from the north (from the Corona del Mar area) (SWRCB 1979).

The City of Newport Beach urban land use includes 38,394 housing units and a population of 70,032 in 2000. Within the immediate watershed drainage area of the ASBS, there is a total population of 4,523. Of the approximately 32,000 acres (129.5 km^2) that make up the City of Newport Beach, the drainage area of the Newport Beach Marine Life Refuge consists of 1,659.32 acres (6.72 km^2). The majority of the drainage area is either residential, 733.27 acres (2.95 km^2), or vacant land, 729.06 acres (2.95 km^2). The rest of the watershed is open land and recreation (100.22 acres; 405,575.9 km^2), mixed use or under construction (82.74 acres; 0.33 km^2), commercial and public (10.44 acres; 42,249 m^2), and transportation and utilities (3.61 acres; 14,609 m^2)). There are no industrial areas within the watershed. The vacant land is located on either side of Buck Gully and Morning Canyon Creek and is bordered by residences and open parks.

5.4.20 - Irvine Coast

Most of the watershed is urbanized with the exception of the Crystal Cove State Park area, which contains some of the last undeveloped Orange County coastline. There are 16 natural gullies or streams in this watershed mostly drain urban areas, the Pacific Coast Highway, and park facilities and then into the ocean. Los Trancos Creek is impaired by fecal coliform bacteria. In addition there is groundwater spring that drains the coastal bluff forming a small surface stream into the ocean.

Caltrans classified and mapped the land use and summarized population density within ASBS TAS. Fifty-six point two percent (56.2%) of the TAS is open space-public lands and 43.8% is medium density-residential. Population density in about 65% of the TAS is less than 100 people per squared mile. Population density of a relatively small area of the TAS ranges from 5,000 to 10,000 people per square mile. The remaining area of the TAS has a population density of 100 to 500 people per square mile.

The California Department of Parks and Recreation, in the Crystal Cove State Beach area, is comprised of 2,791 acres (11.29 km^2) of land. There are 16,800 lineal feet (5.12 km) of beach associated with this park. The park has approximately 8 miles (12.87 km) of trails. The park is bisected by Highway 1. There are 174,120 square feet (16,176 square meters) of parking lot at the Pelican Point facility. Developed area in the park amounts to about 0.5% of the total area. Caltrans has developed collection infrastructure to accumulate all roadway drainage and eliminate any direct runoff from the Highway 1 section over most of the area that has the potential to impact the ASBS. About 50% of the park is bordered by urban development and golf course; with the remainder undeveloped back country to the top of the coastal drainage ridgeline.

5.4.21 - Heisler Park

Discharges into the Heisler Park ASBS arise from hardscape, street, and storm drains. There is one gully that drains runoff from an urban portion of the City of Laguna Beach. The City of Laguna Beach jurisdiction includes 1,225 property lots, 26,000 residents, and the current resident watershed population of approximately 2,500 to 3,000 people. It is estimated that about 3,000,000 tourists visit the city each year. Land use of the watershed area is predominantly residential and a small percentage of commercial use along the Pacific Coast Highway. The reserve watershed area consists primarily of residential development from the beach cliff area, extending inland to the narrow coastal plain and up on the hillsides. There are no industrial businesses or facilities within the watershed. There are five city parks and recreation areas which amount to 61 acres (246,858 m^2), and there is one city facility, the City Park Division operations yard.

5.4.22 - La Jolla

The adjacent, highly urbanized watershed here has nine naturally occurring streams or gullies also drain the developed La Jolla town area into the ASBS. Within the ASBS watershed area, there are approximately 1,640 households based on the 2000 census. It is estimated that the current resident population is 6,060 people in the watershed. During the summer months, visitors and tourists significantly increase the amount of people in the community.

Because the watershed is built out, it is anticipated that the existing percentage of impervious surface will not significantly change in the future. The watershed is fully developed and has been for several decades; land uses, and assumedly storm water quality, have remained fairly static during this time. There are approximately 1,452 acres (5.87 km^2) in the ASBS drainage area. Of this total, 80% is urbanized area and 20% is undeveloped or dedicated open space. There are no industrial businesses or facilities within the watershed.

5.4.23 - San Nicolas Island and Begg Rock

SNI is approximately 61 miles (98 km) from the mainland. The island, managed by the U.S. Navy, is not open to the public. There are 35 natural gullies and ephemeral streams on the island, which drain into the ASBS. There are residential and industrial areas, pier, barge landings, roads, structures, missile testing activities, and an airfield on this island that may contribute to pollutants into the ASBS. A desalination plant operated by the Navy discharges brine under an individual exception.

5.4.24 - San Clemente Island

SCI is located 49 miles (79 km) from the mainland. The island is managed by the U.S. Navy and is not open to the public. There are residential and industrial areas, piers, barge landings, roads, structures, military training activities (including the use of ordinance), and an airfield on this island that may contribute to pollutants into the ASBS. There are also 100 natural gullies and ephemeral streams that drain into the ASBS. A large area in the southern part of the island is used for military operations, including explosion of ordinance. This undoubtedly results in erosion and resulting sedimentation into the coastal portion of the ASBS. A sewage treatment plant operated by the Navy discharges into an excluded zone within the ASBS under an individual exception.

There are 214 watersheds on the island. The revised universal soil loss erosion occurs on most of the island at a rate of less than 4 tons per acre per year, though the northeast coast of the island erodes at 12 to 23 tons per acre per year.

5.5. BIOLOGICAL COMMUNITY BASELINE

5.5.1 - ASBS Reconnaissance Surveys (1979-81)

Biological surveys were conducted and reported in the State Water Board's California Marine Waters, Areas of Biological Significance Reconnaissance Survey Reports (1979-1981). The results have been summarized in Table 5.5.1 (below) to display the number of flora (plant and algae), invertebrate, and fish species found in each ASBS.

Table 5.5.1. Number of flora (algae and marine vascular plants), invertebrate, and fish species found in each ASBS, as summarized from biological surveys conducted for the State Water Board's Reconnaissance Survey Reports (1979-1981)

ASBS Name	Number of Flora Species	Number of Invertebrate Species	Number of Fish Species
Redwoods National Park	35	433	29
Trinidad Head	24	407	0
King Range	28	181	11
Jughandle Cove	14	72	9
Saunders Reef	31	157	13
Del Mar Landing	No Survey Conducted		
Gerstle Cove	39	310	26
Point Reyes Headlands	31	299	16

ASBS Name	Number of Flora Species	Number of Invertebrate Species	Number of Fish Species
Duxbury Reef	6	89	0
James V. Fitzgerald	33	159	12
Año Nuevo	35	634	14
Pacific Grove	87	521	17
Carmel Bay	30	125	78
Point Lobos	27	242	15
Julia Pfeiffer Burns	17	151	26
Salmon Creek Coast	No Survey Conducted		
Laguna Point to Latigo Point	43	613	86
Northwest Santa Catalina Island	38	254	38
Southeast Santa Catalina Island	44	260	27
Robert E. Badham	7	90	13
Irvine Coast	5	187	24
Heisler Park	15	160	28
La Jolla	20	151	36
San Nicolas Island & Begg Rock	No Survey Conducted		
San Clemente Island	No Survey Conducted		

5.5.2 - Marine Wildlife

5.5.2.1 Marine Reptiles

Marine sea turtles occur in California waters. Four species of federally protected sea turtles may be along the California coast: green (*Chelonia mydas* FE), leatherback (*Dermochelys coriacea* FE), loggerhead (*Caretta caretta* FE), and olive ridley sea turtles (*Lepidochelys olivacea* FE). These marine turtles are circum-global in distribution but breeding colonies have not been observed in California (Coastal Conservancy 2005).

5.5.2.2 Marine Birds

Birds comprise the most conspicuous group of animals occurring along the California coast; that many individuals are easily visible from land during all seasons and tidal conditions. Most marine bird populations are seasonal; heaviest use occurs during spring and fall migrations, and in winter. During the summer, most of the species are nesting elsewhere (SWRCB 1979).

Birds are important predators of many of the fish and invertebrates inhabiting the coast. In the rocky intertidal zone, several species of shorebirds (especially black turnstones, surfbirds, rock sandpipers, black oystercatchers, willets, and whimbrels) prey on water lice, salt water fleas, and other small crustaceans. Bristle worms, a variety of small mollusks, and occasionally representatives of other invertebrate taxa are also preyed upon. Gulls feed on crab, seastars, *Pisaster ochraceus*, and sea urchins. On the sandy beach, sanderlings and marbled godwits probe for water lice, *Excirolana*, salt water fleas, *Orchestoidea* and *Paraphoxus*, the sandcrab, *Emerita analoga*, and adult and larval insects. Seabirds that capture food near the water surface (pelicans, phlaropes, terns, and gulls) or dive beneath the surface (loons, grebes, cormorants, sea ducks, and alcids) forage on zooplankton, squid and fish, as well as mollusks and crustaceans taken from the seafloor (SWRCB 1979).

Of the 100+ other species occurring somewhat regularly along the California coast, the great majority nest outside of California, with many species migrating annually to the Arctic to breed. Small numbers of some of these species, often immature birds, remain here throughout the summer (SWRCB 1979).

Seabirds found in the Southern California Bight include Xantu's murrelet (*Synthliboramphus hypoleucus*), California gull (*Larus californicus*), Heermann's gull (*Larus heermanni*), western gull (*Larus occidentalis*), Royal tern (*Sterna maxima*), California brown pelican (*Pelecanus occidentalis*), ashy storm-petrel (*Oceanodroma homochroa*), Brandt's cormorant (*Phalacrocorax penicillatus*), and double-crested cormorant (*Phalacrocorax auritus*) (SWRCB 1979) (PRBO 2005). The California least tern (*Sterna antillarum*) and elegant tern (*Thalasseus elegans*) forage and nest along the California coast. The bald eagle (*Haliaeetus leucocephalus*) is also present along the coast and in the Channel Islands. They were listed as an endangered species in 1967 when their population drastically diminished from exposure to the chemical pesticide DDT. Recovery efforts were made to repopulate this species and, after successful attempts, they were downgraded to threatened species in 1995. As of July 6, 1999, they were recommended for delisting by the U. S. Fish and Wildlife Services due to the increase in numbers found to exist (DFG 2001).

North of the Bodega Marine Life Refuge, along the California coast in the area of the Saunders Reef ASBS, pelagic birds spotted included the Pigeon Guillemot, Brown Pelican, Pelagic Cormorant and Western Gull. On the cliffs over the inter-tidal, birds found nesting include Common Ravens, Black Oyster Catchers, Cliff Swallows, and Pelagic Cormorants (SWRCB, 1980). Gerstle Cove, Del Mar Landing, and Jughandle Cove ASBS are all in the vicinity of the Saunders Reef ASBS and would likely have similar wildlife species.

Farther north, at the Trinidad Head ASBS, Western Gulls rest on offshore rocks. Numerous sea-birds also rest or nest on Blank Rock and Flatiron Rock. Blank Rock specifically serves as a nesting are for Fork-tailed Petrels, Leach's Petrels, Brandt's Cormorants, Pelagic Cormorants, Western Gulls, Common Murres, Pigeon Guillemots, Cassin's Auklet, and the locally rare Tufted Puffin (SWRCB, 1979). Due to the close proximity of the Trinidad Head ASBS to both the Redwood National Park ASBS and the King Range ASBS, the bird life found at these locations should be similar.

Along the northern and central coast, several species nest close to the intertidal zone, and are present as year-round residents. The black oyster catcher nests on rocks just above the reach of the waves. A smaller shorebird, the snowy plover, nests on the upper areas of beaches. Among seabirds, pelagic cormorants nest in scattered colonies along sea cliffs. This species builds nests on rock shelves along the cliff faces above the surf. Brandt's cormorant, a larger species which typically selects flat areas on islands for colony sites, is also present in large numbers along the northern and central coast. Gulls and black oyster catcher also nest along the coast (SWRCB 1979).

5.5.2.3 Marine Mammals

All marine mammals are protected under federal law (Marine Mammal Protection Act). Members of this group are predominantly carnivorous and represent the upper end of the marine food chain in the coastal waters. The three orders of marine mammals found along the California coast are the seals and sea lions (*Pinnipedia*), the sea otters (*Fissipedia*) and the dolphins, porpoises, and whales (*Cetacea*); the seals and sea lions are the most easily observed and abundant (SWRCB 1979). Table 5 displays NOAA's information about the presence of marine mammals within certain ASBS from Point Reyes southward.

North of Point Reyes, marine mammals in the Saunders Reef ASBS include the Harbor Seal and the California Sea Lion (SWRCB, 1980). Other ASBS locations in the area such as Gerstle Cove, Del Mar Landing, and Jughandle cove would also support Harbor Seals and California Sea Lions. At the Trinidad Head ASBS, both California Seal Lions and Stellar Sea Lions haul out on Blank Rock and Flatiron Rock. Harbor Seals use exposed rocks in Trinidad Bay and the western sector of the ASBS as resting sites (SWRCB, 1979). Due to the close proximity of the Trinidad Head ASBS to both the Redwood National Park ASBS and the King Range ASBS, similar marine mammal activity is assumed to also be found in these localities. River otters have been observed along the east side of Trinidad Head (SWRCB, 1979).

Table 5.5.2 Information on Presence of Marine Mammals within Certain ASBS

		Source (1)									Source (2)								
		Pt. Reyes	Duxbury	James V. Fitzgerald	Año Nuevo	Pacific Grove	Carmel Bay	Pt. Lobos	Julia Pfeiffer Burns	Salmon Creek	Laguna Point to Latigo Point	Northwest Santa Catalina Island	Southeast Santa Catalina Island	Robert E. Badham	Irvine Coast	Heisler Park	La Jolla	San Nicolas Island & Begg Rock	San Clemente Island
PINNIPEDS & FISSIPEDS	Southern Sea Otter *Enhydra lutris nereis*	x	x	x	x	x	x	x	x	x								x	
	California Sea Lion *Zalophus californianus*	x	x	x	x	x	x	x	x	x		x	x					x	x
	Stellar Sea Lion *Eumetopias jubatus*	x			x		x	x											
	Northern Fur Seal *Callorhinus ursinus*	x		x	x														
	Pacific Harbor Seal *Phoca vitulina richardsii*	x	x	x	x	x	x	x	x	x	x	x	x					x	x
	Northern Elephant Seal *Mirounga angustirostris*	x			x					x								x	x
CETACIANS	Dall's Porpoise *Phocoenoides dalli*	x	x	x	x	x	x	x	x	x		x						x	x
	Harbor Porpoise *Phocoena phocoena*	x	x	x	x	x	x	x	x	x									
	Pacific White-sided Dolphin *Lagenorhynchus obliquidens*	x						x	x	x	x	x							x
	Risso's Dolphin *Grampus griseus*					x	x	x	x	x	x		x	x	x	x			x
	Northern Right-whale Dolphin *Lissodelphis borealis*								x	x		x						x	x
	Humpback Whale *Megaptera novaeangilae*	x		x	x				x	x									
	Gray Whale *Eschrichtius robustus*	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	Minke Whale *Balaenoptera acutorostrata*	x	x	x								x							x
	Killer Whale *Orcinus orca*	x																	
	Bottlenose Dolphin *Tursiops truncatus*										x	x	x	x	x	x	x		x
	Fin Whale *Balaenoptera physalus*																		x
	Common Dolphin *Delphinus spp.*										x	x	x	x	x	x	x		x
	Blue Whale *Balaenoptera musculus*										x							x	x

(1) NOAA Biogeographic Assessment off North/Central California in Support of the Cordell Bank, Gulf of the Farallones and Monterey Bay National Marine Sanctuaries, Phase II: Environmental Setting and Update to Marine Birds and Mammals

(2) A Biogeographic Assessment of the Channel Islands National Marine Sanctuary: November 2005 (NOAA Technical Memorandum NOS NCCOS 21)

(3) Food limitation leads to behavioral diversification and dietary specialization in sea otters: Proceedings of the National Academy of Sciences 105.02 (2008) 560-565

5.6. EXCEPTION APPLICATION BIOLOGICAL SURVEYS – MARINE BENTHIC COMMUNITY

5.6.1 - Redwoods National Park ASBS

5.6.1.1 <u>Marine Resources of Redwood National and State Parks (Cox et al. 2005)</u>

Redwoods National and State Park submitted a report entitled Marine Resources of Redwood National and State Parks (Cox et al. 2005), which was a comprehensive assessment of coastal resources on sandy shores and rocky in Redwoods National and State Parks. This report included an inventory of the algal, invertebrate, and fish species present at three selected sites, and community dynamics surveys consisting of seasonal monitoring of abundant and/or ecologically important organisms.

Sandy intertidal sites include: Crescent Beach, Gold Bluffs Beach, and Redwood Creek Beach. Rocky intertidal sites include False Klamath Cove (FKC), Enderts Beach (END), and Damnation Creek. The study site at FKC was near discharges, previously identified in the Southern California Coastal Water Research Project (SCCWRP) 2003 Report, associated with Highway 101 roadway runoff. END and Damnation Creek happened to be near natural outlets of varying sizes. The species distribution in the rocky intertidal was examined on a presence/absence scale at each of the sites, with a standardized biodiversity protocol used to map and derive a complete species list for Damnation Creek.

It should be noted that Cox et al re-inventoried the identical sites as that described in reports by Boyd and DeMartini from 1977 (1974-76 field work for National Park Service) and 1981 (1980 field work for State Water Board). Voucher specimens were collected for all possible invertebrate and algal species. Some species were photographed in lieu of collection due to preservation difficulties. Algae were identified using Abbott and Hollenberg (1976) and Gabrielson et al (2004). Invertebrates were identified using Morris et al. (1980) Kozloff (1993), and Kozloff (1966). Measurement of the algal and invertebrate species of the July 2005 survey were recorded as five abundance categories; abundant, common, present, uncommon, or rare.

A total of 114 algal taxa were recorded in inventories of FKC and END in 2005. Thirty eight algal species were found at these sites in 2005 that were not listed by Boyd and DeMartini (1977). Three species of algae (*Haplogloia andersonnii, Pterygophora californica and Pikea robusta*) were found at END in 2005 and 1977 and at FKC in 1977, but were absent from FKC in the 2005 survey. One species, *Odonthalia washingtoniensis*, was only found at FKC in 2005 and 1977. Two species, *Calliiarthron tuberculosum* and seersucker kelp *Grateloupia setchellii,* were only found at END in 2005 and 1977. However, when comparing the algal community found during the 2005 and 1977 rocky intertidal inventories, no clear patterns emerged to assess potential impacts from storm water runoff or ocean water conditions.

Invertebrate inventories at FKC and END found a total of 176 invertebrates in 2005. Of these, 77 were not previously recorded. Invertebrate species inventoried at FKC (near to discharge sites) and END showed no clear pattern in species presence or absence. There were no conclusions pertaining to storm water runoff effects.

From June 2004 to November 2005, community dynamics surveys were conducted for algal and invertebrate communities based on the design of Multi-agency Rocky Intertidal Network (MARINe) (www.marine.gov). Methods adapted from MARINe included scoring percent cover of algal species in permanent photo-plots as well as enumerating mobile invertebrates within the plots, and monitoring seastar plots and surfgrass transects. In addition, select rocky tidepools were repeatedly sampled to provide a more quantitative assessment of specific resident species of tidepool fishes.

Permanent photo-plots were set up at FKC, Damnation Creek, and END. All plots were sampled and photographed every 2 to 3 months from June 2004 though November 2005. Sampling was done for all three sites within six days during lowest tides. The photo-plots were established to record changes in the cover of certain populations including: mussels (*Mytilus californianu*s), barnacles (*Chthamalus dalli and Balanus glandula*), and three species of algae (*Endocladia muricata*, *Pelvetiopsus limitata*, and *Fucus gardneri*). These five sessile populations were chosen for monitoring because they are conspicuous, bed-forming, abundant, and ecologically important. *Fucus gardneri* was not dense and continuous enough at END, nor was there dense enough *P. limitata* at Damnation Creek when the study was initiated, to merit plot establishment for those species at those sites. At Damnation Creek, five additional mussel plots were sampled. These plots were located in the outflow of Damnation Creek where salinity is often much lower than in the other mussel plots. Otherwise, each species type was monitored in five replicate plots at each site.

The 2004-2005 surveys do not provide adequate data to directly assess a response to the effects of storm water runoff or possible constituents in the ocean water. The targeted species are generally known for their tolerance to a variety of physical and chemical environmental conditions, and were not chosen by the researchers as selected species with known tolerances or sensitivity to anthropogenic contaminants occurring from storm water runoff or in the ocean receiving waters. However, this approach does constitute a thorough representation of seasonal data for the year and provides valuable baseline data on the conditions at three sites.

The State Water Board staff asked Dr. Peter Raimondi, of the University of California at Santa Cruz Center for Ocean Health (2008), to evaluate the Cox et al report in the context of the ASBS discharge question. According to Dr. Raimondi, the purpose of this report was to generally characterize the intertidal resources in the Park and the study design was not suitable to provide a dedicated assessment of the possible impacts of storm water to ASBS.

5.6.1.2 PISCO/MARINe (Raimondi 2006)

Dr. Peter Raimondi performed a data assessment for 8 of the 10 ASBS within the influence of Caltrans discharges. In his report (Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006), Dr. Raimondi summarized site characteristics and provided a brief ecological community analysis of established rocky intertidal monitoring stations. These established stations are either a PISCO or MARINe site and provides a continuum of data collected using either Community Dynamics Survey or Biodiversity Protocol. PISCO/MARINe monitors three sites in the Redwood National Park ASBS at END, FKC, and Damnation Creek. All three are sites monitored using Community Dynamics Surveys, but only since 2004. Damnation Creek was also monitored using the Biodiversity Protocols.

Enderts Reef is comprised of a gently sloping (5°) bench of intermediate width and moderate relief. The surrounding coast is made up of boulder, bedrock, and pebble beaches. No biodiversity data were collected here but the species trends seem typical for this sort of site. One species of special interest was recorded here, the surfgrass, Phyllospadix spp. No invasive species were recorded at this site.

FKC reef is comprised of bedrock and boulders. The reef is a gently sloping, long reef of moderate relief. The surrounding coast is made up of bedrock, boulders, and sand. No biodiversity data have been collected here but species trends have been collected (since 2004) and seem typical to this point. Two species of special interest were found here, the surfgrass, *Phyllospadix* spp. and the sea palm, *Postelsia palmiformes*. No invasive species have been found here.

Damnation Creek reef is comprised of pebbles, boulders, and bedrock. The reef is a gently sloping, long reef of moderate relief. The surrounding coast is similar to the sample site. One species of special interest was recorded here, the surfgrass, *Phyllospadix* spp. No invasive species were recorded at this site. Dr. Raimondi compared the ecological communities in a series of “reference” sites in northern California. Species richness at Damnation Creek was 111 species, whereas species richness at reference sites ranged between 98 and 113. However, Damnation Creek differed in community composition significantly from all other sites. This was likely due to the site being remote, pristine, and of different geomorphology than the reference sites.

5.6.2 - Trinidad Head ASBS

One report was available for the Trinidad head ASBS, Sean Craig's 2006 Humboldt State University (HSU) Study intertidal survey, prepared for the City of Trinidad, and the Trinidad Rancheria Ocean Plan exception application. This survey provided a quantitative comparison of rocky intertidal species at one of the discharge sites, identified in the SCCWRP 2003 survey, and at a location distant from the discharge.

The selected waste discharge location is a site where the City of Trinidad's primary storm water outfall is located. Directly adjacent to this pipe is the outfall pipe of HSU's Telonicher Marine Lab, and the location is also influenced by the pier's parking lot runoff and certain boat cleaning operations. The selected "undisturbed" rocky intertidal sampling site was comparable in substrate and located approximately 100 meters northeasterly along the shoreline away from the first site.

Both sampling sites were similar in appearance consisting of boulders partially submerged in sand and appeared to be generally unmoved throughout time. Both sampling stations were examined for vertical and horizontal zonation of the marine life. Boulders were randomly selected along a single axis within four distinct shore regions from the high shore to the low shore. These regions were labeled: High, Mid-High, Mid, and Low. A 0.25 square meter quadrat was placed at each sampling point measuring both the vertical and horizontal arrangement of organisms on each boulder. Surveys were conducted during low tide on three consecutive days, May 25, 26, and 27, 2006. Thirty quadrat samples were collected on 10 boulders at the outfall site, and 36 quadrat samples were collected from 12 boulders at the undisturbed site. Each randomly selected boulder was measured for species abundance, composition, and general pattern of zonation of the intertidal algae and invertebrates. Measuring the vertical and horizontal arrangement of organisms allowed for the examination of changes in species composition at the outfall site as compared to the control site.

The log-normal model of abundance and diversity was used to compare the discharge site with the control site. Sessile and mobile invertebrates were measured for abundance using a count and then the log was taken. Anemones and algae were counted as percent cover. The report stated that when considered together, the diversity and abundance of biologically similar organisms within a community are more powerful in assessing the effects of disruption than when taken separately. A log-normal model of abundance and diversity is one tool in applied ecology for use to test ecosystem integrity, disruption, and health.

Craig reported the same species present at both the outfall (discharge) site and the "undisturbed" location; a total of 23 species were recorded, 10 macrophyte and 13 invertebrate species. The report stated that the outfall site and the "undisturbed" site show a similar pattern in both vertical and horizontal zonation of species. Fucoid algae, including *Fucus gardneri* and *Pelvetiopsis limitata,* were found restricted to the higher regions of boulders generally below the barnacle line across the shore. Also found in the highest zone were a group of red algae species *Mastocarpus papillatus*, *M. jardinii*, *Cryptosiphonia woodii*, *Endocladia muricata* and *Neorhodomela larix.* All four shore zones included barnacles *Chthamalus dalli* and *Balanus glandula,* abundant at the upper reaches of the boulders. The anemone *Anthopleura elegantissima* was present in all but the high zone at both locations.

Abundance between the two sites was not the same. Craig provided the explanation that the difference in organism abundances between the two sites may be due to the physical positioning and slope of the shore line, and describe the outfall site as a long gentle slope more protected from heavy wave action as compared to the “undisturbed” site and filling in more slowly during the incoming tide. The “undisturbed” site was described as being less protected with the potential to be more rapidly immersed with an incoming tide.

At the request of State Water Board staff, Dr. Raimondi performed a statistical analysis of the Trinidad intertidal data set described above. In that assessment, he used Bray-Curtis ordination (PRIMER software) to compare community structure at reference and impact locations. Using the design and data provided, there is evidence that the impact (outfall) location is different from the “undisturbed” location based on comparison of community composition. This effect was complicated by the interaction between effluent “treatment” (impact vs. undisturbed) and tide height.

For species sampled by counts and those sampled by percent cover, 1 of 3 tidal height zones differed between outfall and undisturbed areas, although the differences in the other zones were close to significant. The p value for the species sampled by counts in the low tide zone was 0.023 (2.3%) and the p value for percent cover species in the mid tide zone was 0.005 (0.5%). The p values describe the level of significance of the sample statistics, with lower p values indicating a greater certainty that there are differences between outfall and undisturbed sites.

Algal species contributing the greatest difference between the discharge and undisturbed site was the red algae *Cryptosiphonia woodii,* being more abundant at the discharge site (Table 5.6.1). The aggregating sea anemone *Anthopleura elegantissima* was clearly more abundant at the undisturbed site.

Table 5.6.1. Percent cover, intertidal algae, and the aggregating sea anemone A. elegantissima, and their contribution to differences between the outfall site (Group 1) and the undisturbed site (Group 2)

	Group 1	Group 2	
Species	Av.Abund	Av.Abund	Contrib%
Cryptosiphonia woodii (%)	40.33	0.2	21.38
Anthopleura elegantissima (%)	1.78	17.6	17.52
Endocladia muricata (%)	6.11	17.2	16.04
Fucus gardneri (%)	15.67	3.3	14.9
Pelvetiopsis limitata (%)	8.11	1.1	9.59
Mastocarpus papillatus (%)	4.44	4.3	7.46
Mastocarpus sporophyte (%)	2.56	5.2	6.69

The barnacle *Chthamalus dali*, black limpets, and the barnacle *Balanus glandula* contribute the greatest differences between the outfall and undisturbed sites (Table 5.6.2.).

Table 5.6.2. Counts, Intertidal invertebrates, and their contribution to differences between the outfall site (Group 1) and the undisturbed site (Group 2)

	Group 1	Group 2	
Species	Av.Abund	Av.Abund	Contrib%
Chthamalus dali (count)	2.47	3.82	34.97
Little Black Limpets (count)	0.64	2.34	20.81
Balanus glandula (count)	1.69	1.35	15.71
Littorines (count)	0.42	0.69	8.49
Lottia digitalis (count)	0.61	0.1	6.23
Chitons	0.41	0	4.5

For species sampled by counts and those sampled by percent cover, 1 of 3 tidal height zones differed between outfall and undisturbed sites, although the differences in the other 2 of 3 zones were close to significant.

The following figures provide a graphic representation of the Bray-Curtis multivariate results provided by Dr. Raimondi. Each symbol represents a quadrat sample result. The graphs show that some outfall and undisturbed quadrats cluster together, but some outfall quadrats cluster separately as do some undisturbed quadrats. This displays the differences between the outfall and undisturbed community data sets.

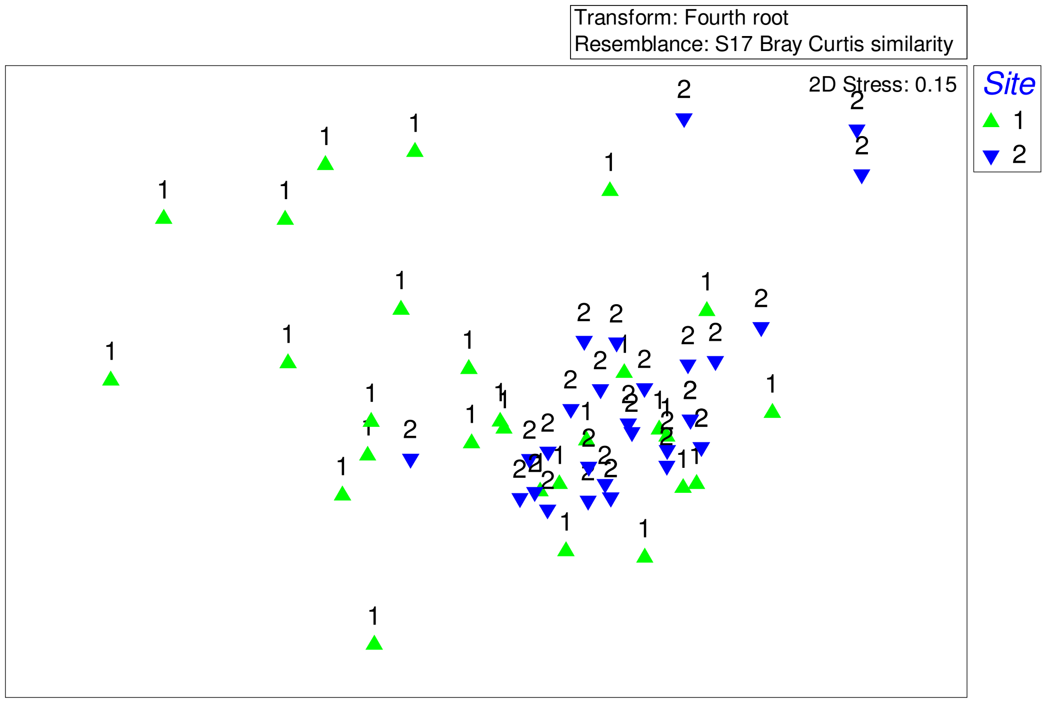

Figure 5.6.1. Trinidad Head ASBS. All tidal zones combined. Site 1 is the outfall site and Site 2 is the "undisturbed" site.

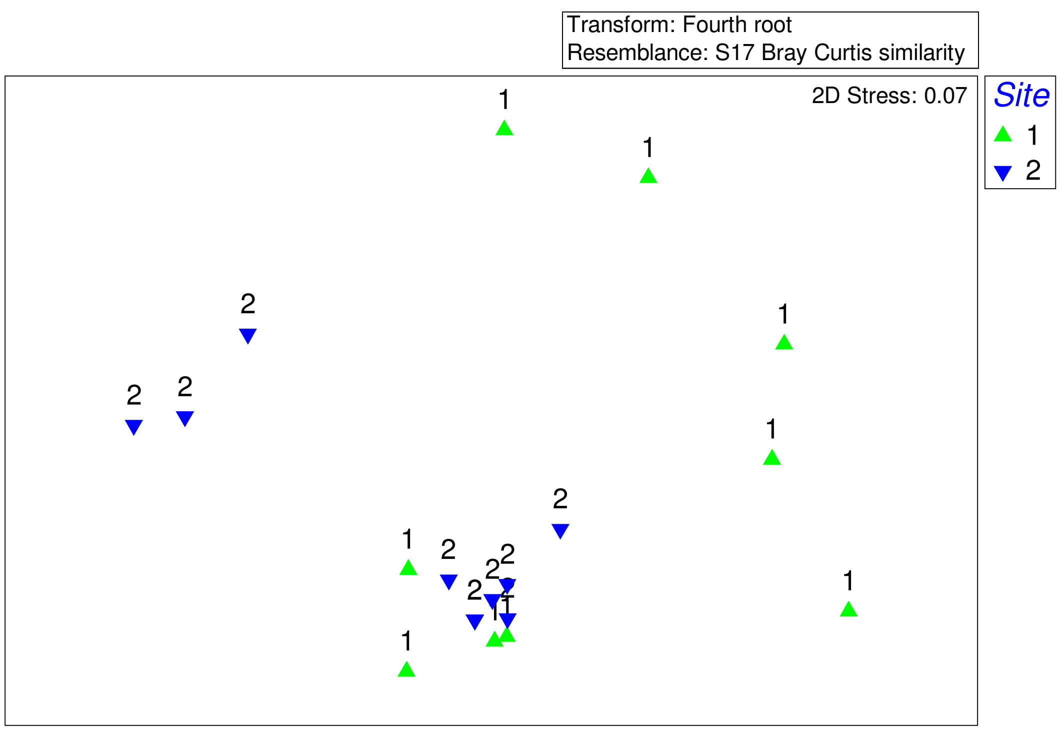

Figure 5.6.2. Trinidad Head ASBS. Low tide zone, species measured by counts. Site 1 is the outfall site and Site 2 is the "undisturbed" site.

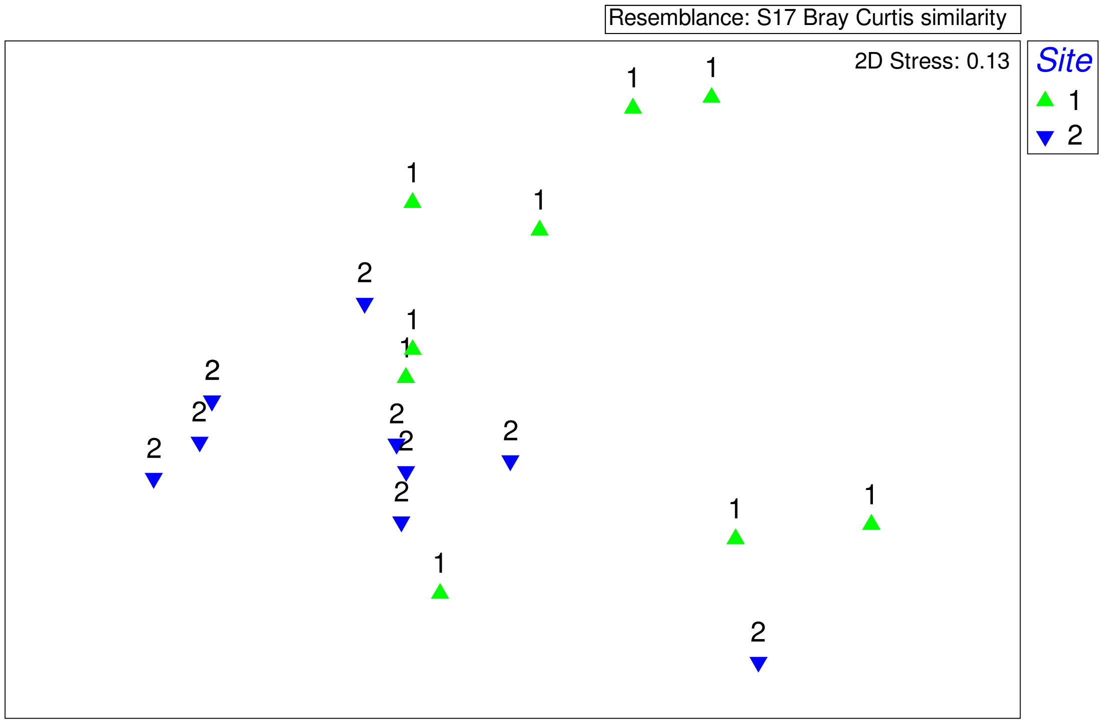

Figure 5.6.3. Trinidad Head ASBS. Mid tide zone, sessile species measured by percent cover. Site 1 is the outfall site and Site 2 is the "undisturbed" site

5.6.3 - Del Mar Landing ASBS

There was one report available, a Baseline Inventory of the Rocky Intertidal Zone at the Del Mar Landing Ecological Reserve May 2006 by Jacqueline Sones et al. This inventory was prepared for the TSRA Ocean Plan exception application and provides a quantitative comparison of marine species at two of TSRA's discharge sites and at two control sites.

The 2006 Sones report provided relevant quantitative information at four selected points along the 1 kilometer of rocky shoreline of the ASBS. Prior to this work, very little rocky intertidal community inventory work had been done at the Del Mar Landing ASBS. Steve Obreski conducted some work at Sea Ranch in 1972, but the exact locations of his study sites are unknown and the data in his report was considered too preliminary and too narrow to use for this initial study (Sones et al. 2006). John Pearse wrote a site description for a rocky intertidal area near Walk-On Beach, a location approximately 3 kilometer south of the Del Mar Landing ASBS. This report did not represent a complete inventory effort of the rocky intertidal biotic community, but did provide an informative overview of the area (Sones et al. 2006).

Also near Walk-On Beach and part of TSRA, the University of California at Santa Cruz's Coastal Biodiversity Survey Team (Raimondi, SWAT) conducted surveys of the rocky intertidal community in 2001 and 2005. Though the topography at Walk-On Beach is slightly different than at Del Mar Landing, that inventory provides a quantitative measure of diversity and abundance of the rocky intertidal algal and invertebrate community in the vicinity.

Sones conducted her biological inventory of the rocky intertidal community at the Del Mar Landing ASBS in April 2006. The ASBS is located off Helm Road at the northern end of the Sea Ranch community. It covers approximately 1 kilometer of rocky shoreline. Four rocky intertidal sites were sampled during the inventory, two discharge sites and two control sites. Two discharges (storm water conveyances) drain into the ASBS near the "discharge" sites, one at Helm Road, and another approximately 185 meters further east. "Control" sites were selected in areas distant from discharge sites, approximately 80 meters away, and considered by the survey team to be most likely free from potential influence of the discharges. Transects were set up and surveyed near both discharge sites and at two control sites located a reasonable distance away from the direct influence of the storm water outfalls. The control sites were also chosen based on similarities in substrate, slope, aspect, and wave exposure.

Surveys were conducted on two consecutive days, April 21 and 22, 2006. At each site, single 5-meter long transects were laid out in each of four tidal zones (high, upper-middle, lower-middle, and low zones). Transects were set up parallel to the shoreline running from east to west at approximately the same tidal height for each zone. Photographs were taken of each transect, as well as selected algae and invertebrates encountered during the surveys. Five 20cm x 20cm quadrats were randomly placed along each transect. The sampling design was 5 quadrats per zone x 4 zones per site x 4 sites for a total of 80 quadrats. The entire survey comprised of 40 quadrats in discharge sites and 40 in control sites.

All species in each quadrat were identified and the percent cover of sessile invertebrates and algae, and number of individuals for mobile invertebrates, were calculated. Mussels were not destructively sampled, so the algae and invertebrate counts represent the topmost layer of the mussel bed, most notable in the lower-middle zone.

Fifty-eight species of marine algae and invertebrates were recorded in all the quadrats and pooled across discharge and control sites. Of these, there were 26 species of algae and 32 species of invertebrates. Of the 32 invertebrates, 13 were sessile species and 10 were mobile species. Twenty-two species of algae were found at the discharge sites versus 25 species of algae at the control sites. Twenty-nine species of invertebrates were found at the discharge sites versus 22 species of invertebrates at the control sites. Approximately 70% (n=40) of all species were shared between the discharge and control sites.

Raw data was pooled from all tidal zones prior to statistical analysis. Species richness, sessile invertebrate cover, sessile invertebrate diversity, mobile invertebrate abundance, mobile invertebrate diversity, algal cover, algal diversity, and total cover were analyzed using a general linear model (Analysis of Variance). Models evaluated the measures of interest as a function of location (west vs. east) and outfall (discharge vs. control). Thus, the results reflect overall impacts of the discharge after accounting for differences in the two locations. Measures of diversity were calculated using the Shannon Diversity Index (H). Dr. Matt Bracken (Bodega Marine Laboratory) performed the data analysis.

Sones et al reported no significant differences between the discharge and control sites. However, invertebrate richness was reported to be slightly higher at the discharge sites and algal richness was slightly higher at the control sites. The only measure that was close to being significantly different was the mobile invertebrate abundance driven by one species, the checkered periwinkle (*Littorina plena/scutulata).* Sones et al concluded that these trends were insignificant and probably due to sampling artifacts and the high variability of rocky intertidal communities.

At the request of State Water Board staff, Dr. Raimondi performed a statistical analysis of the Sea Ranch/Del Mar Landing intertidal data set described above. In that assessment, he used Bray-Curtis ordination (PRIMER software) to compare community structure at discharge and control locations. Using the design and data provided, there is evidence that the discharge locations are different from the control locations based on comparison of community composition. For species sampled by percent cover and those sampled by counts, 2 of 4 zones differed between discharge and control areas. For species sampled by percent cover, the upper-middle tide zone ($p=0.042$) and the low tide zone ($p=0.002$) differed between discharge and control locations. For species sampled by counts, the high tide zone ($p=0.001$) and the upper-middle tide zone ($p=0.015$) differed between discharge and control locations.

Algal species contributing the greatest difference between the discharge and control sites in the upper-middle intertidal was the red algae *Endocladia muricata,* being more abundant at the discharge site (Table 5.6.3.). Two red algal species, *Odonthalia floccosa* and *Polysiphonia* sp., both had an average abundance of zero at the discharge sites.

Table 5.6.3. Percent Cover, Upper-middle intertidal algae, and their contribution to differences between the discharge site (Group Impact) and the control site (Group Reference)

	Group Impact	Group Reference	
Species	Av.Abund	Av.Abund	Contrib%
Endocladia muricata	30.2	24.4	19.23
Mastocarpus papillatus	28.6	8.4	14.65
Gelidium coulteri	24.7	3.8	14.51
Cladophora columbiana	16	13.43	11.79
encrusting coralline algae	1.83	10.8	6.78
Odonthalia floccosa	0	8.63	5.42
Petrocelis	2.6	7.33	4.85
Halosaccion glandiforme	6.53	2.33	4.37
Fucus gardneri	1.1	5.1	3.46
Mazzaella flaccida	0.63	5.45	3.32
Polysiphonia sp.	0	4.6	2.99

Algal species contributing the greatest difference between the discharge and control sites in the low intertidal zone was encrusting coralline red algae, being more abundant at the discharge site. *Odonthalia floccose*, while present at the discharge sites, was more abundant at the control sites (Table 5.6.4.). The sand castle worm *Phragmatopoma californica* had an average abundance of zero at the discharge sites.

Table 5.6.4. Percent Cover, Low intertidal algae and sessile invertebrates, and their contribution to differences between the discharge site (Group Impact) and the control site (Group Reference)

	Group Impact	Group Reference	
Species	Av.Abund	Av.Abund	Contrib%
encrusting coralline algae	60.5	19.4	26.29
Hedophyllum sessile	33.8	20.8	20.47
Odonthalia floccosa	17.1	35.5	16.23
Phragmatopoma californica	0	20	10.08
erect coralline algae	9.4	12.6	6.31
Polysiphonia sp.	0.93	8.1	4.55
Petrocelis	5.2	2.7	3.58
Endocladia muricata	0.7	4.1	3.25

Limpets (*Lottia)* and littorine snails contributed all of the difference between the discharge and control sites in the high intertidal zone (Table 5.6.5.). *Lottia digitalis* and *L. scabra* were more abundant at the control sites, while *Littorina* was more abundant at the discharge sites.

Table 5.6.5. High intertidal mobile invertebrates (measured by count), and their contribution to differences between the discharge site (Group Impact) and the control site (Group Reference)

	Group Impact	Group Reference	
Species	Av.Abund	Av.Abund	Contrib%
Lottia digitalis	0.33	1.33	33.88
Lottia scabra	0.49	1.44	31.95
Littorina plena/scutulata	3.34	2.41	31.7

From the following table, it can be seen that limpets and littorine snails again contributed to the difference between the discharge and control sites in the upper-middle intertidal zone, as did the black turban snail *Tegula funebralis* and the murex snail *Nucella ostrina* (Table 5.6.6.).

Table 5.6.6. Upper-middle intertidal mobile invertebrates (measured by count), and their contribution to differences between the discharge site (Group Impact) and the control site (Group Reference)

	Group Impact	Group Reference	
Species	Av.Abund	Av.Abund	Contrib%
small limpets	0.63	1.29	19.72
Littorina plena/scutulata	1	0.59	19.62
Tegula funebralis	0.61	0	16.37
Lottia scabra	0.46	1.01	15.61
Lottia pelta	0.33	0.32	8.42
Nucella ostrina	0.1	0.42	7.14
Lottia paradigitalis	0	0.24	3.69

The following figures provide graphic representations of the Bray-Curtis multivariate results provided by Dr. Raimondi. Each symbol represents a quadrat sample result. Red symbols represent the west discharge (WD) and east discharge (ED) sites. Blue symbols represent the west control (WC) and east control (EC) sites. The numbers represent the tidal zone (1= high, 2= upper-middle, 3= lower-middle, 4= low) of each quadrat.

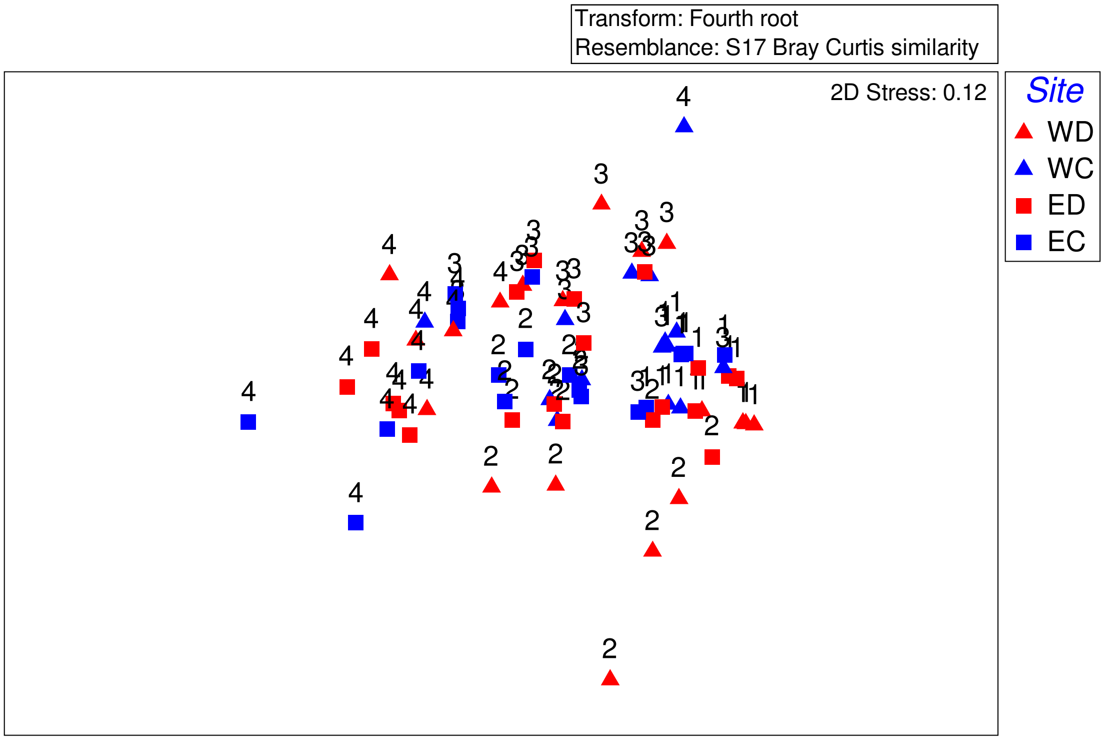

Figure 5.6.4. Del Mar Landing ASBS. Species measured by percent cover. All tidal zones (1-4) shown. WD and ED are discharge sites; WC and EC are control sites.

The above figure shows that discharge quadrats in zone 2 (upper-middle intertidal) clusters out nearer the bottom right of the graph, mostly away from the control sites from the same tidal zone.

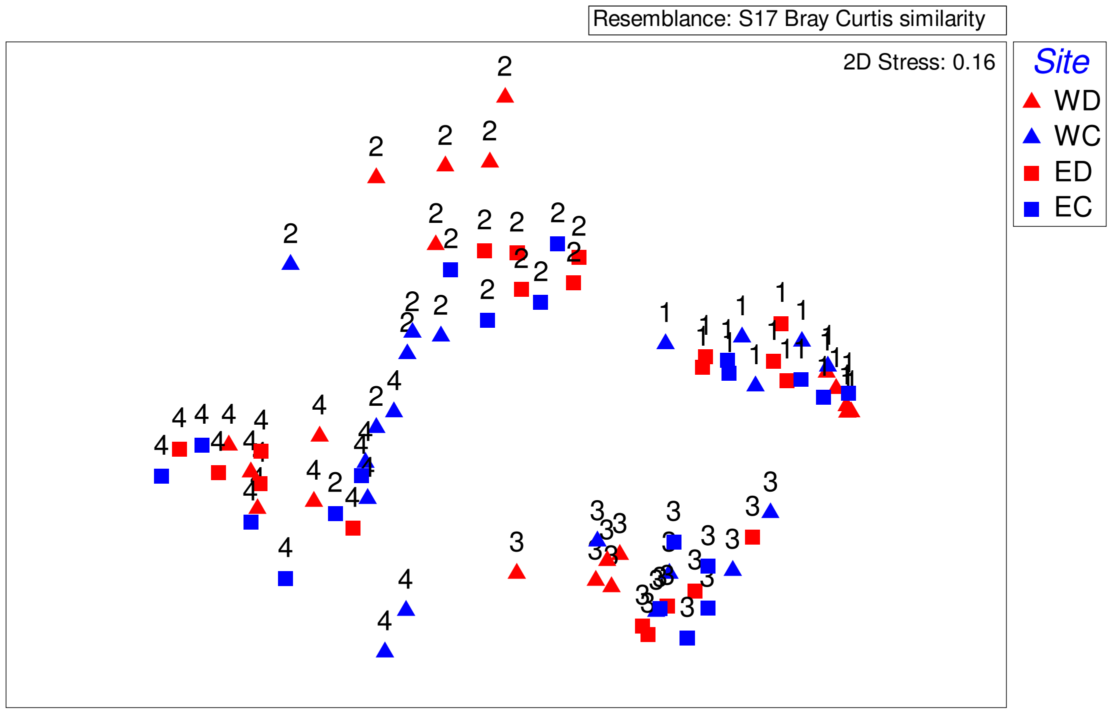

Figure 5.6.5. Del Mar Landing ASBS. Species measured by counts. All tidal zones (1-4) shown. WD and ED are discharge sites; WC and EC are control sites.

The above figure shows that tidal zones cluster together. However, note that the discharge quadrats (WD and ED) from the upper-middle tide zone tend to cluster separately at the top of the graph. While not as obvious, the discharge quadrats (WD and ED) from the low tide zone tend to clump together between two sets of control quadrats from the same tide zone.

5.6.4 - Duxbury Reef ASBS

There was one recent report available, prepared by Dr. Raimondi on July 17, 2008, for the County of Marin, Duxbury Reef (Alder Creek).

Dr. Raimondi used existing PISCO and MARINe data sets and new data in a primarily multivariate assessment of communities at a discharge site (Alder Creek) and reference areas. New data were collected using PISCO biodiversity protocols at sites arrayed in a gradient away from discharge.

Dr. Raimondi concluded that: "*There are clearly differences in the communities between Alder Creek and nearby sites. Part of this is due to differences in the geomorphology of the site, particularly the deep channel that separates the inshore from offshore reef. However, part of the difference also seems due to the presence of an input from the discharge and/or the creek that empties into the site. Based on the information collected during this survey and from the Coastal Biodiversity Surveys our assessment* *is that the differences seen at Alder creek are likely due to a combination of trampling (minor effects) and the geomorphological features (primarily fine sediments and freshwater) present at Alder Creek. Based on our surveys and reconnaissance, the effect of the input (natural or other) appears to be over a relatively small spatial scale, probably no larger than a few hundred meters along shore."*

5.6.5 - James V. Fitzgerald ASBS

5.6.5.1 PISCO/MARINe (Raimondi 2006)

As mentioned previously, Dr. Raimondi performed a data assessment for 8 of the 10 ASBS within the influence of Caltrans discharges. In his report (Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006), Dr. Raimondi summarizes site characteristics and provides a brief ecological community analysis of established rocky intertidal monitoring stations. These established stations are either a PISCO or MARINe site and provides a continuum of data collected using either Community Dynamics Survey or Biodiversity Protocol. PISCO has also carried out Biodiversity surveys at Fitzgerald Marine Reserve.

James V. Fitzgerald is a gently sloping, long, bedrock reef of very low relief. The biodiversity survey (2002) found 96 species at this site, which is high for this region. Two species of special interest, owl limpets and surfgrass were found and, according to Dr. Raimondi, it is likely that abalone may also occur here. No invasive species were found in their surveys. The result of the community analysis showed that Fitzgerald Marine Reserve clustered out with a series of central coast sites, including Pigeon Point, Andrew Molera, Mill Creek, and Rancho Marino. The latter three sites are either reserves or de-facto reserves because of physical isolation. The species present gave no evidence of degradation. There are no extensive long-term data that could be used to detect change.

5.6.5.2 Pillar Point Storm Water Outfall in the James V. Fitzgerald ASBS (Tenera 2007)

In 2007, Tenera studied the rocky intertidal community at the US Air Force Pillar Point storm water outfall. This outfall at Pillar Point is in the southern section of the ASBS.

This report examined the Pillar Point watershed, land use, storm water discharge volumes, and the potential for water quality effect on the biota. Impacts from the main storm water outfall to the rocky intertidal habitat were quantitatively evaluated using a gradient transect method. Additionally, investigations of other relevant marine life habitats were qualitatively surveyed for potential storm water impacts. A previous study performed by Tenera in 2004 in the northern sector of the ASBS near San Vicente Creek was also evaluated in its potential relevance to storm water impacts on the intertidal life. Tenera also examined the previous State Water Board's Reconnaissance Survey performed in the 1970's (SWRCB 1979), comparing the qualitative findings of that report with the current data.

A quantitative marine survey was performed in July 2007 where the U.S. Air Force storm water outfall discharges into the James V. Fitzgerald ASBS. The primary study design was to compare the rocky bench closest to the outfall with a reference area further away from the outfall. The immediate discharge area is a 55 meters (60 yd) wide sand beach. The closest rocky habitat to the outfall is a low-lying intertidal bench rock platform that is approximately 45 degrees lateral to the initial trajectory line of outfall discharges, and is separated from the outfall by the sand beach.

Quadrats were sited along transects on the bench rock platform along a gradient distance away from the discharge. Sampling was done at increasing distances (sites) from the outfall and beach. A nearby low-lying bench rock platform, in a reference area with a sand beach backing the platform, was sampled in the same fashion for comparison. This design resulted in a cross shore approach along with the use of impact/reference areas along shore.

One limitation of the Tenera 2007 study is that the study was performed during the dry season, and it is possible that species may have recovered since the prior rain events of the previous wet season. The assessment of storm water discharge effects is limited from the study being a one-time survey of only 2 areas, and due to naturally occurring variation between sites. It is possible that a larger, more intensive sampling effort over a longer duration may detect possible storm water discharge effects. However, effects may still not be detected with additional studies without further investigation of species and their sensitivity to various constituents found in the runoff and ocean water.

Another limitation was related to the limited period covered by the survey. A one-time survey assumes that the reference area adequately represents baseline conditions and the species and patterns of abundances that would be present near the storm water outfall if the outfall were absent. While every effort was made to locate a reference area that was similar in habitat characteristics to the area sampled along the outfall transect, differences in community composition were still expected, due to the number of natural factors that can vary unpredictably over time and space and, therefore, affect the composition and spatial patterns of species abundances. Factors include wave impacts, microhabitat differences, sand scour, pre-emption of space by sand, sand burial, predation, grazing, and competition for space, to name a few.

The storm water outfall and reference transects were densely populated with a variety of species, characterized mainly by the algae and surfgrass. Invertebrates were less common. The relative scarcity of invertebrates was likely due to the abundant layer of sand covering the rocks. The influence of sand is likely year-round in the study area. The sand likely prevents many motile invertebrates from remaining firmly attached to rocks and the sand tends to smother rock boring and tube-dwelling invertebrates.

The bench rock platform nearest the Pillar Point storm water outfall and the reference platform are low-intertidal elevation platforms, and thus lack the higher elevations supporting species more characteristic of the upper-intertidal zone (e.g., rockweed communities). Species characterizing the bench rock platforms were surfgrass (*Phyllospadix torreyi*), oar kelp (*Laminaria sinclairii*), split kelp (*L. dentigera*), hollow-branch seaweed (*Gastroclonium subarticulatum,* previously *G. coulteri*), and iridescent seaweed (*Mazzaella splendens,* previously *Iridaea cordata*). All are obligate low-intertidal or low-intertidal/shallow-subtidal occurring species.

In general, Tenera found most of the species sampled to be more abundant on the storm water outfall transect than the reference transect. Analysis was primarily based on community level comparisons between impact and reference areas using multivariate techniques found in PRIMER software. This multivariate analysis of the community data did reveal that many of the differences in species abundances between transects were statistically significant. According to Tenera, the storm water outfall and reference areas were both densely populated with species indicative of a healthy marine community and characteristic of rocky habitats exposed to high wave action. There were no indications of stress to the marine community near the Pillar Point storm water outfall based on the presence of unusual species patterns.

Tenera's multivariate analysis revealed various species that were significantly different in abundance between transects. A variable abundance pattern was seen in the distribution and abundance of surfgrass (*Phyllospadix torreyi*) and oar kelp (*Laminaria sinclairii*). These two species can be common along sandy shores, and were abundant on both transects. However, where they were most abundant along the transects was different between transects. On the storm water outfall transect, surfgrass had low abundance in the sand beach-bench rock interface zone but abundant at distances further away from the outfall and sand beach. In contrast, surfgrass on the reference transect was most abundant in the sand beach-bench rock interface zone. While this may indicate that storm water can limit the abundance of surfgrass near the outfall, other factors may account for the relative lower abundance of surfgrass in the sand beach-bench rock interface zone near the outfall. Feather-boa kelp (*Egregia menziesii*) and oar kelp were relatively abundant in this zone near the outfall. Feather-boa kelp and oar kelp may have limited the potential amount of surfgrass that could have otherwise grown in that area. The differences in species abundances may have also been due to different spore and seed settlement opportunities between species and whether sand cover was a factor during the times of settlement.

While the sand beach was a large habitat type in the area, large amounts of sand also covered the bench rock platforms, entrapped at the bases of the algal branches and fronds. The algae emerging from the sand provides direct evidence that the rocks were at one time not covered by sand. The shifting sand in the area probably has a large effect in constantly altering species abundances and their distributions in the area. Any changes resulting from sand effects, such as scour and burial, could easily mask any potential effects from storm water discharges.

The State Water Board staff asked Dr. Raimondi (2008) to evaluate Tenera's report and conclusions. According to Dr. Raimondi, there is an inconsistency between the basis of the design and analysis and the conclusion. The goal of a design in the ASBS context should be to assess the possibility of impact due to discharge. This was the intent here. The conclusion of no evidence of impact, given that statistical results suggest differences between areas, suggests that the design was not adequate to test the implicit hypothesis.

Tenera also performed a qualitative survey in 2007 at the Pillar Point sector of the ASBS. The purpose of this survey was to supplement the findings of the gradient transect study performed on the bench rock platform near the main storm water outfall. This qualitative study includes the other marine life habitats in this area, including rock walls and outcroppings. Shore walk surveys were done to further characterize the marine community in the overall study region. It is important to note that, during the Tenera 2007 qualitative assessment, storm water was not discharging from the main outfall. The shore walk surveys of the Pillar Point storm water outfall area covered a shoreline distance of approximately 450 meters (492 yds) and documented a variety of species in habitats not sampled by the gradient transects. Observations were recorded and assessed for unusual patterns in species distributions in other areas that were readily apparent and could possibly be attributed to effects from storm water discharges.

All areas observed in the qualitative survey were populated by a variety of species indicative of a healthy, rocky intertidal marine community. Most of the differences between the general area of the storm water outfall transect and general area of the reference transect were in the zone where the sand beach transitions into rocky habitat. Various habitat areas, other than where the gradient transects were located, were specifically searched for sea lettuce (*Ulva* spp.) as an indication of freshwater and constituent influence. There were no areas of algal blooms that would possibly be indicative of a pollution or high nutrient influence.

Tenera stated that a discharge response can be found in the northern sector of the ASBS at the perennially flowing San Vicente Creek, where sea lettuce is found to be quite abundant, while none is found near the Pillar Point storm water outfall. The watershed of San Vicente Creek is also larger than that of the Pillar Point, with multiple land uses. The abundant sea lettuce at San Vicente Creek indicates that prolonged drainages from relatively large watersheds with multiple land uses are needed to elicit and sustain a discharge response. Discharges from the Pillar Point headland are much smaller and less frequent, and the areas drained are not used for ranching, farming, or residential living, as what occurs in the San Vicente Creek watershed. There may be a smaller likelihood that discharges from the Pillar Point storm water outfall would cause the same type of change seen at San Vicente Creek. Should such changes occur, however, they would be expected to be smaller in spatial scale and more temporary in nature.

5.6.6 - Año Nuevo ASBS

5.6.6.1 PISCO/MARINe (Raimondi 2006)

As mentioned previously, Dr. Raimondi performed a data assessment for 8 of the 10 ASBS within the influence of Caltrans discharges. In his report (Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006), Dr. Raimondi summarizes site characteristics and provides a brief ecological community analysis of established rocky intertidal monitoring stations. These established stations are either a PISCO or MARINe site and provides a continuum of data collected using either Community Dynamics Survey or Biodiversity Protocol.

Año Nuevo is a long, gently sloping reef of moderate relief. It is comprised of sedimentary rock and sand. Año Nuevo is a UC Marine Reserve site co-administered by the State. The biodiversity surveys (2002) found 92 species at the site. In these surveys, one species of special interest was found, surfgrass, but both owl limpets and black abalone have been found in other surveys. Invasive species were not found at this site. Cluster analysis of the ASBS sites relative to a suite of reference sites in the central coast indicates some interesting patterns. Año Nuevo differs from all other sites in the region. Evaluation of the species lists and the site characteristics suggests that this is mainly due to geomorphology (mixed rock and sand). It is also possible that the site is affected directly and indirectly by the impacts of the large population of elephant seals that resides at Año Nuevo.

5.6.7 - Pacific Grove ASBS

Tenera performed “A Comparative Intertidal Study and User Survey, Point Pinos, California” (July 2003), which was submitted as part of the City of Pacific Grove’s exception application. The purpose of the Point Pinos Survey was to investigate the effects of visitor use on the Point Pinos rocky shoreline located on the Monterey Peninsula, and just outside the western boundary of the Pacific Grove ASBS, and was not designed to survey the biological community at outfall locations, or the effects of discharges on the ASBS. In this report, site descriptions were compared to Point Pinos, which receives high levels of visitor use because of its scenic values and easy accessibility from roads, adjoining parking lots, and trails. One of the main attractions of Point Pinos is the rich, diverse marine life along the rocky shore. Tide pools are common in the area, and small sandy beaches also occur along the upper shore.

Five sites surveyed in the State Water Board 1979 Reconnaissance Survey Report (SWRCB 1979) were revisited in July 2002. One of the five sites was located at Point Pinos and the other four sites were situated along the shoreline between Point Pinos and Hopkins Marine Station. A species list was developed for each site by walking the area and noting all species encountered. All identifications were made in the field. In contrast, it was not clear in the original study if samples had been collected for laboratory identification. The tide level was slightly above MLLW (above the surf grass zone) during the 2002 survey. Two biologists worked separately in the search effort at each site and created a combined species list for each site. The combined search effort at each site was between 1-2 hours.

The Point Pinos report found it difficult to use the data from the State Water Board 1979 Reconnaissance Report (field survey in 1977) and current data to make direct comparisons over time, as the species list appeared to be affected by differences in the intensity of search effort, time spent at each site, tidal levels during the surveys, and detail to adequately characterize the sampling sites. It was found that the most common species were still present in all areas in both surveys, but there was uncertainty concerning the continued or past occurrences of less common species. Without the same sampling effort in both surveys, there was no assurance in whether a species was not present or simply overlooked.

The total number of algal and invertebrate species found at the Point Pinos site was similar between the 1977 and 2002 surveys. In contrast, more species were found at each of the four other sites in the 2002 survey compared to the 1977 survey, but all of the sites also had species that were unique to one or the other survey.

The appendices in the 1979 State Water Board Report contain other species lists. Tenera found that those lists could not be used for comparison with the current survey. The list of intertidal invertebrates for several areas in the State Water Board Report is based on the cumulative listings from 27 literature and museum references dating in the 1940s-1960s. The species were tabulated for large general areas (Point Pinos, Monterey Peninsula, Pacific Grove, Hopkins Marine Station). Because the collecting locations were not specified, the data were of limited use in comparing changes in faunal composition over time. Also, the number of species found in each area probably reflects the number of times each area was sampled. Tenera found, however, that Point Pinos was a popular study area between the 1940s and 1960s, as the species list for Point Pinos is the longest. Tenera concludes that, from their observations, overall diversity has not changed at the Point Pinos site since the survey in 1977.

Tenera found one conclusive difference, however, between the 1977 and 2002 surveys. This was a lack of sea palms (*Postelsia palmaeformis*) in the present survey, although they were not able to conclude whether its absence was due to visitor impacts or other causes. Although not listed as a species of special concern or of rare, endangered, or threatened status by DFG or the U.S. Fish and Wildlife Service, California Code of Regulations prohibit cutting or disturbing this species. Regardless, this species is illegally collected for consumption.

5.6.7.1 <u>Barry et al. (1995)</u>

A paper by J. P. Barry (Monterey Bay Aquarium Research Institute), C. H. Baxter (Monterey Bay Aquarium Research Institute and Hopkins Marine Station), R. D. Sagarin (Hopkins Marine Station), and S. E. Gilman (Hopkins Marine Station) was reviewed. Of 45 invertebrate species studied at the Hopkins Marine Station in the Pacific Grove ASBS, the abundances of 8 southern species increased and the abundances of 5 northern species decreased. Annual mean shoreline ocean temperatures at Pacific Grove have increased by 0.75° C over the past 60 years. This paper's conclusion was that changes in the invertebrate fauna in the rocky intertidal community between the period 1931 to 1933 and the period 1993 to 1994 indicate that species' ranges shifted northward, consistent with predictions of change associated with climate change (i.e., warming). However, State Water Board staff also reviewed other work by Schiel et al (2004), which found (for the area at Diablo Canyon) that changes in community structure were common and there was little support for the hypothesis of predictable directional changes in northern and southern species based on biogeographic models (i.e., there was no obvious connection to global warming).

The State Water Board staff asked Dr. Raimondi (2008) to evaluate Barry et al to determine if the data provided had any potential for use in the question of the effects of runoff on marine life. According to Dr. Raimondi, this paper did not provide any insight relevant to an assessment of runoff into ASBS.

5.6.8 - Carmel Bay ASBS

A report by Dr. Richard Ford, dated April 30, 2005, was reviewed. There were two parts to the report. Fieldwork was performed in southern California in the Irvine Coast ASBS, and subtidal survey data from other reports [not Dr. Ford's original data but rather field work by Dr. Michael Foster (Moss Landing Marine Lab)] in Carmel Bay were assessed. The connection between the Irvine Coast work and the assessment of dive survey data from the Carmel Bay study is that both ASBS were adjacent to golf courses. Dr. Ford's report concluded that runoff caused no discernable impact on marine life in the Carmel Bay ASBS.

The State Water Board staff asked Dr. Raimondi (2008) to evaluate this report regarding Carmel Bay ASBS. According to Raimondi, there is no direct support for Dr. Ford's conclusion. The design is inadequate for the determination of impact (or lack of impact) from golf course runoff in Carmel Bay.

5.6.8.1 PISCO/MARINe (Raimondi 2006)

In his report "Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006", Dr. Raimondi summarizes site characteristics and provides a brief ecological community analysis of established rocky intertidal monitoring stations. Two MARINe/PISCO sites within the Carmel Bay ASBS are adjacent to Caltrans roadway drainages: Carmel Point and Stillwater Cove. Carmel Point is a long, gently sloping reef made up of bedrock and boulders. It is a high relief reef surrounded by bedrock, boulders, and sand. Dr. Raimondi has been following black abalone for the last two years at this site because it has a healthy abalone population, which is increasingly uncommon with the progression of withering disease. Dr. Raimondi does not do biodiversity or community dynamics surveys at this site.

Stillwater Cove is a gently sloping bedrock reef of intermediate length. It is a high relief reef surrounded by other bedrock reefs and sandy coves. Dr. Raimondi conducts biodiversity surveys (2001, 2005), abalone surveys (since 2001), and community dynamics surveys (since 2000) at this site. Ninety species were found at this site and species trends and abalone populations appear healthy. Three species of special interest have been found at this site: abalone, owl limpets, and surf grass. Sea palms are not found here because the site is protected from high wave energy. No invasive species have been found at this site. Based on cluster analysis, Stillwater Cove is similar to a site to the south, Point Sierra Nevada. These two sites are then most similar to Point Lobos, which makes sense given the proximity of Stillwater Cove to Point Lobos.

5.6.9 - Point Lobos ASBS

In his report "Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006", Dr. Raimondi summarizes site characteristics and provides a brief ecological community analysis of established rocky intertidal monitoring stations. These established stations are either a PISCO or MARINe site and provides a continuum of data collected using either Community Dynamics Survey or Biodiversity Protocol.

Point Lobos is a marine reserve and one of the most protected sites along the central coast. Point Lobos is a gently sloping, long, bedrock reef that has high relief and which is topographically complex. The biodiversity surveys (2001, 2005) found 90 species at this site. In addition, community dynamic and abalone surveys have been performed at Point Lobos since 1999. Community trends and abalone populations appear healthy at this site. Three species of special interest have been found at Point Lobos: abalone, owl limpets, and surfgrass. According to Dr. Raimondi, it is very likely that sea palms may occur at this site at the more exposed locations. Based on cluster analysis, Point Lobos differs from all other sites along the central coast. Looking at the species list and site characteristics, the separation of Point Lobos seems to be due to its topographic complexity and high relief. Also, the species composition of this site is not suggestive of a degraded state.

5.6.10 - Julia Pfeiffer Burns ASBS

“Side-casting” is the movement of sediment down-gradient off of a road. Side-casting that result in sediment deposition into the ocean is considered a waste discharge regulated under the Ocean Plan and prohibited in ASBS.

A side-casting event was conducted by Caltrans after a landslide resulted from heavy rains in the winter of 1982-83; the landslide closed Highway 1 for almost 2 years. The natural portion of this slide deposited some material on the beach, but the majority of the slide was on the upper hillside and not into the ASBS. The road clearance work resulted in moving over 3 million cubic meters of soil onto the shore, burying large portions of the ASBS intertidal and subtidal habitat. The manipulation of the McWay landslide produced an extreme physical and ecological event, with severe ecological impacts. The manipulated slide material covered about 23,700 square meters of intertidal boulders, cobble, and gravel beach. The natural beach was completely buried under the side-cast slide material. The waterfall on McWay Creek once flowed into a rocky cove populated by diverse intertidal and subtidal marine life. Now that cove is buried by a sandy beach. The adjacent subtidal habitat was also buried out to about 20 meters water depth, burying natural rock pinnacles (originally in water depths of 20-25 meters) and fine sand habitat.

The subtidal slide material is more prone to movement by wave action than the previous subtidal fine sand habitat. In addition, none of the slide sediment above the high tide line had been adequately stabilized with terrestrial vegetation, and there has been further erosion of the slide material (257,000 cubic meters) below the highway and into the ASBS. Aside from the obvious effects of direct burial of the affected natural intertidal and subtidal communities, scouring by coarse sediments (sand scour), deposition of fine sediments, and increased turbidity are an ongoing result of the side-casting event.

Starting in 1985, the Benthic Lab at Moss Landing Marine Laboratory has investigated the movement of this sediment into the ocean and its resulting impacts on the near shore marine communities. Surveys were performed to assess biological and physical conditions in the slide affected areas, which include terrestrial, intertidal, and subtidal zones. Natural rocky habitats around the slide have been shown to be disturbed by sand scour, with the vertical pinnacle wall communities being radically modified. Barnacle (more tolerant of scour) cover is higher, and cover by sponges, tunicates, and anemones is lower than what would be found naturally. Barnacle recruitment has spread into the kelp forest, and impacts of fine sediment and turbidity affect under-story algae in the kelp forest (Oliver, 1998).

The Monterey Bay National Marine Sanctuary funded PISCO to assess effects of erosion and landslides along the Big Sur Coastline. It is clear, from that more recent work, that there were pronounced and long-lasting effects of the material deposition at the McWay slide (Raimondi, 2008).

In his report (Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006), Dr. Raimondi summarizes site characteristics and provides a brief ecological community analysis of established rocky intertidal monitoring stations. These established stations are either a PISCO or MARINe site and provides a continuum of data collected using either Community Dynamics Survey or Biodiversity Protocol. Partington Point (also called Pardington Point) is a short, steep, bedrock reef of moderate relief. This reef is one of the characteristic steep reefs of the Big Sur coast that are unlike most other central California reefs (more like the reefs of the Gulf of the Farallones). Two species of special interest, abalone and owl limpets, are found at Partington Point. No invasive species have been found at this site. Species richness of the ASBS sites in the central coast region (Año Nuevo, Point Lobos, Julia Pfeiffer Burns at Partington Point, and Carmel Bay) ranges from 75-92 species. The lowest value, 75, was found at Partington Point, which is a very small reef. Still, this site is not atypical when compared to a suite of reference sites in the central coast. Based on cluster analysis, Partington Point is similar to another Big Sur site, Lucia, which has similar geomorphology.

5.6.11 - Laguna Point to Latigo Point ASBS

5.6.11.1 <u>PISCO/MARINe (Raimondi 2006)</u>

Dr. Raimondi performed a data assessment for 8 of the 10 ASBS within the influence of Caltrans discharges. In his report (Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006), Dr. Raimondi summarizes site characteristics and provides a brief ecological community analysis of established rocky intertidal monitoring stations. These established stations are either a PISCO or MARINe site and provides a continuum of data collected using either Community Dynamics Survey or Biodiversity Protocol.

Old Stairs is a reef composed of bedrock, boulders, and sand. It is a relatively long, gently sloping reef of moderate relief. It is surrounded by sand and a few other bedrock reefs. Dr. Raimondi found 54 species at Old Stairs in their biodiversity survey (2001). Old Stairs is also a site that has been monitored using community dynamics surveys since 1994. One species of special interest, the owl limpet, is found at Old Stairs. Abalone has long been absent from this region. Surf grass is found nearby. No invasive species have been found at Old Stairs. In the community analysis with other nearby sites, Old Stairs groups out with Mussel Shoals in a group distinct from other southern California reefs. Species diversity and trends are typical for southern California and suggest anthropogenic impact (collection, trampling, and other more indirect effects). Number and size distributions of key species (like sea stars and owl limpets) are lower than would be expected in a protected area.

5.6.11.2 Summary of Biological Resources of the ASBS (Ambrose & Lee 2007)

The Ambrose & Lee 2007 report was performed for the City of Malibu and summarizes information from previous field studies conducted at the Laguna Point to Latigo Point ASBS; it also presents a summary of a collection of recent data from 1994 through 2006.

The biological community at Paradise Cove was selected by Ambrose and Lee as the place most representative of relatively undisturbed conditions within the ASBS. Paradise Cove can be compared to other southern California study sites using a statistical clustering technique. Dr. Raimondi had performed such comparisons among a set of MARINe sites sampled in southern California. In his analysis, the rocky intertidal near the community at Paradise Cove was reported to be most similar to the community at Alegria, a site in Santa Barbara County south of Point Conception that has little human disturbance. However, possible disturbance from storm water or other anthropogenic discharges effects are not part of the MARINe study site design or analysis. Other sites that clustered with Paradise Cove were Arroyo Hondo and Coal Oil Point in Santa Barbara County, and Mussel Shoals and Old Stairs in Ventura County. General observations by Ambrose and Lee suggest that Paradise Cove historically supported and continues to support a relatively rich, rocky intertidal community compared to other intertidal reefs in the ASBS.

Ambrose and Lee concluded that the lack of consistent, quantitative data for sandy beach communities makes it difficult to compare Paradise Cove (the selected "reference" site) to other areas within the ASBS. Most notably, there are considerable differences among different beaches. For example, in the 1970's, Morin and Harrington (SWRCB 1979) reported higher diversity of macroinvertebrates on sandy beaches around Paradise Cove compared to Zuma Beach, which is up coast from (west of) Point Dume. Morin and Harrington attributed this to differences in physical factors, such as exposure and influence of beach wrack. Dugan et al (2003) also emphasized the influence of different physical factors and wrack. Since these differences still exist throughout the ASBS, Ambrose and Lee anticipated that there will still be significant differences in the sandy beach communities on the various beaches. When comparing Paradise Cove as a reference area with few discharge sites, the potential for impacts to the marine life, and the other selected research areas within the ASBS, Ambrose and Lee conclude that there is insufficient data to determine if there has been general degradation in the ASBS over the past 30 years, or whether certain sites have changed more than others. In addition, there is insufficient data to link discharges to the condition of the sandy beaches presented in this report.

Ambrose and Lee recommended that an intertidal marine life study be designed to encompass gradient transect sampling at the two representative storm water discharge sites (MUG 232 and MUG 430, SCCWRP discharge data ID points) and at the selected reference location. These discharge sites were selected to be representative of the City of Malibu's storm water flows. In addition, the reference location was selected at a site between MUG 375 and MUG 386. A transect survey would provide data which can then be analyzed for differences in species composition and abundance between sites; and further analyzed for differences in quadrats and their physical distance from the discharge source.

5.6.12 - Irvine Coast ASBS

5.6.12.1 <u>PISCO/MARINe (Raimondi 2006)</u>

Dr. Raimondi performed a data assessment for 8 of the 10 ASBS within the influence of Caltrans discharges. In his report (Data assessment for ASBS/Ocean Plan for Caltrans, March 12, 2006), Dr. Raimondi summarizes site characteristics and provides a brief ecological community analysis of established rocky intertidal monitoring stations. These established stations are either a PISCO or MARINe site and provides a continuum of data collected using either Community Dynamics Survey or Biodiversity Protocol.

This ASBS is co-located with Crystal Cove State Park. Other surveys have been done at this site including a number of projects from faculty and students at California State University, Fullerton. This ASBS, like most sites in Southern California, is heavily visited and there really is no expectation of areas not being impacted (Raimondi 2007).

The reef at Crystal Cove is composed of bedrock and boulders. It is a relatively long, gently sloping reef of low relief. It is surrounded by areas of bedrock, boulders, and sand. Dr. Raimondi found 114 species at this site in their biodiversity surveys (2001, 2003, 2004), which is a high number for this region. Community dynamics surveys have been conducted at this site since 1995. Two species of special interest are found at this site, owl limpets and surf grass. Abalone has long been absent from this region. The invasive species *Sargassum muticum* and *Caulacanthus ustulatus* are both found at Crystal Cove. In the community analysis with other nearby sites, Crystal Cove groups with Dana Point and Scripps (Dike Rock), suggesting its similarity to 2 relatively nearby sites. Species diversity suggests anthropogenic impact (extraction, trampling, and other more indirect effects). Number and particularly size distributions of key species (like sea stars and owl limpets) are lower than would be expected in a protected area.

5.6.12.2 MBC Applied Environmental Sciences (MBC 2004)

One report for the Crystal Cove Park site within the Irvine Coast ASBS, "Characterization of the Rocky Intertidal Crystal Cove State Park," was prepared for DPR by MBC Applied Environmental Sciences of Costa Mesa, CA (MBC 2004).

The study was designed to characterize two intertidal areas of Crystal Cove State Park, at Treasure Cove and Reef Point, during the spring and fall of 2003. This MBC study was not designed to address the question of the effects of runoff on ecosystem health. Still the results are valuable and are described below to explain the status of intertidal life in the Irvine Coast ASBS.

This study was designed to duplicate methods utilized previously in the area by Valencic in 1986. Like Valencic's previous survey, this 2004 study was designed to assess seasonal variation in the intertidal community of Crystal Cove during one year. This report compares the results of the spring and fall 2003 intertidal surveys at two sites in Crystal Cove State Park, and to a lesser extent compares these results to those of the 1986 survey and other work in the area. Four tidal communities were examined at each reef: low, mid, upper-intertidal, and mussel zones. Each tidal level was identified by characteristic species: the low zone was characterized by low algal turf and coralline algae, the mid zone by rockweed, the upper-intertidal zone by barnacles and littorine snails, and the last by mussel communities.

The study involved the use of rectangular quadrats sited along pre-established transect lines. The location of each quadrat was recorded as the transect line identification, the distance in meters along the transect, up coast or down coast direction, and perpendicular or parallel placement of the quadrat relative to the transect line. Quadrat locations were initially chosen in spring 2002 as representative of a tidal level/community in the area. Five replicate quadrats were selected for each tidal level at each reef site. A PVC frame with an inside diameter of 50cm x 75cm was placed on the sample site. At least two digital photographs were taken of each quadrat. In the laboratory, the photoquadrats were examined on a desktop computer monitor. Each photoquadrat picture was converted to Photoshop (PSD) file format, which allow an additional visual gridline layer to be added to each photo. The gridlines divided each photo into 10 equal sections.

Percent coverage and species identification for each quadrat were determined from a single photo, with the additional photos reviewed to assist with identification and to ensure that all species were noted. In several cases, two photos of the same quadrat were examined and analyzed independently as a quality check of methods. Identification was made to the lowest possible taxonomic level, with the exception of two similar, coexisting red algae species, *Gelidium* and *Pterocladia*, which were collectively identified as algal turf. Species were enumerated as percent cover.

Treasure Cove is located at the northern end of the park and has poor public access except during low tides. The upper rocky intertidal at Treasure Cove is characterized by relatively low-lying, flat bedrock which occasionally is covered or scoured by the coarse beach sands. The mid intertidal at Treasure Cove is characterized by bedrock, which extends seaward as exposed craggy ridges with fairly sharp relief and numerous channels and pools to the down coast side of the area; while more centrally, ridges are fewer and most of the mid-tidal-level fauna is found on bedrock and boulder outcroppings within numerous shallow pools. The low intertidal at Treasure Cove is typified by low relief, flat bedrock benches. Offshore of this area are large exposed and mussel covered bedrock outcrops that are accessible only on very low tides on calm days. The mussel sites at Treasure Cove are reoccupied plots established in 1986 on the flat top of the rocky point to the down coast side of the area.

Species richness generally increased in the Treasure Cove area between spring and fall 2003, except in the upper level plots that had one fewer species in fall. Total percent cover at Treasure Cove was also higher in the fall, even though percent cover of the lower level plots in fall was nearly 20% less than in spring. In total, 20 species covered 54% of the area in spring, and 24 species covered 56% of the available substrate in fall. While a core group of dominant species was found in the area during both seasons, the contribution of those species differed notably between seasons. Algal turf, the dominant species in the low and mid level plots and present at all levels in spring, was reduced considerably in the area by fall. Coralline alga, present in low abundance at the low and mid-levels in spring, replaced algal turf as the dominant species in the low and mid levels and was present at all levels in fall. Coralline alga and algal turf are generally found in very similar conditions at Crystal Cove, on fairly flat surfaces in the low intertidal or in areas with pooled water. The decline of algal turf throughout Treasure Cove, along with a reduction in total coverage by all species at the low-level plots, suggests that the algal turf decline was due to seasonal variations such as water and air temperature and day length, but not competition from other species. The increase in coralline alga in the Treasure Cove area in fall appears to be a result of increased availability of suitable habitat.

Reef Point is the southernmost rocky intertidal reef at Crystal Cove State Park. This area is near two pedestrian trails and is easily accessible to the public. The rocky intertidal at Reef Point is composed of three slightly separated rocky structures. The reef farthest down coast is a narrow, high relief rock ridge that runs offshore of the beach. Slightly up coast of this ridge is a relatively low relief flat, rocky bench. Continuing up coast is the main Reef Point structure, where sampling for this project was undertaken. Attempts to relocate the 1986 plots were unsuccessful, so all quadrats were located along the new transect lines. Exposed ridges support the upper level and mussel communities examined in this study. Farther offshore, the mid and low levels are characterized by a relatively flat area with exposed bedrock and boulders interspersed by shallow pools, channels, and sandy areas. Slightly offshore of the lower intertidal areas are larger, high relief rock structures, including several large offshore rocks. The intertidal area at Reef Point is exposed to waves from both the south and northwest. Sand movement in the area is greater than at Treasure Cove, and parts of the low relief areas, particularly on the up coast side of the reef, are subject to burial by sand.

Species richness was slightly higher in spring than in fall at Reef Point, although the low and mussel-level plots had slightly more species in fall. Overall percent cover was very similar between seasons, with a slight increase at all but the mid-level plots in fall. In total, 24 species covered 68% of the area in spring, and 22 species covered 69% of the available substrate in fall. The contribution by the dominant core species was found to be fairly similar during both seasons. Algal turf was somewhat reduced in the area in fall, but not as noticeably as at Treasure Cove. At the low intertidal quadrats, increase in percent cover of coralline alga in fall was about the same as the reduction in algal turf; while in the mid levels, increases in coralline alga, rockweed, and bare substrate were similar to the reduction in percent cover of algal turf. This may suggest that a local, possibly seasonal, reduction of algal turf allowed the expansion of other species.

In fall, several of the intertidal quadrats at Reef Point were partly inundated by sand. Although sand was also present in some plots in spring, it was not as prevalent as in fall. Some organisms were covered to an extent that could impair their survival. For this reason, percent cover of sand was noted for the fall Reef Point surveys. The amount of sand was highly variable and sand was noted in some quadrats at low-, mid- and upper-intertidal levels. Mussel plots on the bedrock ridges were above the level of sand inundation, even during the fall sampling. Coverage of sand ranged from relatively low at three low-intertidal plots to 100% cover at one upper intertidal photo-quadrat. Excluding the mussel level, sand cover averaged about 20% at Reef Point in fall.

Seasonal totals from both sites at Crystal Cove State Park suggest that the intertidal biota remains fairly consistent between seasons, with 27 species covering 61% of the available substrate in spring and 26 species covering 63% of the substrate in fall. However, specific tidal levels show notable differences between spring and fall. Percent cover at low level plots in the fall were reduced by about 10% from spring values, while species richness was higher. This is likely a result of the general reduction in algal turf with a resultant increase of availability of substrate as mentioned previously. At mid-level quadrats, a slight increase in percent cover in fall accompanied a slight decrease in species richness. Both cover and richness were very similar between seasons, making the mid-intertidal the most seasonally consistent level. In upper-intertidal quadrats, the level with the lowest total percent cover during both seasons, species richness decreased from 19 species in spring to 15 species in fall, while average percent cover increased by about 5% during that same period. The increase in percent cover at the upper level plots appears to be related to an increase in white acorn barnacles at Reef Point, and coralline alga at Treasure Cove. In the mussel-level plots, six more species were found in fall than in spring. On average, 10% more of the available substrate was covered in fall, with most of the additional cover accounted for by increases in California mussel. When results from both seasons are combined, Treasure Cove and Reef Point both were found to support 27 intertidal species, although cover of available substrate was about 13% higher at Reef Point. Cover at all levels was greater at Reef Point, particularly in the upper-intertidal, with about 30% more substrate covered than at Treasure Cove. This difference is likely related to scouring by coarse sand noted in the upper-intertidal at Treasure Cove. At Reef Point, the finer grained sand that inundates the site does not seem to scour the rock substrate clean as it does at Treasure Point.

Large and relatively well-protected tidal pools at Treasure Cove support populations of conspicuous, and occasionally numerous, large intertidal invertebrate species, including sea urchins (*Strongylocentrotus* spp), giant keyhole limpets (*Megathura crenulata*), California sea hares (*Aplysia californica*), and sea cucumbers (*Parastichopus* spp.), while hermit crabs and snails are common in the rocky pools. Difficult public access to the area helps protect these species from being harassed or taken by park visitors. However, the upper-intertidal level at Treasure Cove, the most depauperate of the quadrats surveyed during this study, are occasionally scoured by coarse sand, while the rocky substrate in the mid-tide level tends to be craggy with notable vertical relief. These physical characteristics differ from those found at the same tidal levels at Reef Point, and likely contribute to the differences between areas at those levels. The physical characteristics of the low-intertidal and mussel community plots at Treasure Cove are fairly similar to those at Reef Point, and, consequently, these levels are the most similar between the sites. At Reef Point, while the hard substrate is well populated, pools are generally sandy and smaller than at Treasure Cove, and with easy public access, large species are rare.

In 2003, species richness appeared to be lower than had been noted in previous studies in the Crystal Cove area; however, species composition and especially the dominant species were similar to those in previous surveys in the area (MBC 1971, Valencic 1986). In comparison to the results of the 1971 study, which included surveys at Reef

Point, species richness was notably lower. However, the earlier study conducted both in situ investigations and intertidal scrapings. Differences in sampling methods may account for the disparity in results. In the 1986 project, results were not well quantified for the intertidal survey, although Valencic's descriptions of the communities at both areas are similar to those found in the recent study. The low intertidal in the Valencic study seemed to be at a slightly lower tidal level than during the current study, judging by the presence of *Phyllospadix*, *Egregia*, and other fairly large plant species. Although occasionally found in the current 2003 field work, these species are much more common slightly lower in the intertidal than in areas surveyed in this survey, although observations outside of this study may suggest that presence of these larger plant species is seasonally variable at the low-tidal level.

Overall, Shannon-Wiener species diversity (H') for all surveys and tidal levels combined was 1.91, with the highest diversity (1.99) for results of the combined fall survey. Diversity was consistently lowest at the low-tidal level stations and tended to be highest at the upper-tidal level on most transects, although not notably higher than at mid or mussel quadrats. Overall, diversity with all tidal levels combined was generally similar to values found at mid, upper, or mussel zones.

The seven most abundant species (each of which covered 1% or more of the area during all surveys) together occupied 58% of the available intertidal substrate at Crystal Cove State Park. The remaining 25 species collectively occupied another 4% of available substrate. Algal turf (*Gelidium/Pterocladia* spp) was the most abundant taxa, covering an average of 26% of the available substrate during both seasons at the two sites. California mussel (*Mytilus californianus*) was the next most abundant species, accounting for about 11% of the total coverage in the quadrats, followed by the calcareous red coralline alga *Corallina* spp with 7% of the cover, the white acorn barnacle (*Balanus glandula*) and the tar-spot alga (*Ralfsia* spp.) with about 5% each and the aggregating anemone (*Anthopleura elegantissima*) and rockweed (*Silvetia compressa*) each covering about 2% of the total available substrate. Two taxa, algal turf and tar-spot alga, were the only species to occur in all tidal levels at both sites during spring and fall. Algal turf was more abundant at all levels during the spring surveys, while most other species were similarly abundant between seasons or were slightly more abundant in fall.

A dendrogram was constructed based on the percent cover for each species at each site. The 16 sites (two seasons, two locations, and four levels) fell into three groups based on community composition and abundance. Tidal level appeared to be the most important determining factor, with all low intertidal sites found in Group III and all mussel sites falling into Group II. Site location was the next most important factor, with all Reef Point upper quadrats and spring mid-level quadrats grouping with the mussel level in Group II, and both Treasure Cove upper quadrats and spring mid level falling into Group

III with the low- intertidal sites. Season appeared to be the least important factor. Group I, the most dissimilar from the other groups, contained only one site, the fall Treasure Cove mid level. Relative percent cover of the dominant alga species, algal turf and coralline alga, at the Group I site differed notably from that at any other site in the study area. Site clustering was strongly related to relative percent cover of California mussels at each site. At Group II sites, California mussel covered at least 3.5% of the available substrate, while at Group I and III sites California mussel was absent, or occurred only in low abundance (MBC 2004).

5.6.12.3 Ford et al. (2007)

This report was prepared for the Irvine Company in April 2007 by Richard F. Ford (San Diego State University and Hubbs-Sea World Research Institute), Barbara B. Hemmingsen (San Diego State University), Michael A. Shane (Hubbs-Sea World Research Institute), Eric Strecker (GeoSyntec Consultants, Inc.) (This report was referred to earlier in the context of Carmel Bay ASBS. However, here only the applicability of fieldwork performed in the Irvine Coast ASBS is considered.).

This was a comprehensive report that evaluated water quality, subtidal habitats, and the intertidal zone. For intertidal communities the goal was to conduct quantitative marine ecological studies of benthic invertebrates, algae, and surf grass epiphytes in the rocky intertidal zone at the best attainable reference site (Emerald Bay) and at sites influenced by runoff from Muddy and Los Trancos Canyons. In addition effort was made to compare and evaluate these together with the corresponding water quality information to assess similarities and differences among sites.

Using photoplots and on-site surveys, five species groups were sampled: (1) the *Anthopleura elegantissima* and associated species; (2) *Mytilus californianus* and associated species; (3) Anthopleura sola and associated species; (4) algal turf species; and (5) barnacles (Balanus glandula, Chthamalus dalli and C. fissus). The major conclusion was that there is no evidence of impacts related to discharge.

State Water Board staff requested Dr. Raimondi to review the Ford et al work as it relates to Irvine Coast ASBS. According to Dr. Raimondi (2008), this was a very difficult report to assess. In Dr. Raimondi's opinion, the authors did not rigorously test the hypothesis that reference and control sites differed in their biological communities. They did test whether there were long or short-term trends in species numbers (cover, abundance, etc.) that differed between reference and impact locations. The underlying basis of the long-term hypothesis was not supported. Here the idea was that evidence of an impact would be manifest in a trend at the impact sites relative to the reference site. This could indicate increasing degradation at the site. An alternative is that the community at the impact site(s) is in steady state, yet still degraded. In such a situation, no trend would occur. In addition, there was no assessment of the community. Such assessments are often more sensitive than species-specific assessments. Finally, this design rests on the adequacy of the reference site. In southern California, the selection of a reference site is difficult and an alternative approach involving a series of possible reference sites could have provided a more robust context for the results. Despite the stated short comings, Dr. Raimondi stated that the Ford et al study was otherwise of very good quality.

5.6.13 - La Jolla ASBS

As part of their exception application, the City of San Diego included four recent reports that pertain to the La Jolla ASBS. Two of these reports were "Ghost Forest in the Sea: The Use of Marine Protected Areas to Restore Biodiversity to Kelp Forest Ecosystems in Southern California" (Parnell et al. 2005a) and "Effectiveness of a Small Marine Reserve in Southern California" (Parnell et al. 2005b).

Recent subtidal habitat surveys, such as the "Effectiveness of a Small Marine Reserve in Southern California" (Parnell et al. 2005b), provides new data not otherwise performed since the Kobayashi ASBS Reconnaissance Surveys (Kobayashi et al. 1979) which surveyed the conspicuous species in the kelp-forest, submarine canyon, and boulder-reef habitats of the San Diego-La Jolla Ecological Reserve. The Kobayashi surveys did not provide detailed baseline data necessary for a temporal comparison, but this Parnell et al report conducted inside/outside comparisons among similar microhabitats that were discriminated quantitatively. This ensured that inside/outside comparisons were conducted between similar habitats, increasing the likelihood that differences were due to the protection within the Reserve.

This work by Parnell was not designed to address the question of the effects of runoff on subtidal ecosystem health. Still the results are valuable and are described below to explain the status of subtidal life in the La Jolla ASBS.

The kelp habitat in the reserve is characterized by reefs, sharp vertical relief, crevices and overhangs, and moderate levels of sand. The entire La Jolla kelp forest was divided into squares of 250 meters on each side; surveys were conducted using band transects placed randomly within a grid. At least two transects were conducted within each square. Habitat parameters included depth measurements and estimates of sharp vertical relief within 1 meter of the transect line at every 1 meter interval mark, substrate type (sand, bedrock, rock, cobble), and algae every 0.5 interval mark, and the presence/absence of major benthic features (ledges, crevices, overhangs) along 5 meter sections. Sixteen transects were conducted within the single grid box located in the kelp habitat within the reserve. The algal species that distinguished this habitat from other areas within the kelp bed were *Egregia menziesii, Eisenia arborea, Cystoseira osmundacea, Desmerestia spp.*, and turf-forming red algae.

For kelp habitat, inside/outside density comparisons revealed significantly higher densities of male and female sheephead, rock scallops and red urchins inside the reserve. Densities of lobsters were nearly significantly greater inside the reserve. Of the fishes, only male sheephead displayed size differences between the reserve habitat and similar habitat outside. Overall, Parnell found the results to indicate that the reserves provide protection only for species that are strictly residential or sessile. Parnell found that historical comparisons of densities in the kelp habitat inside and outside the reserve indicate alarming declines in many fished species inside the reserve: lobsters, green abalone, pink abalone, octopus, kelp bass, and scorpionfish (*Scorpaena guttata*), whose mean densities have sharply declined.

In the submarine canyon habitat, vermilion rockfish and male sheephead appear to be protected well. Both species were observed in significantly higher abundances in the La Jolla branch of the La Jolla underwater canyon located inside the reserve, than the Scripps branch of the canyon located outside. No size data are available; however, they are probably the only populations of large individuals of these species remaining in the La Jolla area.

The surveys in the boulder-reef habitat were specifically targeted at green abalone for logistical reasons. However, Parnell commonly observed several very large lobsters in the northeastern shallows of the reserve. Individuals of this size outside the reserve are very rarely observed; therefore the reserve may be protecting some resident lobsters. Further evidence of this is the observation that lobster traps are still common at the western margin of the reserve late in the lobster season.

Parnell counted 33 species of invertebrates and 27 species of fish in the band transects. Of these, only the species currently or historically targeted for commercial or recreational harvest were included in the inside/outside comparison.

Inside/outside reserve comparisons were only possible for seven species of animals. These comprised of kelp bass, barred sand bass, male and female sheephead, red urchins, spiny lobster *Panulirus interruptus*, rock scallop *Crassedoma giganteum,* and pink abalone *Halliotis corrugata*. There were not enough individuals of other target species to conduct statistical comparisons. The results indicate that individual species' comparisons were significant ($\alpha = 0.05$) for red urchins, rock scallops, and male and female sheephead, whose densities were all higher in the reserve. Adult sea urchin populations were significantly larger inside the reserve. Smoothed size-frequency distributions of red and purple urchins show differences that probably reflect fishing pressure on red urchins outside the reserve.

In general, the results of the inside/outside comparisons and the comparisons with historical data yielded four general conclusions: (1) The Reserve at the La Jolla ASBS appears to protect only a few harvested species, those that are sessile or highly residential, suggesting that the reserve is too small; (2) Comparisons with historical data indicate that most harvested species in the reserve, even some species for which reserve effects were observed, have declined seriously since 1979; (3) Green abalone in the boulder-reef habitat, red urchins in the kelp habitat, and vermilion rockfish and sheephead in the canyon habitat displayed large individuals in higher densities inside the reserve than outside; and (4) Historical data are important in determining reserve effectiveness when baseline date are lacking because they provide a historical perspective with which to gauge inside/outside comparisons.

5.6.14 - San Nicolas Island & Begg Rock ASBS

One report was available, the Biological Survey Report prepared by Merkel & Associates (April 2007), for the Navy's exception application for (SNI. Quantitative intertidal and subtidal biological surveys were performed at representative discharge sites and at two reference locations. This report also includes biological survey work previously performed by other researchers and provides a comprehensive assessment of the various subtidal and intertidal "eco-regions" of SNI.

Sampling stations were determined by conducting a reconnaissance of each location and selected based on several criteria including representation of the general area, access, unexploded ordinance (UXO) avoidance, operational safety, proximity to observed or expected runoff, proximity to sensitive wildlife, and whether or not there is a habitat area of sufficient size to sample.

Two metrics were derived from these surveys: (1) number of taxa and (2) abundance or percent cover. Since there were no benchmarks available for the metrics, comparisons were made to reference conditions within an associated island eco-region. Based on historical data, these community measurements are highly variable. Merkel and Associates considered differences of 50% in the number of taxa or abundance/cover between any two sites to be in the realm of natural variation. If a metric measured at a station was lower by 50% or more than the associated reference station, then that metric was flagged. When one or both metrics at a station were flagged, the biologist considered substrate data, historical data if available, looked at results of the receiving water and sediment measurements for causal relationships, and used best professional judgment to determine if intertidal or subtidal habitats required additional evaluation. State Water Board staff disagrees with this approach using the 50% criteria. A difference of 50% is an inadequate measure of differences between impact and reference sites; not supported by peer reviewed literature.

Graphs were prepared for species or taxonomic groups that were relatively abundant, and in some instances, species were placed into taxonomic groups for graphing purposes. Summary tables were prepared for species or taxonomic groups that were not relatively abundant or common. In addition, a species list was developed from this and previous surveys.

Results indicated a high degree of biological variability in the intertidal and subtidal zones around SNI, possibly due to differences in substrate type and coverage such as cobble, boulder, bedrock, or sand. Generally, different substrate supported different assemblages of organisms and at some locations the presence of competitive dominants led to biological interactions. According to Merkel and Associates all marine habitats surveyed at SNI had diverse, healthy communities; variability amongst communities was attributed to natural variability and they believed there was no indication of direct impacts associated with Navy activities. The metrics used to determine potential impacts to beneficial uses further indicated biological variability within an island eco-region, supporting the need to have multiple reference locations. According to Merkel and Associates, the biological data, in combination with water and sediment chemistry, and toxicity, provided a weight of evidence that Navy discharges do not compromise protection of ocean waters for beneficial uses.

Long-term trends in giant kelp forest populations have been studied at SNI. For a National Park Service study, six benthic study sites (10–12 m deep) have been sampled semiannually since 1980, and they have concluded that at Dutch Harbor giant kelp populations fluctuate on a cyclical pattern and sea urchin grazing is not significant; on the west end of SNI sea urchin grazing heavily influences giant kelp populations, which may lead to a higher turn over rate with more frequent recruitment pulses.

Based on decades of sampling kelp forests within the Channel Islands, the National Park Service suggested annual sampling for Channel Island sites for a minimum of 10 years, with an initial, consistent annual sampling program necessary to provide an adequate baseline to describe perturbations.

Subtidal Survey Methods: At each subtidal sample station, a diving biologist using SCUBA determined the distribution and abundance of subtidal invertebrates and algae at the -40 feet (-12.19 m) MLLW isobath. A 25-meter long transect tape was established at each isobath. Kelp abundance was counted in 10, randomly placed 5-meter long by 2-meter wide band transects (10m2). Observations included the number of kelp plants in each band transect, the number of stipes at a height of one meter above the bottom, and the size of the individual plants. Four size categories were measured: newly recruited kelp plants (minimum size 2-10 cm), juveniles (10-40 cm in length), subadult (between 40 cm and 2 m), and adults (greater than 2 m in length).

Biologists documented the abundance of key indicator plant and invertebrate species in 10, randomly placed 1-meter by 1-meter quadrats (1 m^2). Biologists also quantified substrate type (sand, rock, cobble) and algal cover using a point contact method with 20 points sampled within the 1m^2 quadrat. Target species/assemblages were surveyed at each subtidal sampling location. These were common subtidal organisms present during previous Navy surveys performed in 1998. Other species of interest were also noted. Formal fish transects were not conducted, but all fish species observed were recorded to document presence and relative qualitative abundance (e.g., abundant, common, rare).

Intertidal Spatial Assessment Methods: At each sample station, marine biologists recorded the abundance and/or percent cover of organisms at each of three tidal elevations (+5, +3, and 0 ft MLLW) using a 0.25m^2 quadrat following methods used for previous Navy surveys at SNI in 1998. A 10-meter long transect tape was established at each tidal elevation, and four randomly placed quadrats along the transect line were sampled at each of the three tidal elevations. Two biologists were assigned to each quadrat to record abundance and/or percent cover (for invertebrates, algae, and substrate) for several target species that were determined to be key species in the previous Navy marine resources inventory in 1998. Abundance was quantified by counting total individuals within each 0.25m^2 quadrat and percent cover was measured using the point contact method at 20 points within each 0.25m^2 quadrat.

Several algal species were grouped into taxonomic categories to allow efficient field sampling and comparison with past studies. All species in the genus *Corallina* were grouped into the group coralline algae, red turf included low-lying red algae (e.g., *Gelidium* spp.), red foliose was made up of leafy erect red algae (e.g., *Pterocladia* spp.), Ralfsiaceae included all encrusting brown algae in the Ralfsiaceae family (e.g., algae that resemble "black tar"), and other browns included brown algae such as *Dictyota* spp., *Dictyopterus* spp., *Zonaria* spp., *Halydris* spp., *Colpomenia* spp., *Leathesia* spp., *Scytosiphon* spp., *Fucus gardneri, Selvetia compressa,* and *Pelvetiopsis limitata.*

A total of six sites were chosen for sampling around SNI. They include four sites that are representative of areas that receive discharges associated with distinct Navy operational activities such as airfield, water desalination, and rocket launch operations. The total also included two locations chosen to represent areas that receive storm water runoff not associated with Navy activities, and thereby are considered a reference condition. Because there are insufficient historical data to assess how reference conditions might vary around the island, two reference locations were chosen to represent potential differences that might occur on either side of the island. The sampling locations are:

Corral Beach and **Dutch Harbor** were selected reference locations. Corral Beach is located between Blue Whale Cove and Tranquility Beach and was chosen as a reference location to account for potential spatial variability. The general area consists of rocky bluffs, with relatively small pocket beaches. The intertidal area ranged from vertical rocky bluffs to cobble, with surge channels. The intertidal sampling location was located in the vicinity of an ephemeral stream/drainage, and consisted of bedrock at all tidal levels. The subtidal zone consisted mostly of boulders and bedrock with moderate relief of up to 2.5 meters. Patches of sand were common in deeper areas or in pockets between rocky outcroppings. Water and sediment samples were collected outside the surf zone directly offshore of the drainage. Intertidal sampling was conducted on the rocky platform west of drainage, and subtidal sampling was conducted directly offshore of the drainage. Dutch Harbor, located on the south-central portion of SNI, consists of a rocky headlands separated by sandy beaches, and was chosen as a reference location to account for potential spatial variability. The intertidal area consists of rocky intertidal platforms separated by sandy beach, and the subtidal area consists of bedrock with moderate to high relief of up to 3 meters, separated by sand patches. Water and sediment samples were collected outside the surf zone directly offshore of the headland. Intertidal sampling was conducted on the rocky platform east of the headland, and subtidal sampling was conducted directly offshore of the headland. One notable observation included the presence of black abalone (*Haliotis cracherodii*) within some of the intertidal ledges.

Coast Guard Beach is an area of point source brine discharge from desalination operations. Coast Guard Beach is located on the eastern portion of the island, and was requested by the State Water Board to be sampled. The area is predominantly sandy beach habitat, with the exception of a riprap jetty that extends approximately 250 feet (77 m) into the ocean. The subtidal habitat is also primarily sandy substrate, although west of the jetty at an approximate depth of 25 feet (8 m), scattered low-relief rocky substrate is present. The brine discharge area is located on the back beach, east of the jetty. Water and sediment samples were collected outside the surf zone directly offshore of the brine discharge area. Subtidal sampling was conducted west of the jetty in the area of low-relief rocky substrate. For a large portion of the year, the sandy beach serves as a nursery and breeding area for northern elephant seals and California sea lions. Strong southerly currents (i.e., running from north to south) are common in this area, and were experienced while sampling.

At Coast Guard Beach, nine species or taxonomic groups were flagged for the subtidal habitat for exceeding the 50% difference criteria, and included: *Macrocystis, Pterygophora, Laminaria, Parastichopus, Pisaster*, urchins, sponges, ectoprocts, and ascidians. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability, exposure, and species mobility.

For the intertidal analysis, species abundance or percent cover and number of taxa from Coast Guard Beach were compared to Corral Beach and Dutch Harbor. Sixteen species or taxonomic groups were flagged for the intertidal habitat at Coast Guard Beach for exceeding the 50% difference criteria, and the total number of species also exceeded the 50% criteria, which was expected considering that the intertidal habitat at Coast Guard Beach consisted of sandy substrate and that all of the indicator organisms were primarily those found on firm or rocky substrate. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by substrate variability.

Daytona Beach, located in the southeast portion of the island, is representative of a storm water runoff area associated with barge landing operations. A large pier, used to load and unload barges, is located along a sandy stretch of beach. The intertidal area is sandy beach, as well as the habitat adjacent to the pier. However, mature giant kelp forests are located offshore, both east and west of the pier. Water and sediment samples were collected outside the surf zone adjacent to the pier, while subtidal sampling was conducted in the kelp forest east of the pier. For a large portion of the year, the sandy beach serves as a nursery and breeding area for northern elephant seals and California sea lions.

At Daytona Beach, four species or taxonomic groups were flagged for the subtidal habitat for exceeding the 50% difference criteria, and included: *Pterygophora*, red turf algae, ectoprocts, and ascidians. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability, and exposure.

For the intertidal analysis, species abundance or percent cover and number of taxa from Daytona Beach were compared to Corral Beach and Dutch Harbor. Similar to Coast Guard Beach, 16 species or taxonomic groups were flagged for the intertidal habitat at Daytona Beach for exceeding the 50% difference criteria, and the total number of species also exceeded the 50% criteria, which was expected considering that the intertidal habitat at Daytona Beach consisted of sandy substrate and that all of the indicator organisms were primarily those found on firm or rocky substrate. According to Merkel and Associates there was no apparent impact to beneficial use based on these metrics as they can be explained by substrate variability.

Tranquility Beach is located on the northern portion of the island, and is representative of a storm water runoff area associated with the residential area (Nick Town). Nick

Town is located on a mesa above Tranquility Beach, with a ravine that may potentially transport storm water from Nick Town to near shore receiving waters. The majority of the intertidal area is comprised of sandy beach, with rocky intertidal platforms on the east and west ends of the beach. An expansive giant kelp forest is located offshore of Tranquility Beach, with the substrate consisting of a mixture of bedrock with high relief (4 meters in some places) and large boulders with interspersed patches of sand. Water and sediment samples were collected outside the surf zone directly offshore of the ravine. Intertidal sampling was conducted on the rocky platform west of ravine, and subtidal sampling was conducted directly offshore and to the north of the ravine.

At Tranquility Beach, five taxonomic groups were flagged for the subtidal habitat for exceeding the 50% difference criteria, and included: *Laminaria*, red turf algae, *Parastichopus, Pisaster*, and ectoprocts. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability, exposure, and species mobility.

For the intertidal analysis, species abundance or percent cover and number of taxa from Tranquility Beach were compared to Corral Beach and Dutch Harbor. Eight species or taxonomic groups were flagged for the intertidal habitat at Tranquility Beach for exceeding the 50% difference criteria, and included: encrusting coralline algae, turf and geniculate coralline algae, *Sargassum*, littorine snails, mussels, chitons, turban snails, and urchins. The total number of species was within the 50% criteria of the reference locations. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, substrate variability, exposure, and species mobility.

Blue Whale Cove is located on the northern portion of SNI and is representative of storm water runoff associated with rocket launch operations. Rocket launch platforms are located on a mesa above Blue Whale Cove, with a ravine that may potentially transport storm water from the platforms to near shore receiving waters. Similar to Tranquility Beach, the majority of the intertidal area in Blue Whale Cove is sandy beach, with rocky intertidal platforms on the east and west ends of the beach. An expansive giant kelp forest is located offshore of Blue Whale Cove, with the substrate consisting of a mixture of bedrock with high relief (4 meters in some places) and large boulders with interspersed patches of sand. Water and sediment samples were collected outside the surf zone directly offshore of the ravine. Intertidal sampling was conducted on the rocky platform west of the ravine, and subtidal sampling was conducted directly offshore and to the north of the ravine.

At Blue Whale Cove, eight species or taxonomic groups were flagged for the subtidal habitat for exceeding the 50% difference criteria, and included: *Laminaria*, red turf algae, coralline turf, *Pisaster*, urchins, sponges, ectoprocts, and ascidians. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability, exposure, and species mobility.

For the intertidal analysis, species abundance or percent cover and number of taxa from Blue Whale Cove were compared to Corral Beach and Dutch Harbor. Ten species or taxonomic groups were flagged for the intertidal habitat at Blue Whale Cove for exceeding the 50% difference criteria, and included: geniculate and encrusting coralline algae, *Sargassum*, green algae, limpets, littorine snails, mussels, chitons, turban urchins, and anemones. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, substrate variability, exposure, and species mobility.

At the request of State Water Board staff, Dr. Raimondi performed a statistical analysis of the SNI intertidal data set described above. In that assessment, he used Bray-Curtis ordination (PRIMER software) to compare community structure at reference and impact locations. Dr. Raimondi expressed concern about the choice of reference sites (rocky reefs). Using the design and data from Merkel and Associates, there is evidence that discharge locations are different from selected reference locations based on comparison of community composition. This is based on data for both the species that were counted ($p=0.001$) and for those sampled by estimating percent cover ($p=0.039$).

Limpets, anemones, and the purple sea urchin (*Strongylocentrotus purpuratus*) contribute the greatest differences between the reference and impact sites. All three of these, as well as mussels, the black turban snail *Tegula funebralis*, bladder chain kelp *Sargassum agardhianum,* chitons, and littorine snails were more abundant at the reference sites (Table 5.6.7.). Of those taxa with contribution to the differences, only barnacles were more abundant at the discharge sites.

Table 5.6.7. Counts, intertidal invertebrates and algae (*Sargassum agardhianum*), and their contribution to differences between the reference sites and the discharge (impact) sites

	Group Reference	Group Impact	
Species	Av.Abund	Av.Abund	Contrib%
Limpets	2.64	1.49	23.09
Anemones	0.51	0.5	13.21
Strongylocentrotus purpuratus	0.72	0	11.66
Mussels	1.01	0.15	8.7
Tegula funebralis	0.47	0.18	8.48
Sargassum agardhianum	0.23	0.04	7.43
Chitons	0.54	0.15	7.37
Barnalces	0.96	1.53	6.69
Littorina spp	0.94	0.38	5.25

Erect coralline red algae (*Corallina*) and red algal turf contributed the greatest differences between the reference and impact sites (Table 5.6.8.). Both erect and encrusting coralline red algae and the surf grass *Phyllospadix* were more abundant at reference sites. *Chaetomorpha*, a filamentous green algae, had a relatively high average abundance at the discharge sites and was virtually absent at the reference sites. Green algae are often a preferred food item for intertidal grazers and, therefore, are often not abundant. It is possible that eutrophication causes filamentous green algae to be more productive and, therefore, more abundant, exceeding grazing rates.

Table 5.6.8. Percent cover, intertidal vascular plant (*Phyllospadix*) and algal taxa, and their contribution to differences between the reference sites and the impact sites (Group 2)

	Group Reference	Group Impact	
Species	**Av.Abund**	**Av.Abund**	**Contrib%**
C_Coralline Algae	25	6.46	26.72
Red Turf	3	4.67	21.61
C_Phyllospadix	11.25	10	13.10
C_Chaetomorpha sp.	0	12.08	11.07
Other Browns	0.38	0.46	7.40
C_Encrusting Coralline Algae	6.04	1.04	7.06
Ralfsiaceae	0.21	0.46	6.64

For species sampled by counts and those sampled by percent cover, 1 of 3 tidal height zones differed between outfall and undisturbed sites, although the differences in the other 2 of 3 zones were close to significant.

The following figures provide a graphic representation of the Bray-Curtis multivariate results provided by Dr. Raimondi. Each symbol represents a quadrat sample result.

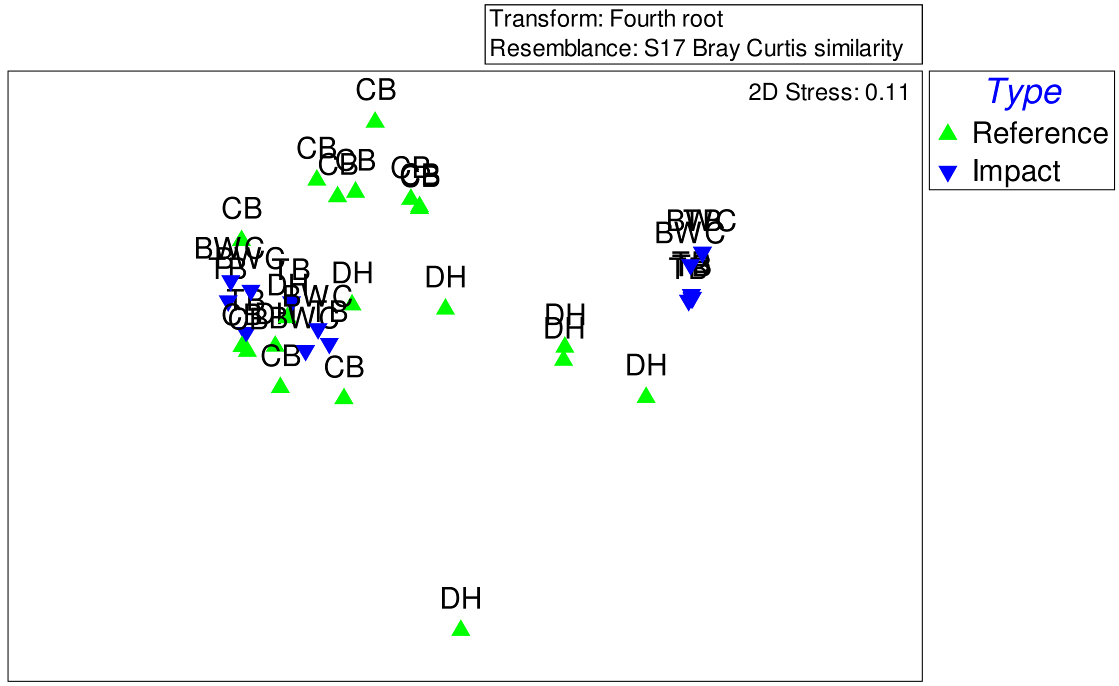

Figure 5.6.6. San Nicolas Island ASBS. All tidal zones combined, species measured by counts. The green pyramid symbols are for Dutch Harbor (DH) and Corral Beach (CB) reference sites. The blue inverted pyramid symbols are for discharge sites.

In the above graph representing a multivariate cluster assessment of data for intertidal species measured by counts, many of the reference sites cluster in the center. While there is some overlap with discharge sites on the left side of the graph, there is a cluster of only discharge sites on the right side.

In the following graph representing a multivariate cluster assessment of data for intertidal species measured by percent cover, there is a tight cluster of reference sites in the upper left and a few reference sites loosely clustered in the bottom center. The discharge sites are clustered in the center left and lower left, and also loosely clustered and scattered along an axis in the upper center and upper right.

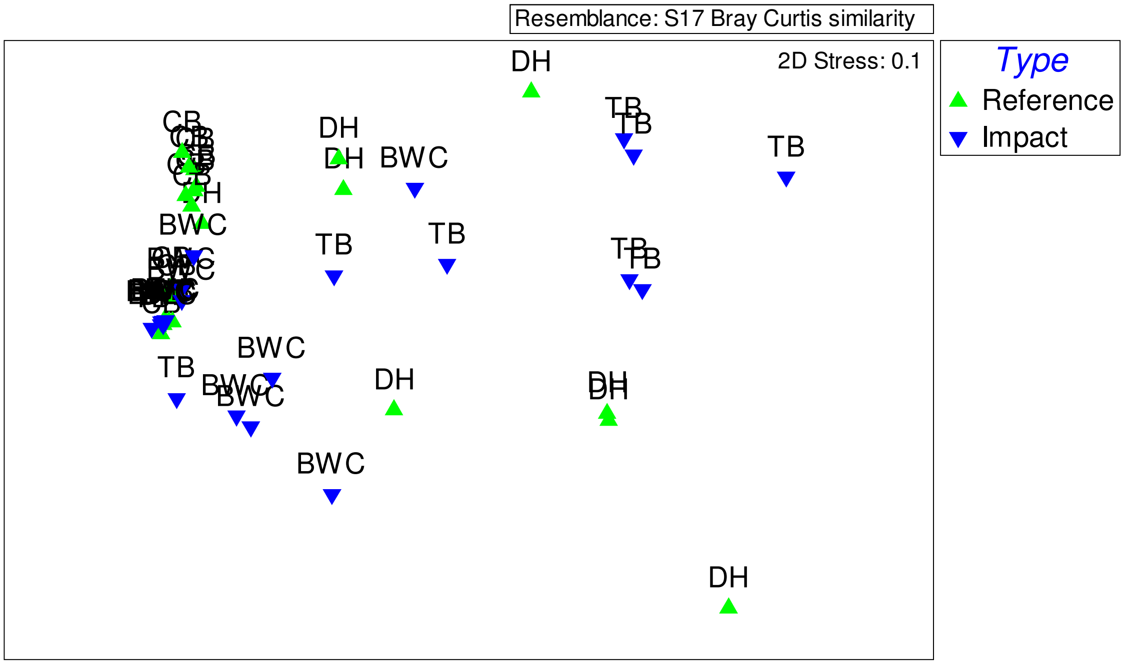

Figure 5.6.7. San Nicolas Island ASBS. All tidal zones combined, species measured by percent cover. The green pyramid symbols are for Dutch Harbor (DH) and Corral Beach (CB) reference sites. The blue inverted pyramid symbols are for discharge sites.

5.6.15 - San Clemente Island ASBS

One report was available, the Naval Auxiliary Landing Field, San Clemente Island Area of Special Biological Significance Biological Survey Report (Merkel & Associates February 2007). The report provides a comprehensive assessment of the various subtidal and intertidal “eco-regions” of SCI, including significant data of the status of surrounding kelp forests. Their report also includes previous biological surveys performed at SCI.

Several marine biological surveys have been conducted at SCI to either meet permit conditions (focused) or to assess the biological communities around the island. The focused surveys were aimed at documenting potential effects of the SCI wastewater treatment plant outfall on marine biota. These surveys included both intertidal and subtidal surveys in the vicinity of the Wilson Cove sewage point source outfall. According to Merkel and Associates, results of the focused surveys suggested that very localized impacts to marine biota occurred in the intertidal zone directly in the vicinity of the outfall, but there were no apparent effects 15 meters (50 ft) beyond the outfall or in the subtidal zone.

Previous island-wide surveys were conducted to document and compare the habitat around SCI with other Channel Islands. The island-wide surveys were all subtidal, kelp forest surveys, and results indicated that the subtidal communities at SCI were diverse and healthy in comparison to the other southern Channel Islands (e.g., Santa Catalina, Santa Barbara, Anacapa, and Santa Cruz Islands), and similar to SNI. Fish, algae, and invertebrates displayed a high degree of diversity, and most noted species were observed from juveniles to aging adults. SCI's relative remoteness, limited anchorages, and unpredictable operational closures likely play a significant role in reducing fishing pressure and subsequent impacts to the associated marine communities. According to Merkel and Associates, no visible impacts from Navy operations were observed on the underwater communities at visited sites.

The island-wide surveys delineated four island eco-regions around the island. Although the number of sites sampled within each island eco-region was too low to describe significant differences between island eco-regions, some notable trends in habitat classification were apparent. First, the only two sites classified as developing kelp forests were located on the east shore, where bottom substrate and oceanographic conditions possibly limited perennial kelp forests from forming. As expected, the north and west island eco-regions were dominated by mature kelp forests and sand bottom with sub-canopy brown algae. These mature kelp forests supported dense stands of understory algae unlike the Pyramid and east island eco-regions, which were dominated by encrusting invertebrates on the hard substrate. Dense understory algae were most typically present where high flow, nutrient rich oceanic water was consistently available, as in the north and west shore eco-regions of SCI. The Pyramid eco-region had a southeast aspect and typically experiences less wind and swell than other exposures throughout the island.

Methodologies from previous surveys were reviewed to assist in the development of methods to meet the State Water Board request. Due to logistical constraints, including access to portions of the island, potential weather concerns, diver safety and bottom time limitations, and the distance between potential sampling locations, the methods were developed to provide the best information to satisfy the request by the State Water Board and also to make comparisons with previous survey data.

Results indicated a high degree of biological variability in the intertidal and subtidal zones within an island eco-region, primarily due to differences in substrate type and coverage (e.g., cobble, boulder, bedrock, sand). Generally, different substrate supported different assemblages of organisms, and at some locations the presence of competitive dominants (e.g., mature giant kelp forest) led to biological interactions. According to Merkel and Associates, all marine habitats surveyed at SCI had diverse, healthy communities. Variability amongst communities was attributed to normal variability and there was no indication of direct impacts associated with Navy activities. The metrics used to determine potential impacts to beneficial uses further indicated biological variability within an island eco-region, supporting the need to have multiple reference locations.

Two metrics were derived from these surveys: (1) number of taxa, and (2) abundance or percent cover. There were no benchmarks available for these metrics so they can only be compared to reference conditions. In the case of SCI, the comparisons were made to reference conditions within an associated ecoregion. Based on historical data, these community measurements are highly variable. According to Merkel and Associates, differences of 50% in the number of taxa or abundance/cover between any two sites would be considered in the realm of natural variation. Therefore, if a metric measured at a station was lower by 50% or more than the associated reference station, then that metric was flagged. When one or both metrics at a station were flagged, the biologist considered substrate data, historical data if available, looked at results of the receiving water and sediment measurements for causal relationships, and used best professional judgment to determine if intertidal or subtidal habitats required additional evaluation. Again, State Water Board staff disagrees with the adequacy of a 50% criterion in determining differences between impact and reference sites.

Graphs were prepared for species or taxonomic groups that were relatively abundant and, in some instances, species were placed into taxonomic groups for graphing purposes (e.g., red turf and red foliose algae were grouped into a red turf algal taxonomic group). Summary tables were prepared for species or taxonomic groups that were not relatively abundant or common. In addition, a comprehensive species list was developed from this survey, and previous surveys.

Subtidal Survey Methods: At each sample station, a diving biologist using SCUBA determined the distribution and abundance of subtidal invertebrates and algae at two isobaths (-12 and –40 ft MLLW). A 25-meter long transect tape was established at each isobath. Kelp (i.e., large brown algae) abundance was counted in 10, randomly placed 5-meter-long by 2-meter-wide band transects ($10m^2$). Observations included the number of kelp plants in each band transect, the number of stipes at a height of one meter above the bottom, and the size of the individual plants. Four size categories were measured: newly recruited kelp plants (minimum size 2-10 cm), juveniles (10-40 cm in length), subadult (between 40 cm and 2 m), and adults (greater than 2 m in length). The characteristic color and wavy pattern of the blades allowed biologists to readily identify even relatively small *Macrocystis* plants.

Biologists documented the abundance of key indicator plant and invertebrate species in 10 randomly placed 1-meter by 1-meter quadrats ($1m^2$). Biologists also quantified substrate type (sand, rock, cobble) and algal cover using a point contact method with 20 points sampled within the $1m^2$ quadrat. A list of target species/assemblages that were surveyed at each subtidal sampling location is provided. These were common subtidal organisms present during previous Navy surveys. Other species of interest were also noted. Formal fish transects were not conducted, but all fish species observed were recorded to document presence and relative qualitative abundance (e.g., abundant, common, rare).

Intertidal Survey Methods: At each sample station, marine biologists recorded the abundance and/or percent cover of organisms at each of three tidal elevations (+5, +3, and 0 ft MLLW) using a 0.25m² quadrat following methods used for previous surveys at SCI. A 10-meter long transect tape was established at each tidal elevation, and four randomly placed quadrats along the transect line were sampled at each of the three tidal elevations. Two biologists were assigned to each quadrat to record abundance and/or percent cover (for invertebrates, algae, and substrate) for several target species that were determined to be key species in the previous marine resources inventory. Abundance was quantified by counting total individuals within each 0.25m² quadrat and percent cover was measured using the point contact method at 20 points within each 0.25m² quadrat. A list was composed of target intertidal species/assemblages that were surveyed at each intertidal sampling location. These species are common intertidal organisms and are considered to be representative organisms that were present during previous surveys. Other species of interest and substrate type (rock, cobble, sand) were also noted. Cobble was defined as small, moveable rock generally less than 12 inches in diameter.

Several algal species were grouped into taxonomic categories to allow efficient field sampling and comparison with past studies. All species in the genus *Corallina* were grouped into the group coralline algae, red turf included low-lying red algae (e.g., *Gelidium* spp.), red foliose was made up of leafy erect red algae (e.g., *Pterocladia* spp.), Ralfsiaceae included all encrusting brown algae in the Ralfsiaceae family (e.g., algae that resemble “black tar”), and other browns included brown algae such as *Dictyota* spp., *Dictyopterus* spp., *Zonaria* spp., *Halydris* spp., *Colpomenia* spp., *Leathesia* spp., and *Scytosiphon* spp.

A total of 10 locations were chosen for biological sampling around SCI. These included five locations that were representative of areas with discharges associated with distinct Navy operational activities. The total also included five locations chosen to represent areas that receive natural storm water runoff not associated with Navy activities, and thereby considered a reference condition. The five reference locations were chosen because historical data indicated that there are four eco-regions around the island that result in different reference conditions. The 10 sampling locations and survey results, grouped by island eco-region, are:

Castle Rock (CR) was chosen as a reference location for the north eco-region and is located approximately 0.5 miles (0.8 km) west of Bird Rock. A rocky bluff backed the intertidal area, with patches of cobble at higher tidal levels, leading to bed rock at lower tidal levels. An expansive kelp forest was present offshore with extensive surf grass beds present near shore. The substrate in this area consisted of a mixture of bedrock with moderate relief (2 meters in some places) and large boulders with interspersed patches of sand.

Northwest Harbor (NW) is located in the north eco-region, and was an area requested to be sampled by the State Water Board since in-water Basic Underwater Demolition/SEALS (BUD/S) training occurs in near shore waters. In-water ordinance detonation (explosives) training occurs directly offshore of BUD/S Camp on sandy subtidal habitat in water ranging from 10 to 15 feet (3 to 4.5 m) deep. The area boasts a wide variety of different marine habitats, including sandy beach, rocky intertidal habitat composed of boulders and cobble, and also formational rock along the western shoreline, sandy subtidal habitat, and a diverse rocky subtidal habitat. The cove is somewhat protected by prevailing northwesterly winds and swell, by a small island (Bird Rock) located offshore that provides a roosting area for a variety of sea birds and marine mammals. An extensive giant kelp forest was present both within the cove and further offshore. The ASBS sampling location was situated east of the sandy beach, along the boulder and cobble intertidal area, on a rocky headland between BUDS Camp and Graduation Beach. The subtidal sampling locations were situated directly offshore of the intertidal locations.

Five species or taxonomic groups were flagged for the intertidal habitat at NH for exceeding the 50% difference criteria, and included: coralline algae, *Sargassum*, green algae, barnacles, and mussels. The total number of species was within the 50% criteria, which was almost expected as the comparisons are among organisms or groups of organisms that were previously reported to be common species at SCI. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability (the substrate at NH was predominantly boulder, while CR was bedrock), and exposure (NH is more protected than CR).

Four species or taxonomic groups were flagged for the subtidal habitat at NH for exceeding the 50% difference criteria, and included: *Cystoseira*, *Phyllospadix*, crustose coralline algae, and urchins. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability, exposure, and species mobility.

East Airfield (EA) is located in the north eco-region and east of the runway, and is representative of a storm water runoff area associated with airfield operations. The site was situated below a steep rocky bluff, with two distinct geological formations, and a small pocket beach that extended into the subtidal zone. The intertidal area was heterogeneous with rocky outcroppings separated by sand at lower tidal levels, small benches with tide pools at mid-tidal levels, and irregular and steep upper tidal level. A very narrow band of rocky substrate that supported giant kelp was present near shore, with sandy subtidal habitat present further offshore. A more extensive kelp forest was present down coast of this site.

Three species or taxonomic groups were flagged for the intertidal habitat at EA for exceeding the 50% difference criteria, and included: coralline algae, *Sargassum*, green algae, and limpets. The total number of species was within the 50% criteria. According to Merkel and Associates there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability (e.g., green algae tend to be ephemeral species), competitive interaction (biotic), and substrate variability (the substrate at EA was predominantly bedrock outcropping with sand patches, while CR was bedrock).

Twelve species or taxonomic groups were flagged for the subtidal habitat at EA for exceeding the 50% difference criteria, and included: *Laminaria*, *Cystoseira*, *Sargassum*, *Phyllospadix*, *Dictyota*, red turf algae, crustose coralline algae, and all of the invertebrates. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability (the 40-ft isobath at EA was all sand, while CR was bedrock with high relief), exposure (EA is more protected than Castle Rock), and species mobility.

Eel Point (EP) is within the west eco-region. This region tends to be characterized as having a wide shelf of mostly bedrock with expansive kelp forests. It is also exposed to large swell for the entire year. The EP site was located within the cove south of Eel Point, and was chosen as a duplicate reference location for this eco-region to account for potential spatial variability. The intertidal area within the cove ranged from vertical rocky bluffs to cobble. The sampling location was located south of the point in the vicinity of an ephemeral stream/drainage, with boulder and cobble present at higher tidal levels, and bedrock at lower tidal levels. The subtidal zone consisted mostly of bedrock with moderate relief of up to about 2.5 meters. Patches of sand were common in deeper areas or in pockets between rocky outcroppings.

Lost Point (LP) is within the west eco-region, and was also chosen as a reference location for this eco-region. The LP site was located within the cove south of Lost Point. The intertidal area within the cove ranged from vertical rocky bluffs to cobble. The sampling location was located south of the point in the vicinity of an ephemeral stream/drainage, with boulder and cobble present at higher tidal levels, and bedrock at lower tidal levels. The subtidal zone consisted mostly of bedrock with moderate and high relief of up to 4 meters. Small patches of sand were common in deeper areas or in pockets between rocky outcroppings.

West Airfield (WA) is located on the very north section of the west eco-region. This site is located in West Cove, and is representative of a storm water runoff area associated with airfield operations. West Cove is a protected cove relative to the other sites within this region, with a small sandy beach bordered by a steep rocky intertidal area to the north, and relatively flatter intertidal bench to the south, where intertidal sampling was conducted. Sand extends into the subtidal zone providing a clear path for entrance into West Cove. Mid- to high-relief rock and bedrock were present to the north and south, which supported a dense giant kelp forest.

Twelve species or taxonomic groups were flagged for the subtidal habitat at NH for exceeding the 50% difference criteria, and included: *Laminaria*, *Cystoseira*, *Sargassum*, *Phyllospadix*, *Dictyota*, red turf algae, crustose coralline algae, and all of the invertebrates. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability (the 40-ft isobath at EA was all sand, while CR was bedrock with high relief), exposure (EA is more protected than CR), and species mobility.

One taxonomic group was flagged for the subtidal habitat at WA for exceeding the 50% difference criteria, and included: crustose coralline algae. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), substrate variability (the 40-ft isobath at EA was all sand, while CR was bedrock with high relief), exposure (EA is more protected than CR), and species mobility.

Stone Station or East Reference (REF) is located in the east eco-region, and was chosen as a reference location for this eco-region. Similar to other locations within this region, the island drops off very rapidly with steep depth contours in the subtidal zone. The sampling area was located in the vicinity of an ephemeral stream/drainage, with large boulders and cobble present in the intertidal and subtidal zones. A narrow, but dense stand of giant kelp was present in the subtidal zone.

Naval Ordnance Test Station (**NOTS) Pier** (NT) is located in the east eco-region, and was an area requested to be sampled by the State Water Board since the area is used to stage testing operations and is a potential source of runoff. The east side of the island drops off very rapidly and, as a result, there are not large expansive stands of giant kelp as along the west shore, but rather relatively narrow bands that parallel the coast. The intertidal zone was predominantly cobble and boulder, which also extended into the subtidal zone. The subtidal zone consisted mostly of very large (often several meters in size) boulders with small patches of sand. Adjacent to the boulder habitat were large expanses of sandy subtidal habitat that supported isolated beds of eelgrass.

Five subtidal species or taxonomic groups were flagged for the subtidal habitat at NOTS Pier for exceeding the 50% difference criteria, and included: *Pterygophora*, *Laminaria*, *Cystoseira*, *Dictyota*, and red turf algae. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability (e.g., *Pterygophora* was relatively uncommon at NT), competitive interaction (biotic), and substrate variability (the 40-ft isobath at reference location had a high percentage of sand compared to the NOTS location).

Intertidal species abundance or percent cover and number of taxa were compared to a reference location (Stone Station). Three species or taxonomic groups were flagged for the intertidal habitat at NOTS Pier for exceeding the 50% difference criteria, and included encrusting coralline algae, *Eisenia*, and littorine snails. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), and substrate variability (the substrate at the reference location was predominantly cobble), and species mobility.

Sun Point (SP) was chosen as a reference location for the Pyramid eco-region. Unlike many of the other locations, SP area has a large sandy beach, with large expanses of sandy subtidal habitat offshore. Relatively small, but dense stands of giant kelp were only present on patch reefs located offshore. The intertidal and shallow subtidal sampling locations were located east of an ephemeral stream/drainage. The intertidal zone consisted of a relatively low relief bedrock bench, while the shallow subtidal zone consisted of moderate to high-relief bedrock with sand. The deeper subtidal sampling location was located further offshore, and consisted of bedrock and cobble with moderate amounts of sand.

Horse Beach Cove (HB), in the Shore Bombardment Area (SHOBA), is representative of an area that has an active bombing range, and is within the Pyramid eco-region. The sampling location was along the western shore of HB, an area that was predominantly irregular bedrock in the intertidal and shallow subtidal zones. Deeper subtidal areas consisted of lower relief bedrock and boulder interspersed with sand. Sandy habitat was more common in the deeper depths, towards the center of the bay.

The location sampled in the Pyramid eco-region included Horse Beach. Species abundance or percent cover and number of taxa were compared to a reference location (Sun Point). Four species or taxonomic groups were flagged for the intertidal habitat at

HB for exceeding the 50% difference criteria, and included barnacles, the colonial snail *Serpulorbis*, littorine snails, and mussels. The total number of species was within the 50% criteria. According to Merkel and Associates, there was no apparent impact to beneficial use based on these metrics as they can be explained by competitive interaction (the intertidal zone at Horse Beach had a high cover of turf algal species which may affect the distribution of invertebrates), substrate variability (the substrate at the reference location was predominantly a bedrock bench compared to a irregular bedrock platform with tidepools), and species mobility.

Six subtidal species or taxonomic groups were flagged for the subtidal habitat at Horse Beach for exceeding the 50% difference criteria, and included *Phyllospadix*, *Dictyota*, red turf algae, sponges, ectoprocts, and ascidians page. The total number of species was within the 50% criteria. According to Merkel and Associates there was no apparent impact to beneficial use based on these metrics as they can be explained by natural variability, competitive interaction (biotic), and substrate variability (the 40-ft isobath at Horse Beach location had a high percentage of sand compared to the Sun Point [reference] location).

As mentioned previously, State Water Board staff disagree with the use of a 50% criteria as an adequate measure of differences between impact and reference sites. Also, the conclusions provided by Merkel and Associates, that there was no apparent impact to beneficial use and that all of the variability observed was due to natural variability, seemed to rely heavily on subjectivity/best professional judgment when a more objective statistical approach should have been employed. Multivariate cluster assessments (such as Bray-Curtis) would be a better way to determine differences between discharge and reference sites, as was performed by Dr. Raimondi for SNI and other ASBS data above.

At the request of State Water Board staff, Dr. Raimondi performed a statistical analysis of the SCI intertidal data set described above. In that assessment, he used Bray-Curtis ordination (PRIMER software) to compare community structure at reference and impact locations. Using the design (selected reference stations and low replication) and resulting data from Merkel and Associates he found no statistical evidence that discharge locations are different from selected reference locations based on comparison of community composition.

However, Dr. Raimondi expressed an important concern about the choice of reference sites (rocky reefs). In addition, he did not support the use of a 50% difference between sites as a criteria evaluating effects of ASBS discharges.

Natural spatial variability in such environments is high. Merkel and Associates had collected limited data for each zone at each location, characterizing the community by only 80 points for species cover and by counts in a 1 meter square quadrat area. Dr. Raimondi stated that the power of the design used by Merkel and Associates is likely to be low. He went on to state that proper estimation of the effect of discharges in the presence of such high natural variability is made much more rigorous by increasing the sample replication.

5.6.16 - Exception Application Biological Surveys - State Water Board Staff Conclusions

There was a great deal of information provided in the exception applications regarding fish, invertebrate and primary producers in ASBS. These studies provided valuable information concerning the status of marine life in ASBS. However, not all of the studies provided were designed to answer questions concerning the effects of anthropogenic runoff on intertidal or subtidal communities in ASBS. Even those studies that were designed to provide information about the effects of runoff had very different survey site designs, survey methods, and data assessment procedures.

Based on a review of the above information, functional biological communities are found in all ASBS with anthropogenic runoff influences. There is adequate evidence to allow an exception to the Ocean Plan for storm water and nonpoint source discharges, as long as they are properly controlled. The adoption of Special Protections will only reduce pollution and improve habitat, thereby allowing for improved and sustained protection for marine aquatic life.

While functioning biological communities do persist at ASBS, some of the initial data indicates that there were some differences identified between those ASBS survey sites influenced by runoff and survey “reference” sites. While impacts may not be overtly conspicuous, there may be some effects from anthropogenic runoff. For three out of four data sets tested by Dr. Raimondi using Bray-Curtis multivariate analysis, there was a difference (p value significance levels $< 5\%$) in community composition between runoff sites vs. reference sites with no direct waste discharges. Still, these differences are not conclusive because of the inconsistencies and inadequacies of survey designs. There is probably not enough reliable data yet to say that it is definitely the runoff causing differences, or if it is due to some other coincidental perturbation. Additional biological monitoring must be performed in order to insure protection of marine aquatic life. Further staff conclusions regarding future biological monitoring are as follows:

- A rigorous regional approach, with statewide consistency, should be developed for the next round of surveys to adequately quantify the effects of discharges on marine life.

- The reference areas the applicants/consultants picked may have been chosen better than they were. This can be improved by having the reference sites selected with the advice of a team of experts.

- There would be much more power to assess community differences and impacts, or if any differences are due to natural variability, if there are adequate replication and more reference sites.

- Community composition should be compared between discharge and reference sites using statistically robust techniques such as multivariate cluster analysis.

- Ideally, the results of this rigorous and comprehensive sampling effort will yield an index of community health in relation to waste discharges, and possibly the identification of less comprehensive cost-effective biological indicators for future use.

5.6.17 Southern California Bight 08 Regional Biological Monitoring

A well-planned approach to biological investigations is required to adequately address the question of runoff impacts. Toward this end State Water Board staff supports of a regional approach to monitoring, with statewide comparability, including biological monitoring, relying on expert scientists to design and review biological monitoring efforts and to develop objective, statistically sound data assessments.

In part to overcome the limitations addressed by Raimondi in 2009, a regional ASBS biological monitoring program was implemented in southern California as part of the Bight 08 ASBS monitoring program. Twenty one rocky intertidal sites were quantitatively sampled for habitat quality, invertebrate and algal abundance and composition by Raimondi's UC Santa Cruz Coastal Biodiversity research team. The monitoring question focused on differences between reference and ASBS discharge sites. Preliminary results indicated that: 1) there were no significant differences in macro-invertebrate or algal species richness based on geographic grouping or type of site (discharge vs. reference); 2) there were large geographic differences in algal and sessile invertebrate species composition, likely reflecting natural biogeography, but no statistically significant differences between reference sites and ASBS discharge sites; and 3) there were large geographic differences in mobile invertebrate species composition, once again reflecting natural biogeography, but no statistically significant differences between reference sites and ASBS discharge sites. However, the answers differed when sessile and mobile species were jointly considered. Not only were geographic differences observed, but differences were also observed at two discharge sites relative to reference condition[7] (Figure 5.6.8.). The two discharge sites different from reference condition (i.e., outside of the confidence ellipse) are located at the La

[7] Report to the State Water Resources Control Board, Summation of Findings, Natural Water Quality Committee, 2006-2009, September 1, 2010.

Jolla ASBS and the Laguna Point to Latigo Point ASBS. While these sites are both discharge sites and also different from reference, it is still unknown as to what role the discharges and other anthropogenic influences may have causing these differences.

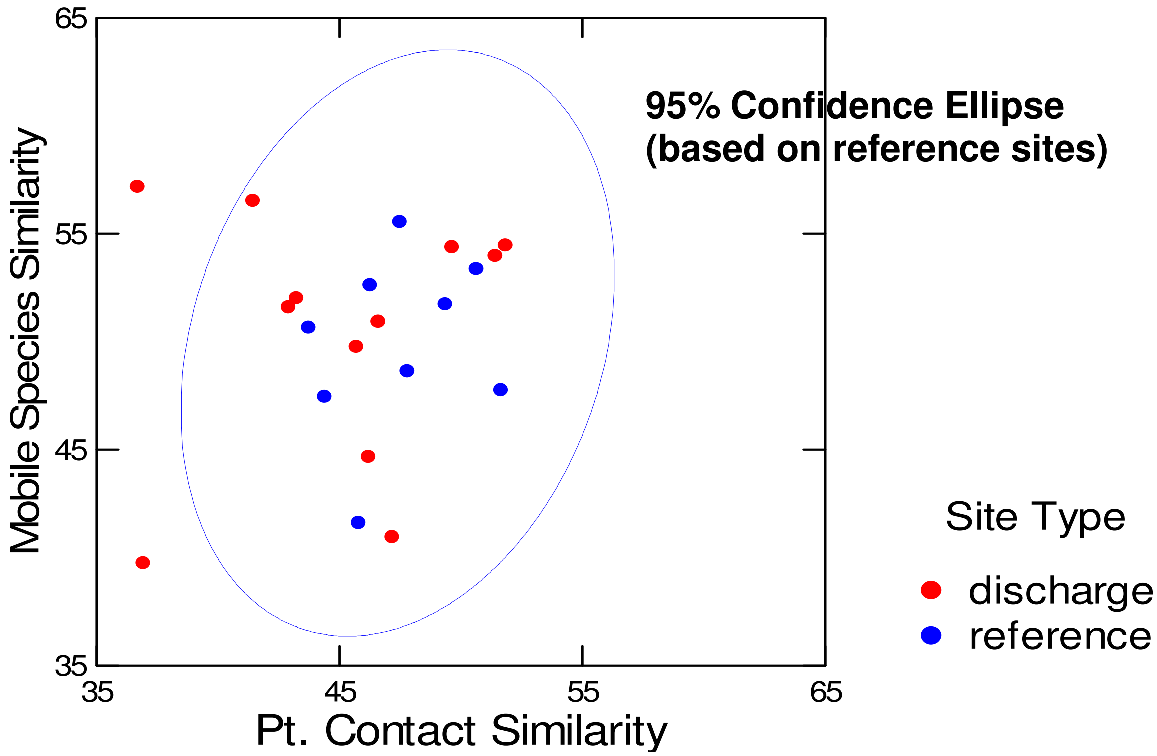

Figure 5.6.8. Similarity of Community Indices and Confidence Ellipse. Source: Pete Raimondi (UC Santa Cruz)

Because of the value of biological information, ASBS stakeholders in southern California supported monitoring of 70 subtidal rocky reef sites. Quantitative sampling for habitat quality, vertebrate, invertebrate and algal abundance and composition was coordinated by Dr. Dan Pondella at Occidental College with collaborators at UC Santa Barbara and San Diego State University. Similar to the intertidal monitoring, the monitoring question focused on differences between reference and ASBS discharge sites. Data analysis for the subtidal rocky reefs has not progressed as far as the intertidal monitoring. Initial data examination has identified clear differences in community composition based on habitat characteristics (i.e., rock relief), but large differences in biological community characteristics between ASBS and reference sites have yet to be determined.

While more work is needed to further investigate the relationship between biological condition and water quality impacts, it demonstrates the importance and value of biological data. and the ASBS Natural Water Quality Committee has suggested to the State Water Board that the above data is sufficient to warrant further investigation. [8]

5.7. BASELINE DISCHARGE INFORMATION

The SCCWRP 2003 Final Report on Discharges into State Water Quality Protection Areas found 391 municipal or industrial storm drains, 1,012 small storm drains, 224 nonpoint sources, and 66 seeps or springs that may have been influenced by nonpoint source wastes. SCCWRP also found 637 naturally occurring intermittent (gullies) or perennial streams. Since the SCCWRP survey, State Water Board staff has identified another 96 drainages, most of which are storm water or nonpoint source discharge sites. There are 473 runoff discharges into ASBS exceeding 18 inches in diameter or width; 315 of those discharges exceeded 36 inches in diameter or width. Other types of discharges occur in many of the ASBS not associated in terms of an end of pipe discharge, but include many high-threat nonpoint sources as well, e.g. marina and boating operations.

5.7.1 - Caltrans – Multiple ASBS

As part of their assessment of highway discharges to 10 of the ASBS, Caltrans evaluated 186 Caltrans maintained highway discharges to ASBS. Of those 186, 83 discharges were immediately into an ASBS and 103 were either attenuated through natural vegetation (65) or are discharged to ASBS via streams (38) along the coast just prior to draining into an ASBS. Direct discharges that are attenuated by natural vegetation and soil would likely not reach the ASBS surface waters as frequently as those direct discharges that drain immediately into an ASBS (e.g., a storm drain outfall into the intertidal zone). Discharges into streams in near proximity to an ASBS (e.g., from a highway bridge along the coast) may be diluted by watershed runoff. Storm water discharges associated with highway runoff have the potential to be considered of a higher threat depending on specific highway and watershed conditions. It should be noted that run-on occurs upstream of and into some of these highway drains, and some of these highway discharges drain across parks and beaches as well. Therefore, highway discharges are also discussed below for specific ASBS.

5.7.2 - State Parks – Multiple ASBS

California Department of Parks and Recreation discharges are primarily related to storm water runoff and non-point source discharges from roadside parking or pull-out areas in 11 ASBS. Many of the storm drain related discharges are co-located with Caltrans storm water conveyances.

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[8] Report to the State Water Resources Control Board, Summation of Findings, Natural Water Quality Committee, 2006-2009, September 1, 2010.

5.7.3 - Redwoods National Park

Although Redwood National Park facilities are some of the most remote in the State, this ASBS is impacted by 303d listed water bodies, primarily for sediment and temperature. There are 39 storm drains in the ASBS that include storm water runoff from highway facilities (contribution from Caltrans, see above) and beach access parking lots.

5.7.4 - Trinidad Head, Trinidad Rancheria

The mooring field is occupied by commercial and recreational fishing boats from May through October. Staff is not aware of any live-in occupation of boats. State Water Board staff is concerned that release of metals by corrosion-protective “zincs” and bottom paint (copper) could damage the kelp beds. Commercial fishing and crabbing boats within the mooring field and on the pier continue to routinely use bleach and detergents to clean gear and boats (See Fish and Game Warden enforcement citation, April 2008). These marina and boating activities are considered to be high threat.

Land based sources at Trinidad include a storm drain system, the pier, boat haul out ramp, and parking lot, and seepage from the coastal bluff. The main Trinidad storm drain is adjacent to the HSU Telonicher Marine Lab waste seawater outfall (the HSU discharge is not included in this exception).

5.7.5 - King Range, Shelter Cove

The County of Humboldt and the Humboldt Bay Harbor Recreation and Conservation District higher threat discharges at Shelter Cove include point and non-point source discharges. Point source discharges include storm drains conveying residential and road runoff directly into the shoreline. Recreation boaters park their vehicles directly on the beach utilizing the concrete boat launch; these types of nonpoint source discharges likely carry fuel, oil, and grease. The recreational and commercial fishing industry is served by a fish cleaning facility immediately adjacent to the shoreline. The highly concentrated fish wastes are ground up and then discharged directly back into the ocean via a suspended pipe into the intertidal zone. This highly concentrated waste is considered to be of high threat.

5.7.6 - Del Mar Landing

TSRA properties have three main storm drains carrying residential and road runoff into the ASBS. These are considered to be of higher threat discharge due to the nature of their size, and direct discharge into the intertidal zone.

5.7.7 - Point Reyes Headlands

Point Reyes National Seashore has seven storm drain and nonpoint source discharges considered to be of lower threat. These discharges are primarily associated with the runoff and related contaminants from the lighthouse visitor center and recreational facilities. While outside the ASBS, nonpoint source discharges from historical dairies may introduce pollutants to Drake's Bay, which in turn may reach the ASBS.

5.7.8 - Duxbury Reef

The County of Marin's discharges to this ASBS are primarily sources from residences, parking lots, and road runoff, and may include nutrients, bacteria, or pathogen contamination from septic seepage (seeps are mentioned as a potential pollutant source but are not included in the exception). There are five storm drains and nonpoint sources considered to be of medium threat. One naturally occurring drainage, Agate Creek, may pose a higher threat.

5.7.9 - James V. Fitzgerald

The County of San Mateo and the Department of the Air Force convey point and nonpoint discharges including residential and road runoff. This ASBS has 19 municipal, military, or transportation related higher threat discharges. California State Parks and Caltrans have discharges impacting this resource as well.

5.7.10 - Pacific Grove

The City of Monterey and the City of Pacific Grove discharge to this ASBS and, combined, have 44 municipal storm drains greater than 0.25 meters carrying residential and road runoff into the ASBS. These are the discharges that are considered to be of a higher threat due to the nature of the impervious surface area of the watershed and amount of roads parallel to the intertidal zone and shoreline.

5.7.11 - Carmel Bay

The Carmel Bay ASBS has 33 storm drains greater than 0.5 meters in diameter discharging directly into the ASBS. Applicants are the County of Monterey, the Pebble Beach Company, the City of Carmel-by-the-Sea, Caltrans, and State Parks. In addition to the larger storm drains, there are 135 smaller storm drains, 0.2 meters to 0.3 meters in size. These discharges are considered to be a considerable threat due to the very nature of the source and size of the discharges; golf course runoff carries with it pesticides, herbicides, rodenticides, and fertilizers; and residential and road runoff carries oils, grease, and metals. Copper is used as an adjuvant in many herbicides, pesticides, and fertilizers, and is also carried in the runoff.

5.7.12 - San Nicolas Island

Although SNI may be considered small, remote, and relatively undeveloped, this Naval facility has 10 industrial storm drains that are considered to be of higher threat. Military operations include missile launches and tracking. There is also an airfield and an active waterfront.

5.7.13 - Laguna Point to Latigo Point

Residential runoff, highway runoff, recreational facilities, and septic leach fields located on the beaches are considered to be high threat in this ASBS. There are 120 municipal storm drains discharging directly to the ocean. The applicants are the City of Malibu, the County of Los Angeles, Caltrans, and State Parks.

5.7.14 - Robert E. Badham

The City of Newport Beach is the primary applicant in this ASBS. Urban runoff in the heavily developed watershed is conveyed via three storm drains greater than 1.0m and three storm drains 0.2m to 0.33m in diameter. These discharges are considered to be of higher threat due to the nature of the constituents in urban runoff.

5.7.15 - Irvine Coast

Urban, highway, golf course, and recreational facilities are the primary sources of high threat discharges to this ASBS. There are 16 storm drains greater than 0.5 meters in diameter. Applicants include the City of Newport Beach on behalf of the Pelican Point Homeowners Association, Irvine Company, Caltrans, and State Parks.

5.7.16 - Heisler Park

Urban runoff, trash, sediment, and untreated storm water runoff are considered to be of high threat to this ASBS. There are three storm drains greater than 0.5m in diameter owned and maintained by the City of Laguna Beach.

5.7.17 - La Jolla

The City of San Diego is the applicant of 14 storm drains larger that 0.5m in diameter, and 156 other storm drains considered being of higher threat to this ASBS.

5.7.18 - San Clemente Island

Military operations at this remote ASBS and the related runoff associated with these activities are considered to be of high threat. Storm water and nonpoint sources include 16 industrial storm drains with potential sources of industrial and military related activities. The island has an airfield drained by storm drains and an active waterfront. Training exercises include live fire, shore bombardment, and ordinance detonation at specific locations, specifically the SHOBA and BUD/S areas. A sink draining into the ocean is located at the NOTS pier.

5.7.19 - Southeast Santa Catalina Island

Connolly-Pacific Company owns and operates a quarry located on the Southeast Santa Catalina Island. This is an industrial facility mining aggregate material from the hillside using the shot method. Explosives are drilled into the hillside and then detonated to release the rock. Material is then transported to the separator plant for sorting. The product is then stockpiled and subsequently loaded onto barges for delivery to the mainland. Quarry operations include petroleum storage tanks, maintenance and equipment yard, and stockpiled aggregate.

5.7.20 - Northwest and Western Santa Catalina Island

SCICO owns 1,530 acres (6.19 km^2) in the Two Harbors area of this ASBS and is the main center of population of the west end of the island. In addition to providing dock facilities for the mainland cruise boats, there is an estimated 720 moorings and anchorage, where private boats can be accommodated. Services and marine related facilities include automotive, fuel facilities, sewer pump out, barge ramps, and wastewater reclamation plant.

Additional smaller anchorages and moorings are located throughout other small island coves. The largest of the group, Fourth of July Cove, contains approximately 200 anchoring and 42 moorings with supporting marina and pier facilities leased and operated by the Fourth of July Yacht Club. Nonpoint source discharges associated with marina and boating operations are considered high threat.

Recreational activities (e.g., camping) also take place at these two ASBS. The Catalina Conservancy manages camping facilities at the Western Santa Catalina Island ASBS. Roads to the recreational sites are coated with road oil and occasionally are eroded. Some of that road oil may pollute the ASBS.

Table 5.7.1. Higher Threat Waste Discharges for Storm Water and Nonpoint Source Discharges. General Exception Applicants

ASBS No.	ASBS Name	Regional Water Board	No. of Higher Threat Discharges	Sources of Threats
1	Jughandle Cove	1	1 (Caltrans bridge)	Highway runoff

ASBS No.	ASBS Name	Regional Water Board	No. of Higher Threat Discharges	Sources of Threats
2	Del Mar Landing	1	3 storm drains	Residential and road runoff
3	Gerstle Cove	1	1 storm drain, and boat ramp area	Recreational facility, parking lot and boat ramp runoff
5	Saunders Reef	1	6 storm drains	Highway and parking runoff
6*	Trinidad Head	1	5 storm drainages and nonpoint sources, 1 waste seawater outfall	Pier and mooring field; boat cleaning; urban runoff
7	King Range, specifically in the immediate vicinity of Shelter Cove	1	9 storm drainages, 1 fish cleaning station, 1 boat ramp	Fish cleaning point source; launch ramp and marine operations; residential and road runoff,
8*	Redwood National Park	1	39 storm drainages	Highway parking lot and campground runoff
9*	James V. Fitzgerald	2	19 municipal, military or transportation storm drains	Sewage collection and pumping facility - sewage spills; residential, parking and highway runoff
11	Duxbury Reef	2	5 storm drains and nonpoint sources medium threat	Residential parking lot and road runoff;
15	Año Nuevo	3	14 storm drainages and nonpoint sources	Agriculture runoff and highway runoff
16	Point Lobos	3	16 storm drainages and nonpoint sources	Parking lot and boat launch, recreational facility and road runoff
18	Julia Pfeiffer Burns	3	38 storm drainages > 0.25m	Highway runoff and legacy sedimentation
19	Pacific Grove	3	44 municipal storm drains > 0.25m	urban runoff
20	Salmon Creek Coast	3	22 storm drainages > 0.25m	Highway and rural residential runoff
21	San Nicolas Island & Begg Rock	4	10 storm drains	Military operations and industrial runoff
23	San Clemente Island	4	16 storm drains	Military operations and industrial runoff
24	Laguna Point to Latigo Point	4	120 municipal storms drains	Residential runoff; highway runoff; recreational facilities and septic leach fields on beach
25	Northwest Santa Catalina Island	4	26 storm drains and nonpoint source discharges	Residential commercial and road runoff; pier and mooring facilities
26	Western Santa Catalina Island	4	3 nonpoint sources	Boating, camping, and road runoff
28	Southeast Santa Catalina Island	4	2 storm drainages/nonpoint sources	Quarry operations and barge landing
29	La Jolla	9	14 storm drains >0.5 m, plus 156 storm drains 0.2 -0.5 m	Urban runoff
30	Heisler Park	9	3 storm drains >0.5 m, plus 2 other large storm drains of undetermined size	Urban runoff, sediment, trash, irrigation runoff and untreated storm water runoff

ASBS No.	ASBS Name	Regional Water Board	No. of Higher Threat Discharges	Sources of Threats
32	Robert E. Badham	8	3 storm drains ≥ 1.0 m, 3 storm drains 0.2 – 0.33 m	Urban runoff
33	Irvine Coast	8 and 9	16 storm drains > 0.5 m	Urban and highway runoff, golf course and recreational facilities
34	Carmel Bay	3	33 storm drains ≥ 0.5m, 135 storm drains 0.2 – 0.3m, plus golf course nonpoint source runoff	Golf course runoff, urban, and highway runoff recreational facilities

* Please note all highlighted ASBS are affected by 303 (d) listed water bodies. For additional information regarding these ASBS, see ASBS by 303 (d) Listed Waterbodies excel spreadsheet posted at http://www.waterboards.ca.gov/water_issues/programs/grants_loans/asbs/index.shtml.

5.7.21 - Waste Discharge Prevention and Treatment

As part of their exception applications, applicants submitted information regarding their pollution prevention and control efforts. Included in this section are summaries of those efforts, Best Management Practices (BMPs) or other controls, or treatment that applicants have described in their exception applications.

5.7.21.1 Department of Transportation - Caltrans

The Caltrans Statewide Storm Water Management Plan (SWMP) identifies permanent and temporary BMPs that have been approved for statewide application. The BMPs fall into four categories; Design Pollution Prevention BMPs, which include permanent soil stabilization systems; Treatment BMPs, which include permanent treatment devices and facilities; Construction Site BMPs, including temporary soil stabilization and sediment control, non-storm water management, and waste management; and Maintenance BMPs, includes litter pickup, toxic controls, street sweeping, etc.

Treatment BMPs may include biofiltration: strips/Swales, Infiltration Devices, Detention Devices, Traction Sand Traps, Dry Weather Flow Diversion, Gross Solids Removal Devices (GSRDs), Media Filters, Multi-Chamber Treatment Train, Wet Basins, and Non-structural maintenance BMPs (Caltrans Storm Water Quality Handbook, Maintenance Staff Guide (CTSW-RT-02-057[1]), May 2003).

Throughout their project planning and design process, Caltrans considers Design Pollution Prevention and Construction Site BMPs for every project. Descriptions, appropriate applications, siting criteria, and design factors for the approved Design Pollution Prevention and Treatment BMPs are listed in the Caltrans Storm Water Quality Handbooks Project Planning and Design Guide.

5.7.21.2 California Department of Parks and Recreation

At Crystal Cove (Irvine Coast ASBS), State Parks has worked under a Water Quality Action Plan for the Irvine Coast ASBS according to the requirements of a Cease and Desist Order (Santa Ana Regional Water Board CDO R8-2000-87). This order involved septic systems associated with the Historic District and Reef Point Parking Lot management in Crystal Cove State Park, as well as the operation of the Newport Coast Development and the Pacific Coast Highway Drainage tributary to the park. The Reef Point Parking Lot plan includes a vacuuming program twice per month (June-October), and once per month (November-May), a trash removal protocol, which includes litter removal from all parking areas daily, inspection, and removal of litter from culverts, drainages, and other areas. As part of their erosion control efforts, a vegetation management program is ongoing, implementing coastal sage scrub revegetation both within natural drainages and on the bluff top. Dry weather flow management efforts include routine maintenance of the public shower area to prevent unnecessary use of fresh water.

Additionally, the Crystal Cove State Park has worked to fulfill the requirements of the El Morro Cease and Desist Order (San Diego Regional Water Board CDO R9-2003-0285 and R9-2003-0228, rescinded September 12, 2007 R902007-0109). These requirements included quarterly monitoring and reporting to the Regional Water Board and final inspection (December 2006).

At Salt Point Park (Gerstle Cove ASBS), a fish cleaning facility is located at the Salt Point parking lot and visitors' area, near the restroom facilities. There is no discharge to surface waters from the Fish Cleaning Station.

In other State Park units adjacent to ASBS, current treatment processes, pollution control, and BMPs include toilet facilities, both permanent and portable, throughout the park units. Trash receptacles and scheduled trash pick-up are a part of each State Park unit's operation. Department-wide educational activities regarding BMPs are continual. Public presentations at park units continue to attempt to educate the public about damage that can occur if litter is not disposed of correctly. Other issues are discussed such as chemical impacts (e.g., oil and grease). The use of pesticides in park units is supervised by licensed applicators. Recycling programs and collection facilities are located in most park units.

5.7.21.3 Humboldt County Department of Public Works

New homes and businesses in the lower Shelter Cove area of the King Range ASBS are required to connect to the existing sewer system. This requirement is being implemented through the Coastal Development Permit process administered by the Humboldt County Planning Division. Construction BMPs for erosion and sediment control are required for construction in Shelter Cove. This is also implemented through the Coastal Development Permits issued by the Humboldt County Planning Division. Inspections during construction are performed by the Humboldt County Planning and Building Division.

Development in Shelter Cove is regulated by the Local Coastal Program land use designations and zoning ordinances, and the Coastal Development Permit process. The land use designations, zoning, and permitting processes regulate parcel size, allowable uses, housing density, commercial development, and sewer and septic development in Shelter Cove. The sanitary wastewater treatment plant is operated by the Shelter Cove Resort Improvement District (SCRID) and is covered under an existing exception (Resolution No. 83-81). SCRID treats the wastewater and a portion is recycled to irrigate the golf course on the airstrip.

Land along the ocean bluffs has been acquired by the Bureau of Land Management to be kept relatively undeveloped.

Humboldt County plans to coordinate with the Shelter Cove Resort Improvement District to develop policies and projects to protect and improve local water quality, such as drainage improvements, storm water treatment BMPs, and water quality testing.

5.7.21.4 Department of the Air Force

The Air Force has several pollution prevention plans in place at their Pillar Point facility at James V. Fitzgerald ASBS. Current BMPs include: a Spill Prevention Control and Countermeasure Plan; an Integrated Natural Resources Management Plan; an Annual Wastewater Inventory; a Wet Weather Preparedness Plan (scheduled for 2006 implementation); and parking lot, building, and drainage system repair and maintenance. Structural BMPs include double-walled above ground storage tanks and storm water runoff energy dissipaters.

5.7.21.5 The Sea Ranch Association

At present, there are no treatment processes, pollution controls, or management practices for waters entering the storm drains. Dry weather flows into the storm drain system are effectively non existent since natural drainage patterns were minimally disrupted and private lots do not drain to a comprehensive storm water collection system, as found in most modern subdivisions. The opportunity for pollutants or toxic substances to enter the drainages to the Del Mar Landing ASBS may be limited by several factors, including the above drainage practices and storm drain system. Another factor is land use in the watershed area draining to the ASBS, which is limited to residential and natural common areas.

5.7.21.6 Marin County Department of Public Works

Marin County municipalities have been actively managing storm water runoff since the early 1990s through their Storm Water Pollution Prevention Program (MCSTOPPP). This storm water management plan details the BMPs being implemented to reduce the impact of road maintenance activities on watercourses in the County, including drainages to the Duxbury Reef ASBS. The performance standards outline BMPs for the following Phase II storm water program elements: Municipal maintenance, Illicit discharge controls, New Development and Construction controls, Industrial and Commercial Discharges, and Public Information and Participation.

Street sweeping occurs on a semi-annual basis on County maintained roads. The County Parks Department is exploring an agreement with County road maintenance staff to sweep the Agate Beach Parking Lot in the fall. Ditch cleaning occurs in the summer and during the winter on an as-needed basis to maintain flow.

5.7.21.7 City of Trinidad

Although septic system discharges are not covered under the exception, it is worth noting that the City of Trinidad is in the process of implementing an On-site Wastewater Treatment System (OWTS) management program. The program is supported by grants from the U.S. EPA and State Water Board. The overall goal of this program is to eliminate the potential contamination of ground and surface waters by maintaining the proper function of all the septic systems and avoiding any septic failure in the City potentially affecting Trinidad Head ASBS.

5.7.21.8 Point Reyes National Seashore

Point Reyes National Seashore (PRNS) implements a General Management Plan (GMP), which includes the three ASBS within their jurisdiction. These are classified in this GMP as: Wilderness Subzone Bird Rock and Double Point ASBS; Marine Reserve Subzone Point Reyes Headlands Reserve; and Biotic Sensitivity Subzone Duxbury Reef Reserve and Extension.

The PRNS Water Resources Stewardship Report (WRSR) is used to support park staff in identifying strategies to meet park desired conditions, and to develop indicators that may be used to measure success. Also, their Coastal Watershed Assessment documents available information and highlight to park managers where more monitoring, or implementation to improve conditions, is necessary.

5.7.21.9 City of San Diego

Current treatment processes, pollution controls, and/or BMPs throughout the La Jolla ASBS City-wide practices, such as street sweeping, storm drain cleaning, and education/outreach efforts, are implemented in the ASBS watershed. Five of the City's 17 ASBS discharge points are currently outfitted with low-flow diversion devices, and additional diversions are planned. The City is currently planning specific ASBS water quality strategies in conjunction with Coastkeeper and SIO as part of the Prop 50 and "Consolidated Grant" grant program.

5.7.21.10 City of Newport Beach

The City is employing three tactics to reduce the discharge of pollutants to the Robert E. Badham ASBS which include: avoidance transport of pollutants (transport prevention), minimize sources of pollutants (source control), and mitigate (treatment control).

5.7.21.11 City of Laguna Beach, Heisler Park ASBS

At the Heisler Park ASBS, the City of Laguna Beach has several pollution prevention measures and water quality management plans in place. The City plans to increase infiltration of storm water through land development requirements and implementation of Municipal Storm Water Permit Standard Urban Storm Water Mitigation Plan (SUSMP) requirements. Additional efforts include a city ordinance ban on smoking at public beaches and trash and grease control measures. Source control measures include street sweeping, pet waste management, pesticide management, illicit discharges, and commercial inspections. Treatment control management measures include dry weather diversion of municipal storm drains that discharge directly to the ASBS, storm water filtering of municipal storm drains that discharge directly to the ASBS, and implementation of BMPs under the NPDES Municipal Separate Storm Sewer Systems (MS4) Permit Programs.

Dry weather flow efforts include implementation of water conservation methods and implementation of effective enforcement Management Measures. The City has made water conservation mandatory within the Heisler Park ASBS drainage area and is enforcing over irrigation issues within the watershed.

The City of Laguna Beach has completed improvements to the sewer system by cleaning and televising the lines, and repairing defects to the lines in all high priority areas.

5.7.21.12 <u>City of Malibu</u>

Within the Laguna to Latigo ASBS, the City of Malibu waste discharge prevention and treatment activities include, but are not limited to, city ordinances, onsite wastewater treatment systems, illicit connection/illicit discharge elimination program, planning and construction of new development and redevelopment projects, street maintenance, public information through Malibu Current Quarterly Environmental News and other sources, and the Ocean Friendly Garden Program.

5.8. PESTICIDE APPLICATIONS IN ASBS

Table 5.8.1 (below) provides information taken from exception applications related to pesticide applications.

Table 5.8.1. Pesticides Applied by Applicants

ASBS	Applicant	Pesticide/Herbicide Use
2	Sea Ranch Association	Pesticides and Herbicides not used within the drainage study area
6	Trinidad Rancheria,	None used
	Trinidad City	None used
	Dept. of Parks and Rec.	Use of pesticides in park units is supervised by licensed applicators.
7	Humboldt County- Public Works Dept.	no information provided
	Dept. of Parks and Rec.	Use of pesticides in park units is supervised by licensed applicators.
8	U.S. Dept. of the Interior-redwood National State Parks	no information provided
	Dept. of Parks and Rec.	Use of pesticides in park units is supervised by licensed applicators.
	Dept. of Transportation (Del Norte County)	Garlon 4: 32 oz/acre; Pathfinder: 32 oz/acre; Roundup Pro: 64 oz/acre
9	Dept. of the Air Force	Stopped use in 2002
	Dept. of Parks and Rec	Use of pesticides in park units is supervised by licensed applicators.
	County of San Mateo	None used on land that drains into the ASBS
11	Marin County- Dept. of Public Works	unknown, personal/private property use only
11,12	Point Reyes National Seashore	Integrated Pest Management (IPM)
19	Pacific Grove City- Public Works Dept.	Pesticides and Herbicides used: Fusalade II; 0.4 to

ASBS	Applicant	Pesticide/Herbicide Use
		0.6 ounce/1000 sq. ft
		Roundup pro; 1.6 % sol'n, spot spray 1.6 gallon/100 gal water
		Pendulum; 40 lb bag per 1/5 acre, 100 to 200 lb/ acre
		Turflon Ester; 1/2 to 1 quart/acre
		Garlon 4; 1 to 8 quarts/acre
		Surflan; 1.5 to 8 quarts/acre
		Rodeo; 3/4 to 1.5 % sol'n, spot spray
		Pro Spreader Activator; Non-ionic surfactant, 2-8 ounces/100 gal water
21	U.S. Dept. of the Navy	Herbicides and pesticides used /year at SNI (in gallons)
		Roundup: 8 gallons Garlon: 6 gallons
		Termador: 0.5 (diluted) Suspend: 0.75 (diluted)
23	U.S. Dept. of the Navy	Herbicides used in 2005 (gallons): Roundup, 45; Garlon, 15
		Previously used herbicides: Rodeo, Pathfinder
24	Los Angeles County- Dept. of Public Works	no information provided
	Malibu City-Public Works	no information provided
	Dept. of Transportation	Endurance: 32 oz/acre
		Manage: 1 oz/acre
		Oust: 2 oz/acre
		Pathfinder: 128 oz/acre
		Pro-Spreader: 4 oz/acre
		Reward: 64 oz/acre
		Roundup Pro: 96 oz/acre; 128 oz/acre
		Telar: 1 oz/acre
		Transline: 8 oz/acre
		Fusilade II T&O: 24 oz/acre
		Gallery 75DF: 16 oz/acre
		Embark 2-S: 64 oz/acre
		Dimension Ultra 40WP: 24 oz/acre
		Montar: 224 oz/acre
	Dept. of Parks and Rec.	Use of pesticides in park units is supervised by licensed applicators.
25	Santa Catalina Island Company	None used
28	Connolly Pacific Company	no information provided
29	San Diego City	Rodeo and Roundup applied on an as-needed, ad hoc basis

ASBS	Applicant	Pesticide/Herbicide Use
		Rodeo and Roundup applied prior to street resurfacing
30	Laguna Beach City	Fertilizers: Turf Supreme, Gro Power Plus, Grow More
		Pesticides/Herbicides: Roundup Pro, Fusilade II, Metaldyhyde 7.5,

5.8.1 – Exception Application Water Chemistry Data

Applicants applying for an exception to the Ocean Plan supplied sampling data from various waterbody types. This data, along with pertinent data from other sources (e.g., data from other storm water discharges already operating under an exception or samples collected by State Water Board staff) were assessed. Data for Ammonia (NH_3), Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Selenium (Se), Silver (Ag), Zinc (Zn), and Polynuclear Aromatic Hydrocarbons (PAH) are provided in Appendix 2 for discharges, receiving water, ocean waters away from discharges (i.e., background) and coastal streams draining in to ASBS. These data may be compared to the objectives for metals and ammonia in the California Ocean Plan Table B, shown in Table 5.8.2 (below). The Ocean Plan Table B 30 day average objective for PAHs is 0.0088 µg/L. In addition, a separate PAH, fluoranthene, has an individual 30 day average objective of 15 µg/L. However, the PAH objectives are provided in the Ocean Plan for human health (bioaccumulation/seafood consumption) and not for marine aquatic life protection.

Table 5.8.2. California Ocean Plan Table B Objectives

Constituent	Inst. Max.	Daily Max.	6 Mo. Median
Arsenic	80 µg/L	32 ug/L	8 ug/L
Cadmium	10 µg/L	4 ug/L	1 ug/L
Chromium	20 µg/L	8 ug/L	2 ug/L
Copper	30 µg/L	12 ug/L	3 ug/L
Lead	20 µg/L	8 ug/L	2 ug/L
Mercury	0.4 µg/L	0.16 ug/L	0.04 ug/L
Nickel	50 µg/L	20 ug/L	5 ug/L
Selenium	150 µg/L	60 ug/L	15 ug/L
Silver	7 µg/L	2.8 ug/L	0.7 ug/L
Zinc	200 µg/L	80 ug/L	20 ug/L
NH_3N	6,000 µg/L	2400 ug/L	600 ug/L

Ammonia nitrogen concentrations in receiving water and discharges ranged from 0.01 to190 mg/L (10 to 190,000 µg/L), with a median of 0.2 mg/L (200 µg/L). The highest concentration was from storm runoff from a roof at the Monterey Bay Aquarium (which is not addressed as a party in this exception but has applied for an individual exception.)

This high concentration may be due to gull and other bird droppings. The next highest concentration was 81.9 mg/L (81,900 µg/L) at the Pillar Point Air Force Base, which is a facility to be covered under this exception.

Table 5.8.3 provides the number of samples for copper, lead, nickel, zinc, and PAH for each sample category. It is important to note that while most of the data represented grab samples, a few data points represent composite sampling.

Table 5.8.3. Number of Samples Collected by Category and Constituent

Constituent	Waterbody Category	Number (n)
Copper	*Stream*	16
	Ocean Background Water	9
	Discharges	154
	Ocean Receiving Water	58
Lead	*Stream*	15
	Ocean Background Water	9
	Discharges	144
	Ocean Receiving Water	61
Nickel	*Stream*	15
	Ocean Background Water	9
	Discharges	128
	Ocean Receiving Water	58
Zinc	*Stream*	15
	Ocean Background Water	9
	Discharges	143
	Ocean Receiving Water	58
PAH	*Stream*	12
	Ocean Background Water	10
	Discharges	43
	Ocean Receiving Water	23

The data was assessed using SYSTAT software. Non-detects in the data set were converted to the numeric values of the detection limits in order to perform the statistical analysis. Generally, most of the baseline data was not normally distributed and exhibited high variability for most constituents and categories.

The following figure displays the data distributions for copper, lead, nickel, and zinc.

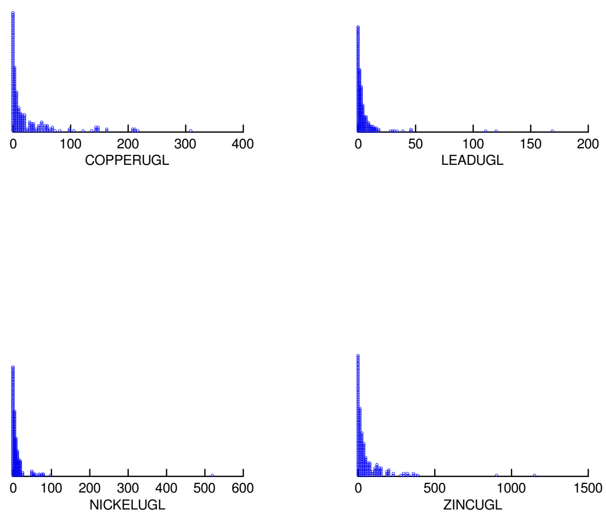

Figure 5.8.1. Data Distributions for Copper, Lead, Nickel, and Zinc.

Based on the skewed nature of the data, a log transformation was performed and "box and whiskers" graphs are provided below to present the data.

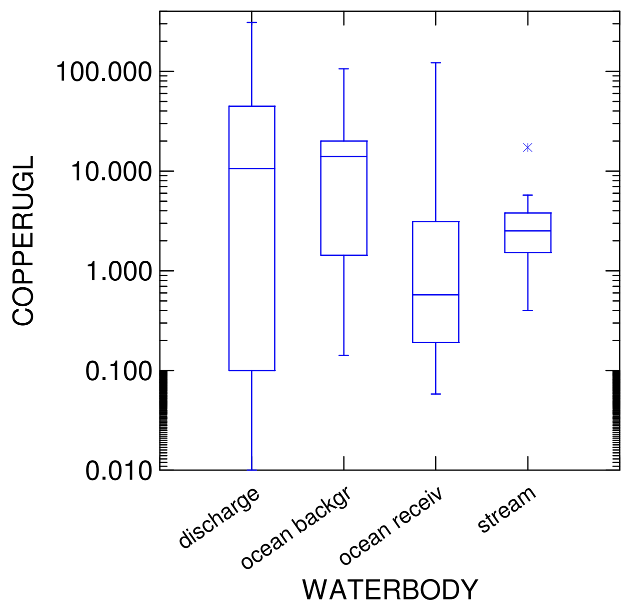

Figure 5.8.2. Copper

The median copper concentration for discharges was 10.6 µg/L and the maximum concentration was 309 µg/L. Seventy-five percent (75%) of the discharge results for copper were below 44.7 µg/L.

Ocean receiving water had a median value of 0.57 µg/L and the maximum concentration was 122 µg/L. Seventy-five percent (75%) of the copper results in the samples were below 3.1 µg/L and 90% are below 26.81 µg/L. The Ocean Plan six-month median is 3.0 µg/L for copper, and the instantaneous maximum is 30 µg/L.

Although based on only nine samples, copper data for ocean waters away from the discharge ("background") was elevated and variable. The median copper concentration in background waters was 14.0 µg/L. This indicates the possibility that ASBS waters may have elevated copper concentrations from sources other than direct discharges such as developed watersheds, even those outside of the ASBS boundaries. Streams draining to ASBS had a median copper concentration of 2.5 µg/L, which is lower than the median copper level in discharges.

Copper is a common constituent in urban runoff and is leached from anti-fouling coatings on vessel hulls. Copper at high levels (above the Ocean Plan standards) is toxic to critical life stages of marine life including the brown alga *Macrocystis pyrifera,* and echinoderms. According to a review by Saiz (1996) the mean no effects concentration (NOEC) for giant kelp gametophyte growth is 16.7 µg/L, and for sea urchin fertilization it is 9.1 µg/L (see Table 5.8.4.).

Table 5.8.4. Data derived from a Comparison of Critical Life Stage Bioassays Performed by Several Different Laboratories

Test Species	Mean NOEC µg/L	st. dev.
Giant Kelp (*Macrocystis pyrifera* gametophyte growth)	16.7	3.4
Giant Kelp (*Macrocystis pyrifera* gametophyte fertilization)	36.2	14.7
Sand Dollar (*Dendraster excentricus* fertilization	11.6	3.4
Purple Sea Urchin *Strongylocentrotus purpuratus* fertilization)	9.1	4.0

In abalone, copper accumulates in the gill, digestive gland, and foot muscle. The gill is the primary site of copper accumulation and toxicity, while the foot and adductor muscles are secondarily impacted. Mucus accumulation or cytological damage at the gill from the accumulation of copper inhibits sufficient oxygen delivery to the muscles. Since their survival is dependent on adherence to rock surfaces, a reduction of muscle function could be fatal. In addition, abalone exposed to copper may develop asphyxial hypoxia (Viant, Walton, TenBrook, Tjeerdema 2001). Giant kelp, abalone, and echinoderms are present in ASBS.

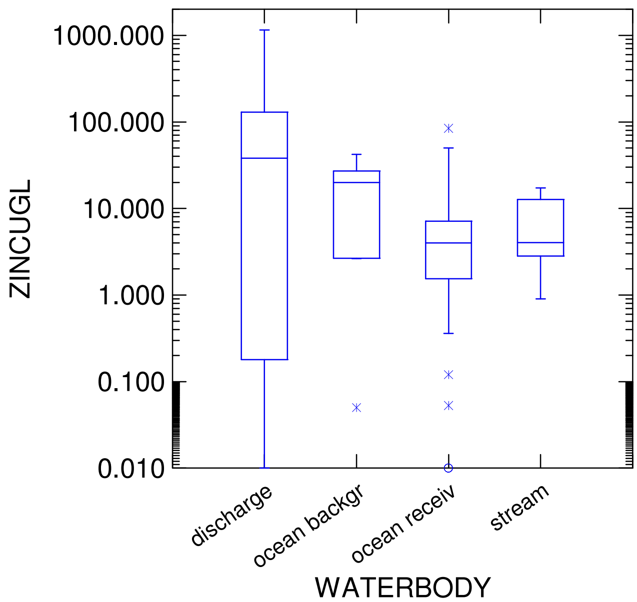

Figure 5.8.3. Zinc

Zinc is another common constituent in urban runoff and is also discharged from vessel hulls (zinc sacrificial anodes). Zinc concentrations were higher in discharges than in the other categories. The median zinc concentration for discharges was 38.0 µg/L and the maximum concentration was 1,150 µg/L. Seventy-five percent (75%) of the discharge results for zinc in the discharges category were below 129.75 µg/L.

Ocean receiving water had a median concentration value of 4.009 µg/L and the maximum concentration was 84.2 µg/L. Seventy-five percent (75%) of the zinc results in the samples were below 7.1 µg/L and 90% were below 30.62 µg/L. The Ocean Plan six-month median is 20 µg/L and the instantaneous maximum is 200 µg/L.

Although based on only nine samples, zinc data for background waters were somewhat elevated. The median zinc concentration in background waters was 20.0 µg/L and the maximum concentration was 42 µg/L. This again indicates the possibility that ASBS waters may have elevated zinc concentrations from sources other than direct discharges. Streams draining into ASBS had a median zinc concentration of 4.046 µg/L, which is lower than the median zinc level in discharges.

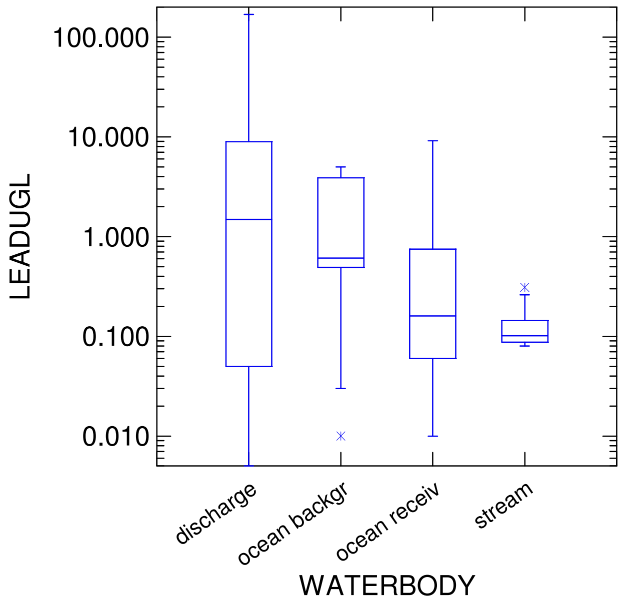

Figure 5.8.4. Lead

Lead concentrations were again higher in discharges category. The median lead concentration for discharges was 1.495 µg/L and the maximum concentration was 169 µg/L. Seventy-five percent (75%) of the discharge results for lead in discharges were below 8.95 µg/L.

Ocean receiving water had a median concentration value of 0.16 µg/L and the maximum concentration was 9.14 µg/L. Seventy-five percent (75%) of the lead results in samples were below 0.751 µg/L and 90% were below 5.0 µg/L. The Ocean Plan six-month median is 2 µg/L and the instantaneous maximum is 20 µg/L.

Although based on only nine samples, lead data for background waters were slightly elevated. The median lead concentration in background waters was 0.607 µg/L and the maximum concentration was 5.0 µg/L. This again indicates the possibility that ASBS waters may have elevated lead concentrations from sources other than direct discharges, such as developed watersheds, even those outside of the ASBS boundaries. Streams draining into ASBS had a median lead concentration of 0.101 µg/L, which is lower than the median lead level in discharges.

One source of lead toxicity found in the environment is anthropogenic activity, including old plumbing found in houses built before 1986. However, even new homes that claim to have "lead-free" plumbing may still contain up to eight percent lead (EPA, 2006). Lead may also be found naturally in the environment. Lead binds to sediment particles in aquatic environments and does not accumulate in fish, but does in some shellfish and mussels (EPA, 2006).

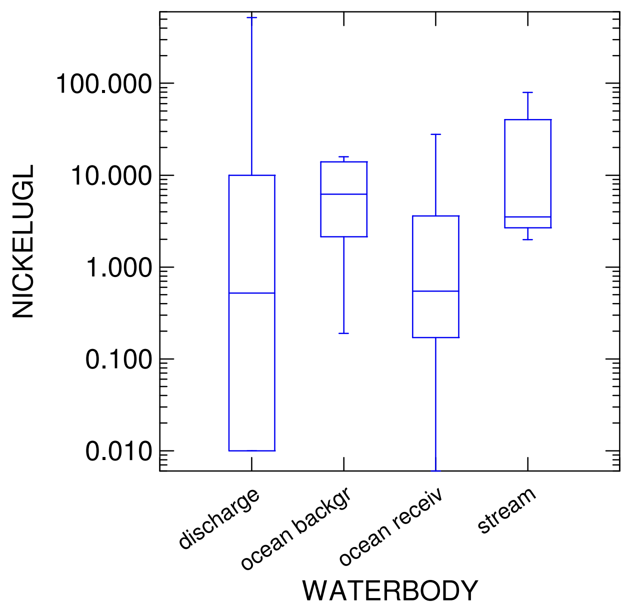

Figure 5.8.5. Nickel

Nickel concentrations were again higher in the discharges category. The median nickel concentration for discharges was 0.52 µg/L, but the maximum concentration was 520 µg/L. Still, 75% of the discharge results for nickel in discharges were below 9.94 µg/L.

Ocean receiving water had a median concentration value of 0.547 µg/L and the maximum concentration was 27.9 µg/L. Seventy-five percent (75%) of the nickel results in samples were below 3.6 µg/L and 90% were below 14.26 µg/L. The Ocean Plan six-month median is 5 µg/L and the instantaneous maximum is 50 µg/L.

Although based on only nine samples, nickel data for background waters were slightly elevated. The median nickel concentration in background waters was 6.2 µg/L and the maximum concentration was 15.9 µg/L. This again indicates the possibility that ASBS waters may have elevated nickel concentrations from sources other than direct discharges, such as developed watersheds, even those outside of the ASBS boundaries.

Streams draining into ASBS had a median nickel concentration of 3.5 µg/L, which is higher than the median nickel level in discharges. Therefore, some component of the nickel in the discharges may be from natural geologic sources.

Nickel has adverse effects on aquatic life such as bacteria, protozoans, mollusks, crustaceans, echinoderms, fishes, amphibians, etc. (Eisler, 1998). Nickel is sometimes found in anthropogenic discharges from mining, industrial, and urban areas. Natural sources of nickel primarily stem from certain minerals (e.g., chalcopyrite, pyrrhotite, pentlandite, garnierite, niccolite, zaratite, and millerite) (EPA nickel, 2006).

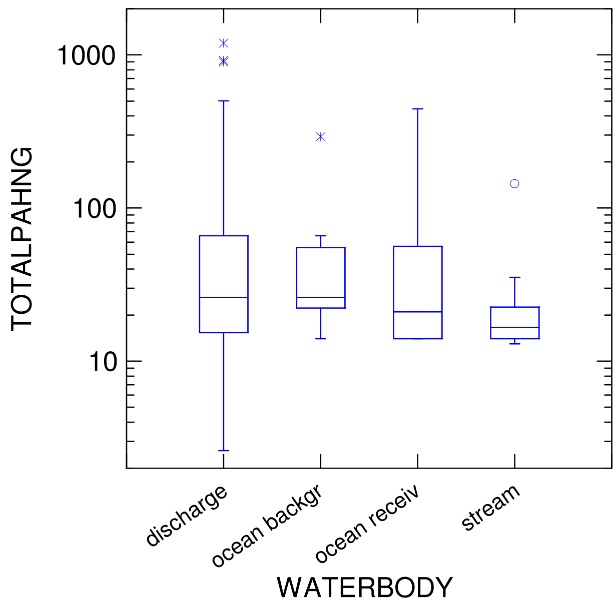

Figure 5.8.6. Ocean Plan PAH

For purposes of recording and assessing PAH data, fluoranthene was combined with the other Ocean Plan PAH compounds. Median and 75th percentile PAH values for discharges, receiving water, and background waters were all somewhat similar. Streams had a similar median level, but a lower 75th percentile value. The discharge PAH concentrations displayed the most variability, with many outliers. Maximum values were much higher for discharges. (It should be noted that the City of San Diego's PAH data was not included in the graph because their Method Detection Limit was measured in micrograms per liter rather than nanograms per liter, thus making all reported levels "Non-Detect" without actual reported levels.)

PAHs may be found in crude oil and petroleum products, and also as a result from the combustion of hydrocarbons. PAHs are known constituents in storm water discharges. The sealcoat found on the surfaces of asphalt, especially parking lots, are a huge source of PAHs found in the environment (USGS PAHs, 2007). The sealcoat can flake off from cars driving on it and then be washed away by rain or erosion into natural bodies of water. Other sources of PAHs include dyes, plastics, and pesticides (EPA PAHs, 2006). PAHs can also bind to sediments in aquatic environments; this leads to problems in these ecosystems that include: inhibited reproduction, delayed emergence, sediment avoidance, and mortality in aquatic invertebrates (USGS PAHs, 2007).

Based on the available results, 11 ASBS did not have metal concentrations in receiving water or discharges above the instantaneous maximum objectives. However, seven did have receiving water or discharge levels above the instantaneous maximum objectives. At the Heisler Park ASBS, the City of Laguna Beach reported elevated levels of copper at a storm drain flow (high reading of 36 µg/L). At the La Jolla ASBS, the City of San Diego reported five elevated levels of copper (high reading of 81.2 µg/L) in storm drain samples taken. At Laguna Point to Latigo Point, the County of Los Angeles reported elevated levels of chromium at four locations (high reading of 97 µg/L) and copper at four locations (high reading of 81.2 µg/L) in storm drain samples taken.

The City of Pacific Grove and Hopkins Marine Laboratory reported elevated levels of zinc at one location (high reading of 201µg/L), copper at two locations (high reading of 69.2 µg/L), mercury at one storm drain was 0.72 µg/L. (While mercury was elevated, the sampling procedures might not have been adequate to avoid sample contamination. Therefore, the mercury results may or may not be relevant, but are reported anyway.)

At SCI, the Department of Defense, US Navy, reported elevated levels of arsenic at two locations (high reading of 87 µg/L), chromium at seven locations (high reading of 1,010 µg/L), copper at fifteen locations (high reading of 309 µg/L), lead at six locations (high reading of 169 µg/L), nickel at five locations (high reading of 520 µg/L), zinc at six locations (high reading of 1150 µg/L), and mercury at one location (high reading of 0.6 µg/L) in storm drain samples taken. (Again, while reported here, there is some question regarding the adequacy of sampling techniques for mercury.)

At Northwest Santa Catalina Island, the Santa Catalina Island Company reported elevated levels of chromium at two locations with a high reading of 43.8 µg/L in storm water runoff. At Southeast Santa Catalina Island, the Connelly-Pacific Company reported elevated levels of copper at three locations (high reading of 40.5 µg/L), and nickel at one location (high reading of 54.00 µg/L) in storm water runoff.

Sea otters and other marine wildlife inhabit certain ASBS. Recently sea otters, which inhabit the ASBS along the Central Coast, have been affected by disease and contaminants. Disease is responsible for roughly 40 percent of the deaths; a rate that is relatively high when compared to disease-caused deaths in other wild predators (USGS 1999). The most frequent infectious disease identified has been toxoplasmosis. *Toxoplasma gondii*, a protozoan disease spread by cat feces, causes inflammation of the brain. Other disease-causing agents have also been identified. The sources of *T. gondii* are terrestrial and may be linked to wastewater treatment plant discharges and/or storm water discharges (SWRCB 2006). Coliform and *Enterococcus* bacteria provide an indication of the presence of fecal contamination, and some part of that fecal contamination may be from domestic animals. For some ASBS, discharge samples were analyzed for indicator bacteria (fecal coliform, total coliform, and enterococci). For fecal coliform, there was a minimum concentration of 1.1 MPN/100 mL, a median of 1,600 MPN/100 mL, and a maximum of 72,699 MPN/100 mL. For total coliform, there was a minimum concentration of 1.1 MPN/100 mL, a median of 4,673 MPN/100 mL, and a maximum of 160,000 MPN/100 mL. For enterococci, there was a minimum concentration of 1.1 MPN/100 mL, a median of 1,702 MPN/100 mL, and a maximum of 92,080 MPN/100 mL.

5.8.2 – Exception Application Toxicity Data

Toxicity tests evaluate the biological response of organisms to the effluent and measure the acceptability of waters for supporting a healthy marine biota. Acute aquatic toxicity tests result in endpoint referred to as a "lethal dose 50" (LC50). The LC50 is the dose that produces mortality in 50% of the test organisms. A high LC50 value indicates low acute toxicity and a low LC50 indicates high toxicity. "Toxicity Units Acute" (TUa) are inverses of the LC50s and are calculated by dividing 100 by the LC50 resulting from a 96-hour toxicity test. High TUa values indicate high toxicity. The Ocean Plan daily maximum objective is 0.3 TUa for acute toxicity.

Samples at various ASBS were measured for acute toxicity in storm water runoff. Eleven samples of storm water runoff were tested for acute toxicity to fish, and many exhibited acute toxic at only moderate levels at or below 1.0 TUa; the most toxic was at the James V. Fitzgerald ASBS with a TUa for two discharge samples of 1.0. Most storm water runoff was not acutely toxic to crustaceans (mysids). However, eight out of 18 samples did exhibit moderate levels of acute toxicity to mysids. The highest acute toxicity to mysids was found in two samples from the City of Pacific Grove runoff discharges into Pacific Grove ASBS, with both samples having a TUa of 1.0.

Thirty six (36) samples of ocean receiving water near storm runoff were also measured for acute toxicity to fish and/or mysids. Half of these samples exhibited no acute toxicity, with the other half exhibiting only slight or moderate acute toxicity. Of these receiving water samples the most toxic of these were at La Jolla ASBS, where two samples had an LC50 for mysids of >75% (95% survival in 65% concentration, 1.33 TUa). One sample of ocean background water offshore of the La Jolla ASBS also displayed slight acute toxicity, with an LC50 for mysids of >75% (1.33 TUa).

Regarding chronic toxicity, the "No Observed Effect Level" (NOEL) is the highest concentration of effluent or receiving water that causes no observable adverse effects on the test organisms in a critical life stage bioassay. NOELs of 100 percent indicate that there was no observed toxicity; NOELs less than 100 percent indicate increasing toxicity with decreasing percent concentration. "Toxicity Units Chronic" (TUc) are inverses of the NOELs and are calculated by dividing 100 by the NOEL resulting from a critical life stage toxicity test. High TUc values indicate high chronic toxicity. The Ocean Plan daily maximum objective is 1.0 TUc for chronic toxicity. The results of chronic toxicity tests on critical life stages of marine life are more sensitive than acute toxicity results and are therefore more informative for purposes of evaluating ASBS discharges.

Samples at various ASBS were tested for chronic toxicity in storm water runoff. Only one (1) of the 35 runoff samples exhibited slight chronic toxicity to fish. However, invertebrates and kelp displayed more sensitivity to runoff samples. Twenty one (21) out of 29 samples exhibited chronic toxicity to giant kelp greater than the Ocean Plan objective of 1.0 TUc, with the highest values of ≥16 TUc at Trinidad Head, Carmel Bay, Laguna Point to Latigo Point, and La Jolla ASBS. Twelve (12) out of 15 samples exhibited some chronic toxicity to mysids greater than the Ocean Plan objective of 1.0 Tuc, with the highest chronic toxicity (>16 TUc) at Heisler Park ASBS. Twelve (12) out of 12 samples exhibited chronic toxicity to sea urchins greater than the Ocean Plan objective of 1.0 TUc, with seven samples exhibiting the highest chronic toxicity of 32.0 TUc. Mollusks appeared to have sensitivity to runoff, with five (5) out of six (6) runoff samples tested with bivalves having TUc > 1.0 and the two (2) samples of runoff tested with abalone both had TUc > 1.0, (2.0 and 4.0, TUc, both Carmel Bay ASBS).
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Thirty nine (39) samples at various ASBS were also tested for chronic toxicity to various species in ocean receiving water. Only two (2) 0out of 38 samples exhibited chronic toxicity to fish greater than the Ocean Plan objective of 1.0 TUc, with the highest chronic toxicity (4.0TUc) at Northwest Santa Catalina Island ASBS at the Isthmus Cove. Ten (10) out of 33 samples exhibited chronic toxicity to giant kelp greater than the Ocean Plan objective of 1.0 TUc, with the highest values of 8.0 TUc at Carmel Bay ASBS (Stillwater Cove Pier) and 16.0 TUc at La Jolla ASBS. Only two (2) out of nine (9) samples exhibited slight chronic toxicity to mysids just above the Ocean Plan objective of 1.0 Tuc. Five (5) out of eleven (11) samples exhibited chronic toxicity to sea urchin fertilization greater than the Ocean Plan objective of 1.0 TUc; notably two samples, at Northwest Santa Catalina Island ASBS at Isthmus Cove were very toxic with ≥16.0 TUc. Two (2) out of nine (9) receiving water samples tested with bivalves had TUc > 1.0, and none of the two samples of receiving water tested with abalone exhibited chronic toxicity.

5.8.3 - ASBS Application Water Quality Data – Staff Conclusions

It is clear that ASBS discharges generally contain some concentrations of anthropogenic waste. However, it appears that a majority of the ASBS waste discharges exhibited metal concentrations below instantaneous maximum objectives, and a majority of ASBS receiving waters had concentrations of ocean plan metals below the six-month median objective for the protection of marine aquatic life. While most of the discharge samples exhibited chronic toxicity to marine life, the majority of the receiving water samples met the daily maximum chronic toxicity objective. Based on its review of the above baseline chemistry and toxicity data, there is ample evidence to support an Ocean Plan exception for nonpoint source and storm water discharges, but only if such discharges are properly controlled to better maintain natural water quality in ASBS.

Still, a number of discharges had elevated metals and PAH concentrations, and exhibited toxicity, and a few receiving water samples were in violation of Ocean Plan objectives. The testing described above generally had very little replication. This indicates that current waste concentrations are temporally and/or spatially variable. In other words, a given waste discharge may meet objectives at least some of the time, but not necessarily all of the time; some other waste discharges definitely do not have adequate BMPs to prevent violation of objectives all of the time, as displayed by some of the minority samples described above. Therefore, BMPs should be designed and implemented to insure maintenance of natural water quality in ASBS receiving water during design storms. The adoption of Special Protections will reduce wastes in discharges to achieve and maintain natural water quality in ASBS. In addition, discharges and receiving water must be adequately monitored to insure compliance with the Special Protections, based on the range of natural water quality conditions at approved reference stations.

The background (away from the direct discharges) ocean water quality data indicated a majority of samples exhibited concentrations of certain metals above the Ocean Plan six month medians. This may be due to the small sample size, but some of the results may be inaccurate due to inadequate methods. Another possibility is that these elevated levels are real and represent pollution from indirect and possibly distant watershed sources. It is important to remember that these “background” ocean water samples were not approved reference sites (SCCWRP 2010) and therefore do not represent “natural water quality. ”Should post-exception sampling indicate that some ASBS have background water quality at levels above natural water quality, then further assessment should be performed to identify and control the sources where feasible.

As noted above there was a large variance in the data set. Some part of these large data ranges may represent true variability in the environment. However, staff believes that there was also a fair amount of inconsistency in the applicants’ sampling and analysis methodology, which may have contributed somewhat to the variance of the exception application results as well. Regional monitoring programs, with consistent methodology and statewide compatibility, were therefore employed to improve data quality and utility.

5.8.4 - ASBS Regional Monitoring

As described above, a better approach for future ASBS monitoring would be to take a collaborative and coordinated regional approach. Therefore, staff requested the Southern California Coastal Water Research Project to assist, with stakeholder participation, in developing a scientifically sound regional monitoring approach. The goal of this monitoring program is to answer three questions:

- What is the range of natural water quality at reference locations?
- How does water quality along ASBS coastline compare to the natural water quality at reference locations?
- How does the extent of natural quality compare among ASBS with or without discharges?

It was agreed that the regional programs would focus on ASBS ocean water quality. Marine samples would also be collected at reference watershed conditions to answer question number one. Reference conditions were determined as follows:

- At the mouth of a watershed with limited anthropogenic influences and with no offshore discharges in the vicinity.
- Limited anthropogenic influence is defined as a minimum of 95% open space. Preferably, the few anthropogenic sources in a reference watershed will be well attenuated (e.g., natural space buffers between a highway and the high tide line).
- There should be no 303(d) listed waterbodies either in the reference watershed or in the coastal zone.

In the 2007-2008 winter season, a pilot study (SCCWRP 2009) was performed on potential reference sites. Table 5.8.5 provides average results and data ranges for all potential reference site samples:

Table 5.8.5. Statewide Pilot Study Potential Reference Sites Average Results and Data Ranges for All Samples Winter Season 2007-2008

Constituent	Units	All Sites n = 8
TSS	mg/L	40.8 (2.3 - 180)
Ammonia	mg/L	0.02 (ND - 0.04)
Nitrate	mg/L	0.02 (ND - 0.06)
Nitrite	mg/L	0.005 (ND - 0.01)
Phosphorus	mg/L	0.19 (ND - 1.13)
Chromium	µg/L	0.87 (0.1 - 3.17)
Copper	µg/L	0.86 (ND - 2.76)
Lead	µg/L	0.98 (ND - 4.65)
Nickel	µg/L	1.53 (ND - 4.58)
Zinc	µg/L	2.13 (ND - 9.37)
Total PAH	µg/L	0.081 (0.001 - 0.444)
Total DDT	µg/L	ND
Total PCB	µg/L	ND
Toxicity Assay	% fertilization	96.8 (92 - 99)

It is clear from the above information (Table 5.8.5.) that the mean values for ammonia and metals were below Ocean Plan six-month medians objectives. The only constituents with maximum values slightly above the six month medians were chromium and lead; in the case of chromium the objective is based on hexavalent chromium, and the chromium value presented above was for total chromium. PAHs were present but are known to be naturally present in watersheds and submarine geological features. Most importantly there were no detectable levels of the synthetic pollutants DDT and PCB in the samples. Although there was a small sample size, and this work only represents one winter season, this first year pilot study may give us a good picture of nearshore ocean natural water quality.

Not all of the eight samples were collected when surface stream runoff entered ocean waters. However when comparing samples with surface drainage influence and with samples when no drainage was occurring, the average values for metals and PAH was slightly higher when there was no drainage. This indicates a likelihood that stream runoff provides some reduction of metal and PAH concentration due to natural dilution.

Table 5.8.6. Statewide Pilot Study Potential Reference Sites Regional Comparison of Potential Reference Stations

Constituent	Units	North Coast n = 1	Central Coast n = 2	South Coast n = 2
TSS	mg/L	12.3	5.35 (2.3 - 8.4)	34.5 (21.7 - 47.2)
Ammonia	mg/L	0.03	0.02 (ND - 0.04)	0.015 (ND - 0.03)
Nitrate	mg/L	0.06	0.01	0.005 (ND - 0.01)
Nitrite	mg/L	0.01	ND	0.005 (ND - 0.01)
Phosphorus	mg/L	ND	ND	0.016 (ND - 0.032)
Chromium	µg/L	1.12	0.11 (0.1 - 0.12)	0.76 (0.6 - 0.92)
Copper	µg/L	1.07	0.31 (ND - 0.62)	0.91 (0.28 - 1.54)
Lead	µg/L	0.15	0.20 (ND - 0.39)	1.11 (0.51 - 1.71)
Nickel	µg/L	1.56	0.66 (ND - 1.31)	1.88 (0.53 - 3.23)
Zinc	µg/L	ND	0.77 (0.1 - 1.45)	2.56 (2.44 - 2.69)
Total PAH	µg/L	0.003	0.003 (0.001 - 0.004)	0.018 (0.012 - 0.024)
Total DDT	µg/L	ND	ND	ND
Total PCB	µg/L	ND	ND	ND
Toxicity Assay	% fertilization	98	96.5 (96 - 97)	95.5 (92 - 99)

One concern voiced by stakeholders is that there may be differences in natural water quality in different regions of the state. Table 5.8.6. represents a regional comparison of the potential reference station results. There were only slight differences between regions with regard to individual constituents, but there are no clear trends overall. This may be due to the small sample size, so additional work should be performed regionally.

The State Water Board funded a statewide monitoring program during the winter of 2008-09 to assess water quality in ASBS near and far from direct discharges. Over 100 chemical constituents and toxicity were measured from 62 sites using a probabilistic study design; roughly half of sites were sampled in the ocean directly in front of a direct discharge into an ASBS and the other half were located in the ocean greater than 500 m from a direct discharge. Sample sites greater than 500 m from direct discharges may be influenced by other watershed drainages either into or outside of the ASBS, and therefore may represent background but not necessarily natural conditions. Samples at each site were collected less than 24 hr before rainfall and again less than 24 hr after rainfall. Ocean receiving water sites were sampled at most mainland ASBS in California.

The statewide survey illustrated generally good chemical water quality in mainland ASBS sites (Table 5.8.6). None of the constituents exceeded the instantaneous maximum objective in the California Ocean Plan. Seven constituents did not exceed the Ocean Plan’s six month median or 30 day average (depending on the specific constituent) including strictly synthetic anthropogenic chemicals such as DDTs or PCBs.

Six constituents (arsenic, cadmium, copper, lead, nickel and zinc) exceeded the six month median but only for relatively small (< 15%) portions of mainland ASBS shoreline. Many of these constituents are common in urban stormwater, but also have natural sources. The lack of excessive chemical contamination in ASBS receiving waters was supported by infrequent (<5% of ASBS shoreline) chronic toxicity to a California endemic species (the purple sea urchin, *Strongylocentrotus purpuratus*).

There were two constituents, chromium and polycyclic aromatic hydrocarbons (PAHs), that exceeded Ocean Plan objectives over relatively large proportions of ASBS shoreline. Chromium exceeded objectives over 50% of ASBS mainland shoreline miles and PAHs exceeded objectives over 87% (Table 5.8.7.). The extent of Ocean Plan exceedence for these two constituents was similar near and far from discharges following storm events, and exceedances of the standards was similar between pre-storm and post-storm conditions near discharges. [9]

Both chromium and PAHs have natural and anthropogenic sources. The chromium objective is based on the more toxic form, hexavalent chromium, but total chromium was analyzed for the statewide probabilistic study. Chromium is a natural product of erosion including that from metamorphic rock, and there is no reason to believe that natural rock erosion products contain significant hexavalent chromium. Also, as mentioned previously, there are natural sources of PAHs (including hydrocarbon seeps, wildfires and plants) and direct atmospheric is another possible source. Furthermore, the objective for PAH is based on human health through bioaccumulation in seafood, and not on the protection of marine aquatic life. Since exceedences were similar between pre-storm and post-storm conditions near discharges, the sources of elevated PAHs may not only be storm related, and may include coastal and beach sediment.

[9] Report to the State Water Resources Control Board, Summation of Findings, Natural Water Quality Committee, 2006-2009, September 1, 2010.

Table 5.8.7. Statewide Probabilistic Study Percent of ASBS shoreline that exceeded State Water Board Ocean Plan objectives following storm events.

	Ocean Plan Objective	% Shoreline Greater Than OP Objective		
		All ASBS	<500 m from Discharge	>500 m from Discharge
Ammonia-N[1]	0.6 mg/L	--	--	--
Arsenic[1]	8 ug/L	1.6	2.7	--
Cadmium[1]	1 ug/L	2.1	3.6	--
Chromium[1]	2 ug/L	50	61	35
Copper[1]	3 ug/L	6.9	4.8	9.8
Lead[1]	2 ug/L	4.8	--	11.5
Nickel[1]	5 ug/L	15	24	3
Silver[1]	0.7 ug/L	--	--	--
Zinc[1]	20 ug/L	3.8	6.5	--
HCH-lindanes[2]	8.0 ng/L	--	--	--
Chlordane[2]	0.023 ng/L	--	--	--
DDTs[2]	0.17 ng/L	--	--	--
Dieldrin[2]	0.04 ng/L	--	--	--
PAHs[2]	8.8 ng/L	87	85	89
PCBs[2]	0.019 ng/L	--	--	--

[1] 6-month median
[2] 30-day average

A collaborative ASBS effort was formed between several exception applicants, the State and Regional Water Boards, and SCCWRP in southern California as part of the Southern California Bight regional monitoring program (Bight'08). This study identified and sampled reference sites to measure natural water quality. Stakeholders agreed on reference site criteria that avoided anthropogenic sources by sampling in the surf zone at the mouth of streams located in watersheds having less than 90 % development. Reference site concentrations were then compared to concentrations measured near ASBS direct discharges. Similar to the statewide probabilistic survey described above, Bight'08 focused on wet weather.

Regional reference results had generally low concentrations of Ocean Plan constituents (Table 5.8.8) and a lack of chronic toxicity to sea urchin fertilization. Results were somewhat similar to the pilot reference study for most constituents, with the exception of total suspended solids (which was much higher in the Bight 08 study); this difference was likely due to the larger number of samples and different storm conditions in Bight 08. In the Bight 08 monitoring study, following storms, mean reference site concentrations for six out of eight Ocean Plan metals were at or below the six month median objective, with cadmium and lead having mean concentrations only slightly higher (less than 1.0 ug/L greater) than the objective. The maximum concentration for reference sites exceeded Ocean Plan objectives for seven metals (cadmium, chromium, copper, lead, nickel, silver and zinc). Maximum concentrations for four of these metals (cadmium, chromium, lead and silver) exceeded the daily maximum following storms, but none exceeded the instantaneous maximum. The mean concentration for PAHs at reference sites was also greater than the 30 day average objective. [10]

Table 5.8.8. Southern California Bight Study Minimum, maximum, median, and mean (+ 95% confidence interval) of post-storm chemical concentrations at reference sites in the southern California Bight during 2009.

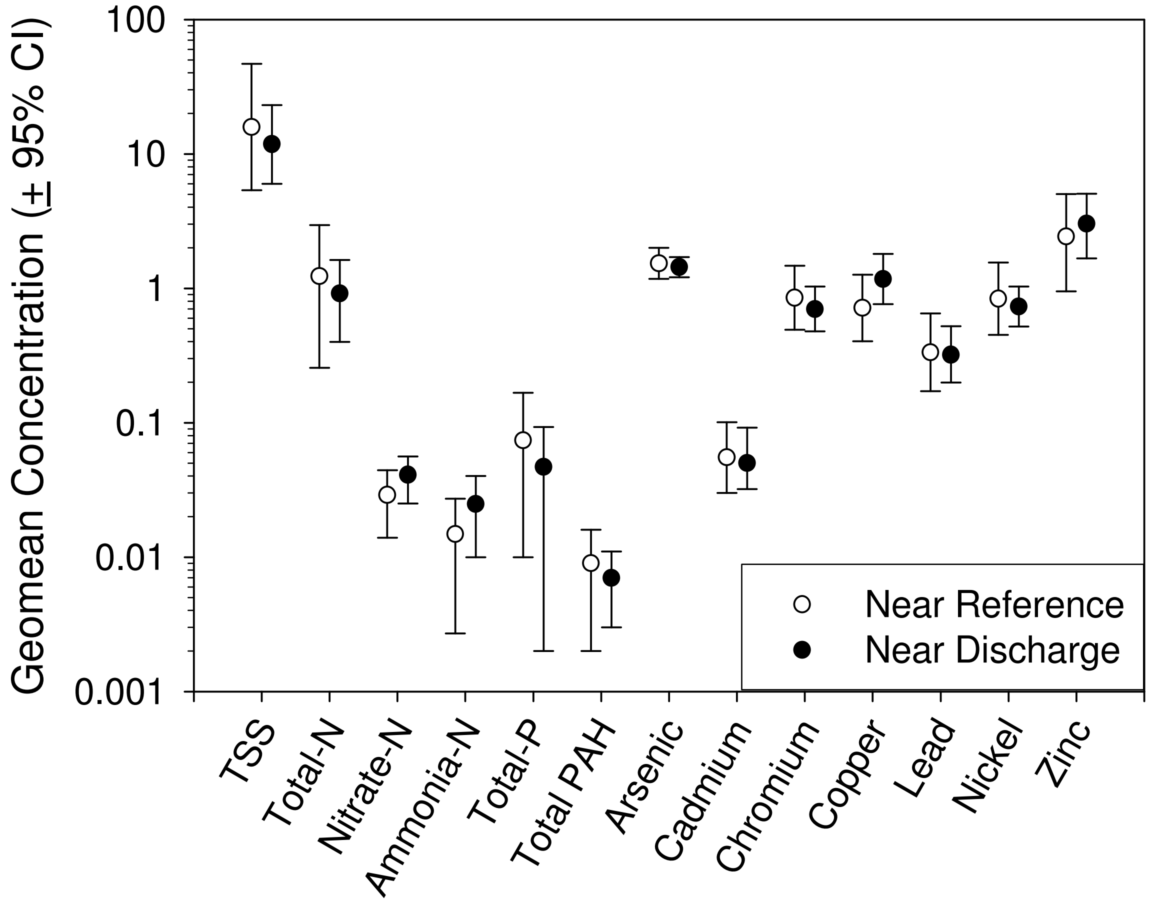
Parameter	Reference Site Concentrations							Ocean Plan Objective
	Units	%ND	Min	Median	Max	Mean	(±)95% CI	
TSS	mg/L	8	Nd	7.7	1692	140	171	-
Ammonia-N	mg/L	64	Nd	nd	0.05	0.01	0.01	0.6
Nitrate-N	mg/L	24	Nd	0.04	0.10	0.05	0.01	-
Nitrite-N	mg/L	88	Nd	nd	0.010	0.002	0.002	-
Total-P	mg/L	44	nd	0.05	0.59	0.08	0.05	-
Total-N	mg/L	65	nd	nd	7.0	0.9	0.7	-
Arsenic	ug/L	0	0.5	1.5	5.0	1.8	0.4	8
Cadmium	ug/L	4	nd	1.5	4.5	1.8	0.5	1
Chromium	ug/L	0	0.2	0.5	16.9	1.9	1.4	2
Copper	ug/L	0	0.05	0.5	6.1	1.1	0.6	3
Lead	ug/L	0	0.1	0.6	9.5	2.4	1.2	2
Nickel	ug/L	0	0.2	0.5	19	2.0	1.8	5
Silver	ug/L	76	nd	nd	6.0	0.7	0.8	0.7
Zinc	ug/L	24	nd	3.3	29	5.2	2.6	20
Total PAH	ng/L	16	nd	6.5	318	22	24	8.8

nd = not detected
95% CI = confidence interval
\- = no objectives exist for this parameter

The results for ASBS discharge sites as a whole were generally similar to reference sites (Figure 5.8.7.) Mean concentrations at ASBS discharge sites following storm events were not significantly different from mean reference site concentrations for all constituents; however many for copper results at discharge sites were above the maximum reference site concentrations. In addition there were individual direct discharges with concentrations of certain other constituents that exceeded reference concentrations. For comparing discharge sites to a measure of natural water quality, a threshold level equivalent to the 85th percentile of the reference site post-storm concentrations was used. This 85th percentile level was chosen to represent natural water quality to eliminate uncertainty associated with outliers, thereby being protective of water quality.

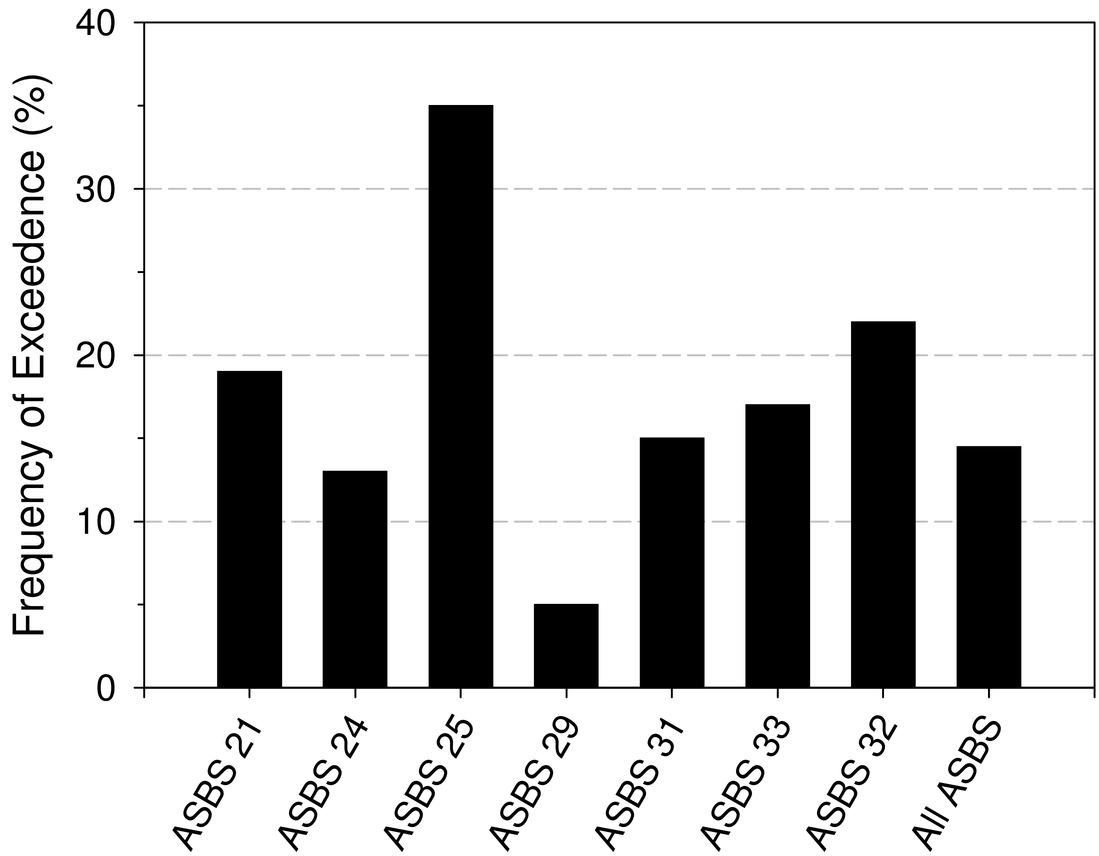
[10] Report to the State Water Resources Control Board, Summation of Findings, Natural Water Quality Committee, 2006-2009, September 1, 2010.

Figure 5.8.7. Southern California Bight Study Comparison of geometric mean (± 95% confidence interval) concentrations in ambient near-shore receiving waters following storm events at reference drainage and ASBS discharge sites. Total suspended solids (TSS) and nutrients in mg/L; Total Polycyclic Aromatic Hydrocarbons (Total PAHs) and total trace metals in µg/L



Exceedences of natural water quality were relatively infrequent at ASBS discharge sites (Figure 5.8.8.). Seven out of eight ASBS in southern California having exceedence rates of less than 25% for all constituents; Northwest Santa Catalina Island ASBS (ASBS 25) had the highest exceedence rate of 35%.

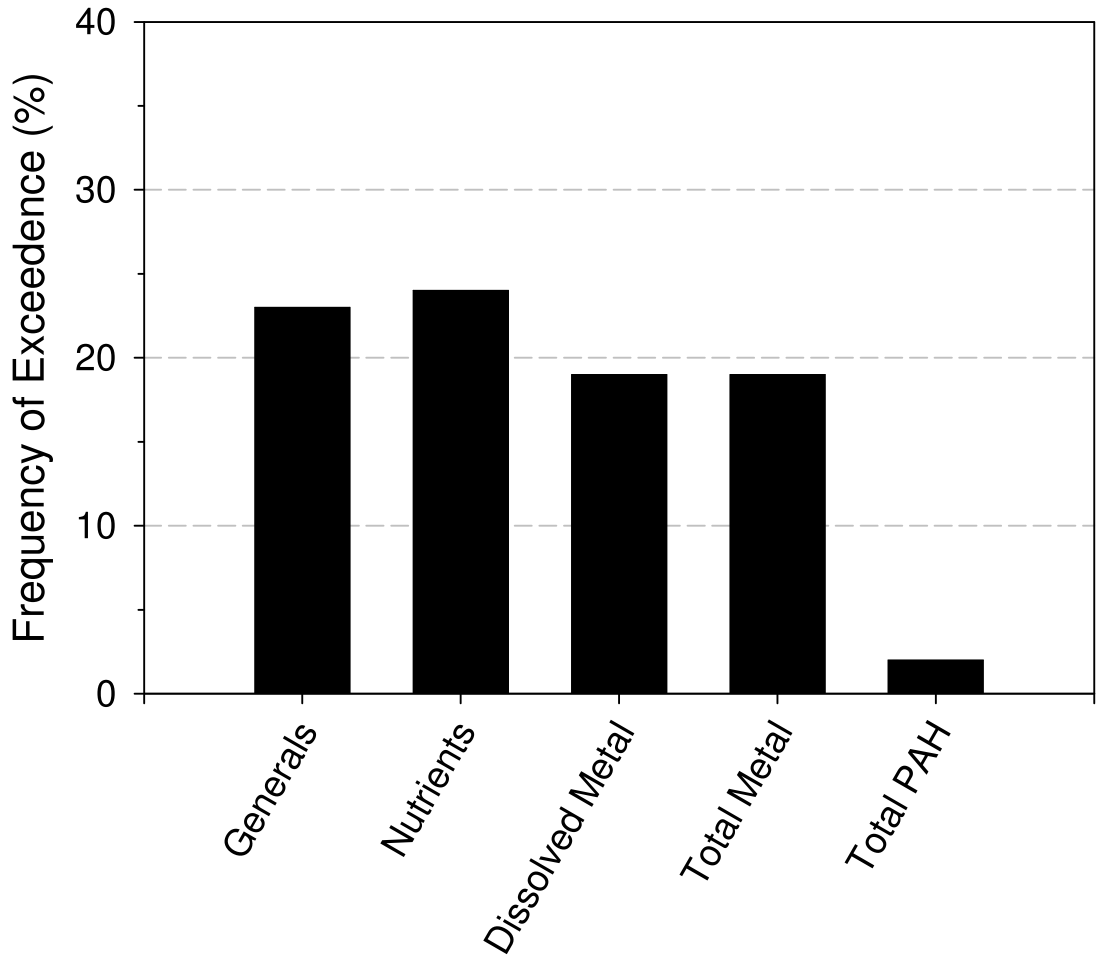
Figure 5.8.8. Frequency of natural water quality exceedences for all parameters during all storm events at each Area of Special Biological Significance (ASBS) in southern California



Where natural water quality was exceeded, general constituents (e.g. total suspended solids), nutrients and trace metals were the most frequent groups to exceed (Figure 5.8.9.). Total and dissolved metals had the same exceedence rate of 19% over the natural water quality thresholds identified in this study. PAHs exceeded the natural water quality threshold in only 2% of the samples. [11]

[11] Final Draft Report , Defining Natural Water Quality In Southern California's Areas Of Special Biological Significance, Kenneth Schiff, Brenda Luk, Dominic Gregorio, and Steve Gruber, 2010

Figure 5.8.9. Frequency of natural water quality exceedences by parameter group for all storm events and all Areas of Special Biological Significance (ASBS) in southern California



Regional and statewide monitoring in ASBS to date has proven very successful in providing scientific evidence of water quality conditions and indications of locations and certain constituents that require additional focus. The Bight'08 study represents the first comprehensive effort to determine natural water quality characteristics in the nearshore following storm events. The Natural Water Quality Committee stated that the Bight'08 program has provided sufficient information for the State Water Board to move forward, but prudent management should seek additional information. For example, Bight'08 quantified intra-annual (storm-to-storm) variability, but lacked inter-annual known to produce natural alterations in ocean water quality. Similarly, additional reference sites in central and northern California are necessary to quantify regional variability. However, in some instances, the reference site approach may be problematic, such as cases of widespread anthropogenic influence (i.e., PAHs and TCDDs) or where distant sources impinge on reference site water quality. (i.e., transport of large stormwater plumes from outside the ASBS). All of these causes of natural variability, and impacts from unanticipated anthropogenic contributions, should be investigated. Therefore staff recommends that where possible the regional approach to ASBS monitoring be designed and implemented to provide comparable and consistent information to manage ASBS discharges.

5.8.5 - Bioaccumulation

As part of their monitoring program for their ASBS exception and NPDES Permit, Scripps Institution of Oceanography (SIO), who performed a bioaccumulation study in receiving waters. This monitoring, which used both transplanted mussels and resident sand crabs, occurred in the vicinity of localized reference and ASBS discharge sites in the San Diego-Scripps ASBS and the La Jolla ASBS. SIO results indicated that:

1) most organic constituents were present at statistically nonsignificant levels relative to a reference sites during the study period;
2) certain pollutants were elevated in transplanted mussels near the SIO pier in the San Diego-Scripps ASBS (Cr, Ni, Fe, and Mn) and at the south end of the adjoining La Jolla ASBS (As) where the City of San Diego storm outfalls are located relative to other sites within the study area;
3) certain pollutants were elevated in transplanted mussels near the SIO pier (Cr and Ni) relative to historical statewide Mussel Watch results; and
4) large relative variability in tissue concentrations from sand crabs due to age/reproductive status precluded an assessment of spatial scale gradients and an evaluation of potential effects. [12]

Statewide mussel watch monitoring is an important tool in assessing bioaccumulation and water quality. Data collected by the National Ocean and Atmospheric Administration (NOAA) National Status and Trends (NS&T), and by the State Water Board Mussel Watch Program (SMWP) are provided below to assess spatial distributions and temporal trends in chemical contamination in or near certain ASBS.

5.8.5.1 State Mussel Watch Program Data

The SMWP was initiated in 1977 by the State Water Board to provide a uniform statewide approach to the detection and evaluation of toxic substances in California coastal waters, bays, harbors, and estuaries. The SMWP conducted a monitoring program using transplanted bivalve (*Mytilus californianus*) for trace elements and organic contaminants. The tissue samples were analyzed for the presence of trace elements and legacy pesticides.

An Elevated Data Level (EDL) is defined for the purposes of the SMWP as that concentration of a toxic substance in mussels or clams that equals or exceeds a specified percentile (such as 85 or 95 percent) of all measurements of the toxic substance in the same species and exposure condition (resident or transplant). Historical information on SMWP sites at ASBS are provided in Appendix 3)

[12] Report to the State Water Resources Control Board, Summation of Findings, Natural Water Quality Committee, 2006-2009, September 1, 2010.

The SMWP program has suffered from a lack of funding since 2000. The Department of Fish and Game at Moss Landing Laboratories collected and analyzed mussel samples since 2001 from a limited list of sites. Only 18 sites are currently being monitored for the Water Boards by the California Department of Fish and Game. SMWP primary targets areas with known or suspected impaired water quality. For this report, data from the following sites in or near ASBS have been reviewed: Pacific Grove ASBS, James V. Fitzgerald ASBS, Bodega Head (near but not within the ASBS), and Trinidad Head ASBS.

The available data for trace elements and organic constituents from 2001 to 2005 were reviewed and compared to the EDL 85 and EDL 95. Most trace elements were present at low concentration in all ASBS. However none of the elements exceeded the EDL 85 or EDL 95 in transplanted mussels at any of the ASBS during 2001-2005 sampling periods.

Certain synthetic chlorinated hydrocarbon compounds were elevated at some ASBS sites. Pesticide compounds including cis-chlordane, trans-chlordane, total chlordane, heptachlor epoxide, and dieldrine exceeded the EDL 85 in Trinidad Head, James V. Fitzgerald and Pacific Grove ASBS, and at Bodega Head, during one or more sampling events in 2001 to 2004. Data from James V. Fitzgerald and Pacific Grove ASBS also show exceedences of the EDL 95 for DDD, DDE, and PCB 1254.

Appendix 3 provides State Mussel Watch data at or near ASBS from 2001 to 2005.

5.8.5.2 NOAA NS&T Mussel Watch Program Data

To characterize the spatial distributions and trends in contaminant levels in the coastal ocean, NOAA NS&T Program was formed in 1986. The NOAA NS&T Mussel Watch Program measures the presence of concentrations of a broad suite of trace metals and organic chemicals in resident bivalves. The NS&T Mussel Watch Program is national in scale and the sampling sites are representative of a large area.

The NOAA NS&T Program analyzes bivalve tissue samples from the mussels *M. edulis and M. californianus* for trace metals, synthetic organic constituents, and histopathology. The NOAA NS&T sampling is conducted every two years.

There are several pre-2007 historical sites in the NOAA NS&T data base that are in or near ASBS. These were:

- Klamath River Flint Rock Head (Redwood National Park ASBS)
- Point Delgada Shelter Cove (King Range ASBS)

- Bodega Head (near Bodega ASBS)
- Farallon Islands East Landing (Farallon Islands ASBS)
- Pacific Grove Lovers Point (Pacific Grove ASBS)
- San Miguel Island Otter Harbor (San Miguel, Santa Rosa and Santa Cruz Islands ASBS)
- Santa Cruz Island Fraser Point (San Miguel, Santa Rosa and Santa Cruz Islands ASBS)
- Point Dume (Laguna Point to Latigo Point ASBS)
- Catalina Island Bird Rock (NW Santa Catalina Island ASBS)
- Newport Beach West Jetty (near Robert Badham ASBS)
- La Jolla (near the La Jolla ASBS).

Beginning in 2007, SCCWRP and the State Water Board entered into a partnership with the NOAA Status and Trends Mussel Watch Program. SCCWRP agreed to sample in southern California and the State Water Board staff agreed to sample in central and northern California. Samples are sent to NOAA contracted laboratories for analysis at no cost to the State. In exchange for providing sampling at existing NOAA sites several additional sampling sites were sampled and analyzed, many at ASBS. During the sampling period 2007-2009 the following sites were added in or near ASBS:

- Sea Ranch (near Del Mar Landing ASBS)
- Gerstle Cove (Gerstle Cove ASBS)
- Duxbury Reef (Duxbury Reef ASBS)
- Point Reyes (near Point Reyes Headlands ASBS)
- Ano Nuevo (Ano Nuevo ASBS)
- Partington Point (Julia Pfeiffer Burns ASBS)
- Anacapa (North Middle) Island (Santa Barbara and Anacapa Islands ASBS)
- Mugu Lagoon (adjacent to Laguna Point to Latigo Point ASBS)
- Old Stairs (Laguna Point to Latigo Point ASBS)
- San Nicolas Island (San Nicolas Island and Begg Rock ASBS)
- San Clemente Island (San Clemente Island ASBS)
- Crystal Cove State Park (Irvine Coast ASBS)
- Scripps Reef (San Diego-Scripps ASBS)

Concentrations of ten constituents (including trace metals and PAHs) in samples from 2007 to 2009 were assessed at all mussel watch sites statewide and at ASBS sites. It is important to mention that all of these constituents have both anthropogenic (e.g., polluted runoff) and natural sources. Natural sources for trace metals include natural background in seawater, sometimes accentuated by upwelling and coastal erosion. In fact, certain metals, including copper and zinc, are essential micronutrients that when present at naturally low concentrations are essential for marine life. Hydrocarbon seeps are an important potential source for PAHs. The following information is provided to give a general status of these constituents in mussel tissue in ASBS.

Arsenic
Mean and median arsenic concentrations for all mussel watch sites statewide were 10.53 µg/ dry g and 9.45 µg/ dry g, respectively. Mean and median arsenic concentrations for all ASBS sites were 13.35 µg/ dry g and 10.8 µg/ dry g, respectively. San Clemente Island ASBS has the highest concentration of arsenic in mussels (39.9 µg/ dry g) among all ASBS sites, and also had the highest concentration of all mussel watch stations statewide.

Cadmium
Mean and median cadmium concentrations for all mussel watch sites statewide were 5.163 µg/ dry g and 5.01µg/ dry g, respectively. Mean and median cadmium concentrations for all ASBS sites were 7.522 µg/ dry g and 6.825 µg/ dry g, respectively. The Carmel Bay ASBS at Arrowhead Point has the highest concentration of cadmium in mussels (14.4 µg/ dry g) among all ASBS sites, and also had the highest concentration of all mussel watch stations statewide.

Chromium
Mean and median chromium concentrations for all mussel watch sites statewide were 1.753 µg/ dry g and 1.46 µg/ dry g, respectively. Mean and median chromium concentrations for all ASBS sites were 1.76 µg/ dry g and 1.6 µg/ dry g, respectively. Bodega Head, near the Bodega Head ASBS, has the highest concentration of chromium in mussels (4.61 µg/ dry g) among all sites in or near ASBS.

Copper
Mean and median copper concentrations for all mussel watch sites statewide were 9.28 µg/ dry g and 8.36 µg/ dry g, respectively. Mean and median copper concentrations for all ASBS sites were 9.335 µg/ dry g and 8.195 µg/ dry g, respectively. The King Range ASBS, at Point Delgada (Shelter Cove) has the highest concentration of copper in mussels (15.5 µg/ dry g) among all ASBS sites, and also had the highest concentration of all mussel watch stations statewide (see Figure 5.8.10.).

Lead
Mean and median lead concentrations for all mussel watch sites statewide were 1.948 µg/ dry g and 1.36 µg/ dry g, respectively. Mean and median lead concentrations for all ASBS sites were 2.279 µg/ dry g and 1.345 µg/ dry g, respectively. The Farallon Islands ASBS, at East Landing, has the highest concentration of lead in mussels (17.8 µg/ dry g) among all ASBS sites, and also had the highest concentration of all mussel watch stations statewide.

Mercury
Mean and median mercury concentrations for all mussel watch sites statewide were 0.116 µg/ dry g and 0.074µg/ dry g, respectively. Mean and median mercury concentrations for all ASBS sites were 0.144 µg/ dry g and 0.106 µg/ dry g, respectively.

San Miguel Island (ASBS 17), at Otter Harbor, has the highest concentration of mercury in mussels (0.69 µg/ dry g) among all ASBS sites, and also had the highest concentration of all mussel watch stations statewide.

Nickel
Mean and median nickel concentrations for all mussel watch sites statewide were 2.913 µg/ dry g and 2.18 µg/ dry g, respectively. Mean and median nickel concentrations for all ASBS sites were 2.973 µg/ dry g and 2.5 µg/ dry g, respectively. The Redwoods National Park ASBS at the mouth of the Klamath River has the highest concentration of nickel in mussels (9.23 µg/ dry g) among all ASBS sites, and also had the highest concentration of all mussel watch stations statewide.

Silver
Mean and median silver concentrations for all mussel watch sites statewide were 0.166 µg/ dry g and 0.061µg/ dry g, respectively. Mean and median silver concentrations for all ASBS sites were 0.131µg/ dry g and 0.084µg/ dry g, respectively. The Laguna Point to Latigo Point ASBS, at Point Dume in Malibu, has the highest concentration of silver (0.842 µg/ dry g) among all the ASBS sites.

Zinc
Mean and median zinc concentrations for all mussel watch sites statewide were 144.98 µg/ dry g and 138 µg/ dry g, respectively. Mean and median zinc concentrations for all ASBS sites were 156.8 µg/ dry g and 160.5 µg/ dry g, respectively. San Miguel Island (ASBS 17), at Otter Harbor has the highest concentration of zinc in mussels (232 µg/ dry g) among all ASBS sites.

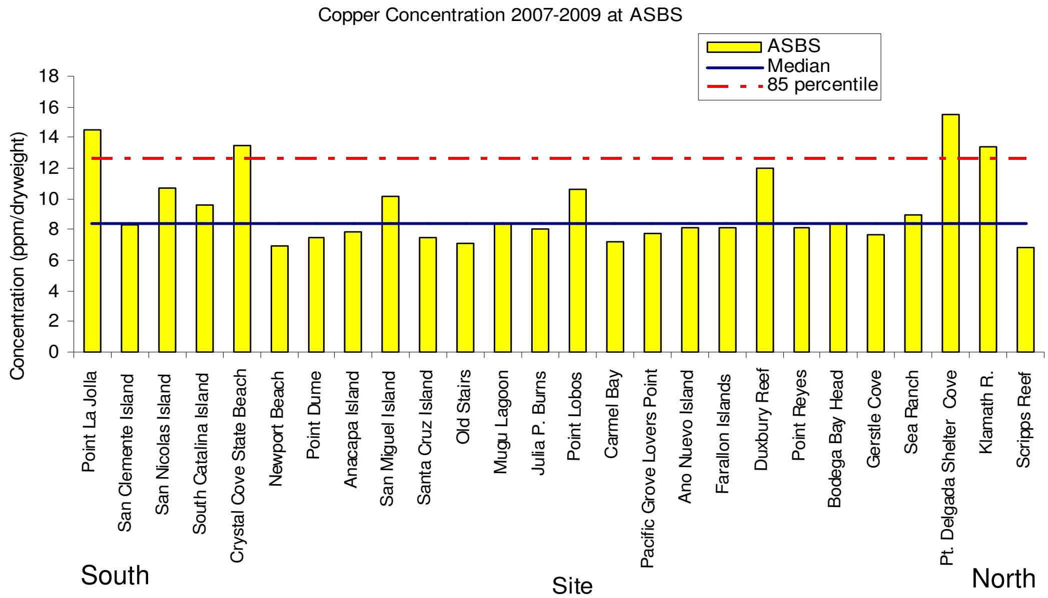
Total PAHs
Mean and median total PAH concentrations for all mussel watch sites statewide were 1139.17ng/ dry g and 122.2ng/ dry g, respectively. Mean and median total PAH concentrations for all ASBS sites were 128.68 ng/ dry g and 100.1 ng/ dry g, respectively. Ano Nuevo ASBS has the highest concentration of total PAHs in mussels (688.7ng/ dry g) among all the ASBS sites.

Trends for historical data (1986 – 2009) at several mussel watch sites at or near ASBS were assessed. Most organic pollutants are either staying the same or showing significant decreases in mussel tissues. Chlordane concentrations show a significant decrease at King Range ASBS, Laguna Point to Latigo Point ASBS, NW Catalina Island ASBS, and La Jolla ASBS. Butyltin concentrations show a significant decrease near the Robert Badham ASBS and in the Laguna Point to Latigo Point ASBS. DDT is also decreasing significantly at Laguna Point to Latigo Point ASBS.

Most trace metals are either staying the same or showing significant decreases in mussel tissues. Arsenic concentrations show a significant decrease at the Pacific Grove ASBS, NW Catalina Island ASBS and La Jolla ASBS. Lead concentrations show a significant decrease near in the Robert Badham ASBS and in the La Jolla ASBS.

Mercury concentrations show a significant decrease near in the Laguna Point to Latigo Point ASBS. Selenium concentrations are decreasing at Laguna Point to Latigo Point ASBS. Silver concentrations show a significant decrease near the Robert E. Badham ASBS and in the La Jolla ASBS. Tin concentrations are decreasing at the King Range ASBS, Pacific Grove ASBS, Laguna Point to Latigo Point ASBS, NW Catalina Island ASBS, and near the Robert Badham ASBS. However there were a few metals that were increasing at certain ASBS. Copper concentrations are increasing at the King Range ASBS; this increase in copper in mussels at the King Range ASBS is of concern because that site has the highest copper concentrations in resident mussels of any mussel watch site (Figure 5.8.10). Cadmium concentrations are increasing at the Pacific Grove ASBS and Laguna Point to Latigo Point ASBS. Mercury concentrations are increasing near the Robert Badham ASBS and in the La Jolla ASBS.

Appendix 3 provides the NOAA Mussel Watch data for ASBS.



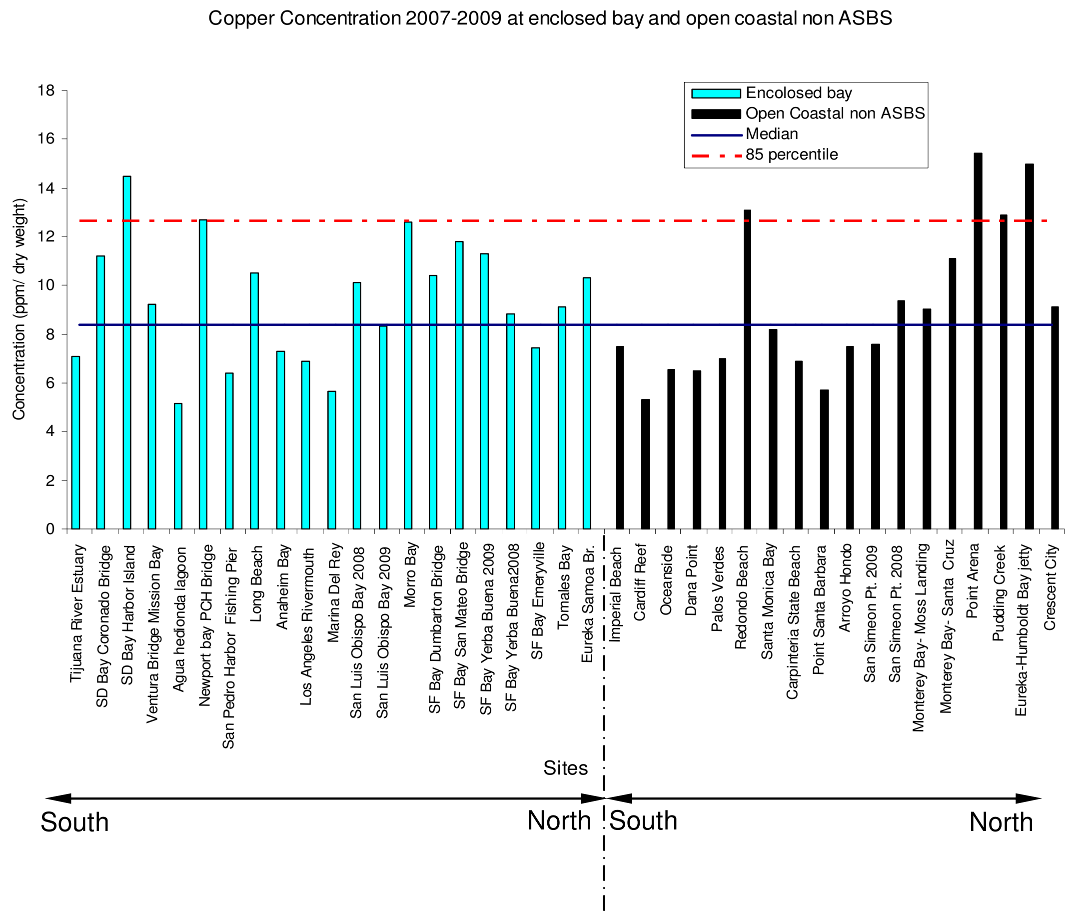


Figure 5.8.10. Mussel watch copper concentrations in ASBS and at other sites statewide.

6.0 ENVIRONMENTAL ANALYSIS

6.0 APPROACH TO THE ENVIRONMENTAL ANALYSIS

Sections 6.1 through 6.10 of this FEIR present a discussion of existing conditions, environmental impact associated with implementation of the proposed project, mitigation measures to reduce the level of impact, and residual significant impacts (i.e., impacts that would be significant and unavoidable despite the imposition of ay proposed mitigation measures). Issues evaluated in these sections consist of the range of environmental topics originally identified for review in the notice of preparation (NOP) and initial study (IS) prepared for the proposed project. Sections 6.1 through 6.10 each include the following components.

► **Environmental Impacts:** This subsection identifies the impacts of the proposed project on the existing environment, in accordance with State CEQA Guidelines Sections 15125 and 15143. Before presenting an evaluation of impacts, the section describes the analysis methodology used, and thresholds of significance used to identify impacts are then listed. Project impacts are identified alphanumerically and sequentially throughout this section. For example, impacts in Section 6.1 are identified as 6.1-1, 6.2-2, and so on. An impact statement preceded the discussion of each impact and provides a summary of the impact and its level of significance. The discussion that follows the impact statement included the evidence on which a conclusion is made regarding the level of impact. The discussions of cumulative impacts and growth-inducing impacts are presented in Section 8.0.

► **Mitigation Measures:** This subsection identifies potentially feasible mitigation measures to reduce significant and potentially significant impacts of the proposed project, in accordance with State CEQA Guidelines Sections 15002(a)(3), 15021(a)(2), and 15091(a)(1). Each mitigation measure is identified alphanumerically to correspond with the number of the impact being reduced by the measure. For example, Impact 6.1-1 would be mitigated with Mitigation Measure 6.1-1. This subsection also describes whether the mitigation measures would reduce impacts to less-that-significant levels. Significant and unavoidable impacts are identified as appropriate in this subsection, as well as in the “Residual Significant Impacts” subsection described below. Significant and unavoidable impacts are also summarized in Section 8.0.

► **Implementation:** This section identifies the agency responsible for the implementation of the mitigation measures.

► **Significance After Mitigation:** This section identifies impacts that would be reduced to less than significant and any significant impacts that would remain significant following implementation of the mitigation measures.

Any potential environmental impacts associated with the implementation of the General Exception Special Protections measures depend upon the specific compliance projects selected by the responsible parties identified herein, most of whom are public agencies subject to their own CEQA obligations. (See Pub. Res. Code § 21159.2, project-specific compliance projects). This program level EIR identifies broad mitigation approaches that could be considered at the program level for common selected BMPs. Consistent with PRC § 21159.2, this EIR does not engage in speculation or conjecture, but rather considers the reasonably foreseeable environmental impacts of the foreseeable methods of compliance, the reasonable foreseeable feasible mitigation measures, and the reasonable foreseeable alternative means of compliance, which would avoid or reduce the identified impacts.

Within each of the sections listed below, this EIR evaluated the impacts of each implementation alternative relative to the subject resource area. The physical scope of the environmental setting and the analysis in this EIR are the 26 ASBS potentially affected discharges arising from the 27 Responsible Parties identified previously in Section 1.0. Though this EIR governs potential impacts at 26 different geographic ASBS locations, generalizations are made about the impacts of different compliance measures (i.e. BMPs) and are expected to generate similar results. This is a reasonable assumption, given that the discharge of waste generated by the Responsible Parties is conveyed to the ocean waters of the ASBS primarily via storm drains and waste would be controlled and/or eliminated by any one of or a combination of the Special Protections implementation alternatives. Also, any potential impacts of implementing the proposed alternatives would be focused, short-term and ultimately produce long-term beneficial improvements to water quality and the removal of pollutants discharged to the ocean.

The implementation alternatives evaluated in this EIR are evaluated at a program level for impacts for each resource area. An assumption is made that a more detailed project-level analysis will be conducted by each Responsible Party once their mode of achieving compliance with the Special Protections has been determined. The analysis is this EIR assumes that, project proponents will design, install, and maintain implementation measures following all applicable laws, regulations, ordinances, and formally adopted municipal and/or agency codes, standards and practices. Several handbooks are available and currently used by municipal agencies that provide guidance for the selection and implementation of BMPs (Caltrans, CASQA, WERF).

As previously discussed in Section S.0 Executive Summary, the Special Protections would also be incorporated into the water quality control plans (basin plans) of six (6) coastal Regional Water Boards and into each Responsible Parties discharge permit. The Regional Water Boards would implement these regulations along with those authorized local agencies that would be given authority by the Regional Water Boards to implement and enforce the regulations, while the Responsible Parties are the lead agencies for any and all projects implemented within their jurisdiction, to comply with the program. The Regional Water Board does not specify the actual means of compliance by which responsible agencies choose to comply with the Special Protections.

Therefore, the implementation alternatives are mostly evaluated at a program level in this EIR. The alternatives assessed at a program level generally are projects that would be implemented as part of Special Protections compliance, PRC § 21159 places the responsibility of project-level analysis on the agencies that will implement the Special Protections.

6.01 DISCUSSION GENERAL EXCEPTION PROJECT MITIGATING TERMS AND SPECIAL CONDITIONS – SPECIAL PROTECTIONS

Since 1983, the Ocean Plan has prohibited the discharge of both point and nonpoint source waste to ASBS, unless the State Water Board grants an exception. The Ocean Plan allows the State Water Board to grant exceptions to plan requirements where the State Water Board determines that the exception "will not compromise protection of ocean waters for beneficial uses, and, [t]he public interest will be served." Prior to granting an exception, the State Water Board must hold a public hearing and comply with CEQA. In addition, the U.S. EPA must concur.

ASBS are also accorded special protection under the Marine Managed Areas Improvement Act (Act), PRC §36600 et seq. Under the Act, ASBS are a subset of state water quality protection areas and, as such, “require special protection as determined by the [State Water Board]” pursuant to the Ocean Plan (Public Resources Code §36700(f).) In all SWQPAs, waste discharges must be prohibited or limited by special conditions, in accordance with state water quality law, including the Ocean Plan (*Id.* §36710(f).)

On October 18, 2004, the State Water Board notified responsible parties to cease storm water and nonpoint source waste discharges into ASBS or to request an exception under the Ocean Plan. Several responsible parties submitted requests, or conditional requests, for exceptions. Subsequently, the State Water Board provided general instructions for exception application packages via its website. The State Water Board sent letters (in a few cases later in 2005) to responsible parties, providing specific instructions and a deadline for submission of the application package by May 31, 2006.

The State Water Board has received 27 applications for the general exception to the Ocean Plan prohibition against waste discharges to ASBS. The applications were filed by permitted storm water dischargers and nonpoint source dischargers, who are identified in Section 1.0. Staff recommends that the State Water Board grant the exceptions, provided that the dischargers comply with the Special Protections that are contained in this document.

Appendix 1 presents the staff draft proposal for State Water Board action on the exception applications that would establish “Special Protections” to address the applicants’ storm water and nonpoint source discharges into the affected ASBS. The proposed action is consistent with the Ocean Plan, which authorizes limited exceptions to the ASBS discharge prohibition, and with the Act, which authorizes waste discharges to ASBS only if they are limited by special conditions and conform to Ocean Plan requirements. The State Water Board will consider adoption of the Special Protections under the exception provisions of the Ocean Plan. The proposed special conditions in these Special Protections would limit waste discharges with prohibitions and special conditions to protect beneficial uses, including marine aquatic life and the maintenance of natural water quality within ASBS.

The 27 applicants have submitted extensive information. This FEIR is based on staff's review of that information, public comments received at the Board scoping meetings and subsequent stakeholder meetings.

This FEIR is in part modeled after State Water Board Resolution Nos. 2004-0052, 2006-0013, and 2007-0058, individual exceptions/Special Protections related to the Scripps Institution of Oceanography, Wrigley Marine Science Center, and Bodega Marine Lab discharges, respectively. The requirements in the draft Special Protections may be summarized generally to eliminate dry weather runoff, ensure that wet weather runoff does not alter natural water quality in the ASBS, and that adequate monitoring be conducted to determine if natural water quality and the marine life beneficial use is protected. The Special Protections are organized first according to applicability to permitted storm water or nonpoint source discharges. Each of these sections provides the applicable prohibitions and special conditions that limit waste discharges from each category. Requirements for storm water plans and compliance schedules are also provided. Special requirements are then given for parks and recreation facilities and waterfront and marine operations. Finally the terms and conditions for ASBS monitoring are provided.

6.1 ANALYSIS OF ENVIRONMENTAL IMPACTS - AESTHETICS

This section focuses on the existing visual resources at, or in the vicinity of, the proposed implementation locations of the General Exception Special Protections project. The potential impacts that could result to visual resources from installation and maintenance of each of the implementation alternatives are addressed, and the significance of those impacts, if anticipated, is analyzed for each of the implementation alternatives. Mitigation to reduce the impacts to the project is provided, where applicable. Visual resources include the aesthetics of the component sites and their surroundings, valued views, designated scenic highways, corridors or parkways, and lighting.

There are valuable scenic resources throughout all of the ASBS. Pacific Ocean view shed, surrounding hills and mountains in many ASBS provide a valuable scenic resource throughout the coastline. Additional resources include state-designated scenic and/or historic highways or roadways.

As part of the scoping and environmental analysis conducted for the General Exception project, sensitive visual resources were considered, but no potential for adverse impacts to these resources were identified. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on aesthetics. However, the State Water Board believes that mitigation is available to reduce any potential impacts to aesthetics to less than significant levels. The mitigation measures would be implemented at the project-specific level.

CEQA establishes that it is the policy of the State to take all action necessary to provide the people of the state “with…enjoyment of aesthetic, natural, scenic and historic environmental qualities” [CA Public Resources Code § 21001 (b)].

It is anticipated that each applicant will assess sensitive visual resources on a project-by-project basis as part of compliance with the terms and conditions of the General Exception. If a proposed project is determined to have a significant visual resource impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. If it is determined that a project will have aesthetic impacts, then potential mitigation measures must be considered.

THRESHOLDS OF SIGNIFICANCE

For the purposes of this analysis, an aesthetic impact is considered significant if implementation of the proposed project would result in exceeding any of the thresholds identified below. These thresholds of significance are based on the State CEQA Guidelines. CEQA establishes that it is the policy of the State to take all action necessary to provide the people of the state “with…enjoyment of aesthetic, natural, scenic and historic environmental qualities” [CA Public Resources Code § 21001 (b)]. An aesthetic impact is considered significant in this analysis if implementation of the proposed project would result in potential:

- ► Substantial adverse effects on a scenic vista
- ► Substantial damage to scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway
- ► Substantial degradation of the existing visual character or quality of the site and its surroundings

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Impact 6.1-1 Direct Impacts Associated with Effects on a scenic vista.

> **The General Exception Project has the potential to have a substantial adverse effect on a scenic vista via construction disruption, which includes earth movement, distracting activities, and storing equipment and material; the effect is unavoidable, but not permanent.**

► **Mitigation Measure:** As part of the scoping and environmental analysis conducted for the General Exception project, sensitive visual resources were considered, but no potential for long-term permanent adverse impacts to these resources were identified. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on aesthetics. However, the State Water Board believes that mitigation is available to reduce any potential impacts to aesthetics to less than significant levels. The mitigation measures would be implemented at the project-specific level. Mitigation measures associated with specific BMPs are discussed below.

► **Implementation:** It is anticipated that each applicant will assess sensitive visual resources on a project-by-project basis as part of compliance with the terms and conditions of the General Exception. If, during the project analysis phase, a proposed project is determined to have a significant visual resource impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. If it is determined that a project will have aesthetic impacts, then potential mitigation measures must be considered.

► **Significance After Mitigation:** Less than significant.

Impact 6.1-2 Direct Impacts Associated with Damage to Scenic Resources

> **The General Exception Project has the potential to substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.**

► **Mitigation Measure:** As part of the scoping and environmental analysis conducted for the General Exception project, sensitive visual resources were considered, but no potential for adverse impacts to these resources was identified. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on aesthetics. However, the State Water Board believes that mitigation is available to reduce any potential impacts to aesthetics to less than significant levels. Siting criteria of the local authority would continue to help establish appropriate locations for new structures or modifications to existing structures, including the installation of treatment systems, and would address, on a site-specific basis, the potential for systems or BMPs to affect designated scenic vistas or resources. The mitigation measures would be implemented at the project-specific level.

► **Implementation:** It is anticipated that each applicant will assess sensitive visual resources on a project-by-project basis as part of compliance with the terms and conditions of the General Exception. If during the project analysis phase, a proposed project is determined to have a significant visual resource impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. If it is determined that a project will have aesthetic impacts, then potential mitigation measures must be considered.

► **Significance After Mitigation:** Less than significant.

Impact 6.1-3 Direct Impacts Associated with Visual Character or Quality of the Site and Surroundings

The General Exception Project has the potential to substantially degrade the existing visual character or quality of the site and its surroundings. The proposed project could cause a gradual shift toward the use of more surface and subsurface treatment systems. Such systems could be installed in a variety of settings in many areas of the coastline including scenic vista, however, most elements of conventional treatment systems are located underground. This is also true for most elements of VSS treatment systems. While some systems have above-grade components, these elements have relatively low profile. These elements may also be small relative to the conveyance they serve. Special Protections BMP implementation projects and measures would eventually improve the overall aesthetic appeal within the ASBS identified herein and affected by trash and debris discharged to the shoreline, beaches and ocean, by the removal of visible trash, thus causing an overall long-term beneficial impact.

► **Mitigation Measure:** As part of the scoping and environmental analysis conducted for the General Exception project, sensitive visual resources were considered, but no potential for adverse impacts to these resources were identified. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on aesthetics. However, the State Water Board believes that mitigation is available to reduce any potential impacts to aesthetics to less than significant levels. Low profile or subsurface treatment systems may be covered with soil and vegetation following a relatively short construction period. The mitigation measures would be implemented at the project-specific level. Mitigation measures associated with specific BMPs are discussed below.

► **Implementation:** It is anticipated that each applicant will assess sensitive visual resources on a project-by-project basis as part of compliance with the terms and conditions of the General Exception. If a proposed project is determined to have a significant visual resource impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. If it is determined that a project will have aesthetic impacts, then potential mitigation measures must be considered.

► **Significance After Mitigation:** Less than significant.

The following BMPs which may be potentially implemented by the Responsible Parties for the General Exception were evaluated for their potential to impact aesthetic resources either directly or indirectly.

ANALYSIS OF VARIOUS BMPs IMPACTS – VISUAL RESOURCES

Catch Basin Inserts

Catch basin inserts will have less than significant impact on any scenic vista or view. Curbside catch basin inserts are roadside devices. Installation of catch basin inserts would not foreseeably obstruct scenic vistas. Installation of catch basin inserts is a quick process and would not likely create an aesthetically offensive site during installation. Once completed, catch basin inserts will not result in an impairment of scenic views. Catch basin inserts themselves are unlikely to create an aseptically offensive site after installation because they are installed at street level. That notwithstanding, the creation of an aesthetically offensive site could be mitigated by improving the aesthetic characteristics of that device.

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Vortex Separation System

Vortex separation systems (VSS) are subsurface devices and therefore installing them at a particular location is unlikely to result in an impairment of scenic vista. Since a VSS unit would be installed within already existing storm drain network, it is not foreseeable that the installation of VSS may substantially damage scenic resources and/or degrade the existing visual character or quality of any particular location and its surroundings. It is not foreseeable that the installation activities associated with siting VSS Units would result in any substantial adverse effect on the scenic vistas of the location. However, in the unlikely event that such activities should create aesthetically offensive impacts, these can be mitigated with screening and other construction BMPs. Screening can be used to reduce temporary impacts from aesthetically offensive installation activities.

Road and Parking Lot Street Sweeping

Increased street sweeping is unlikely to result in an impairment of scenic vistas. Increased street sweeping would not create an aesthetically offensive site. Rather, this alternative would pose a positive aesthetic impact by reducing visible litter instead.

Public Education

Public education would not result in an impairment of scenic vistas nor would it create an aesthetically offensive site. Public education would create a positive aesthetic, by reduction of litter and waste.

6.2 ANALYSIS OF ENVIRONMENTAL IMPACTS - AIR QUALITY

This section provides an overview of air quality, sensitive receptors and other conditions which may arise on potential project areas with the General Exception Special Protections implementation activities, including short term construction and installation activities and long term street sweeping activities. Federal, state, and regional regulations apply to air quality criteria. These criteria and each responsible party's compliance for their regional area is discussed below. Findings of the significance of impacts are presented. Mitigation to reduce the impacts associated with each activity is discussed where applicable.

There are two aspects of air pollution: daily emissions and pollutant concentrations. The term "emissions" means the quantity of pollutant released into the air and has unit of pounds per day (lbs/day). The term "concentrations" means the amount of pollutant material per volumetric unit of air and has unit of parts per million (ppm) or micrograms per cubic meter (µg/m3).

Criteria Pollutants

The State of California and the federal government have established ambient air quality standards for six pollutants to protect public health. The six air pollutants of concern, called criteria pollutants, are carbon monoxide (CO), ozone (O3), nitrogen dioxide (NO2), sulfur dioxide (SO2), respirable particulate matter (PM10), fine particulate matter (PM2.5), and lead (Pb). The criteria pollutants and associated adverse health effects are summarized below:

• **Carbon Monoxide.** Exposure to high concentrations of CO, a colorless and odorless gas, reduces the oxygen-carrying capacity of the blood, and therefore can cause dizziness and fatigue, impair central nervous system functions, and induce angina in persons with serious heart disease. CO is emitted almost exclusively from the incomplete combustion of fossil fuels. In urban areas, motor vehicles, power plants, refineries, industrial boilers, ships, aircraft, and trains emit CO. Motor vehicle exhaust releases most of the CO in urban areas. Vehicle exhaust contributes approximately 56 percent of all CO emissions nationwide and up to 95 percent in cities. CO is a non-reactive air pollutant that dissipates relatively quickly. As a result, ambient CO concentrations generally follow the spatial and temporal distributions of vehicular traffic. CO concentrations are influenced by local meteorological conditions; primarily wind speed, topography, and atmospheric stability. CO from motor vehicle exhaust can become locally concentrated when surface-based temperature inversions combine with calm atmospheric conditions. An inversion is an atmospheric condition in which a layer of warm air traps cooler air near the surface of the earth, preventing the normal rising of surface air.

• **Ozone.** While O3 serves a beneficial purpose in the upper atmosphere (stratosphere) by reducing potentially harmful ultraviolet radiation, when it reaches elevated concentrations in the lower atmosphere it can be harmful to the human and to sensitive species of plants. Short-term O3 exposure can reduce lung function, making persons susceptible to respiratory infection. Long-term exposure can impair lung defense mechanisms and lead to emphysema and chronic bronchitis. O3 concentrations build to peak levels during periods of light winds or stagnant air, bright sunshine, and high temperatures. Ideal conditions occur during summer and early autumn. Sensitivity to O3 varies among individuals. About 20 percent of the population is sensitive to O3, with exercising children being particularly vulnerable. O3 is formed in the atmosphere by a complex series of chemical reactions under sunlight that involve "ozone precursors." Ozone precursors are categorized into two families of pollutants: oxides of nitrogen (NOx) and reactive organic compounds (VOCs). NOx and VOCs are emitted from a variety of stationary and mobile sources. While NOx is considered a criteria pollutant, VOCs are not in this category, but are included in this discussion as O3 precursors. O3 is the chief component of urban smog and the damaging effects of photochemical smog generally relate to the concentration of O3, light winds or stagnant air, bright sunshine, and high temperatures. Ideal conditions occur during summer and early autumn. Sensitivity to O3 varies among individuals. About 20 percent of the population is sensitive to O3, with exercising children being particularly vulnerable. O3 is formed in the atmosphere by a complex series of chemical reactions under sunlight that involve "ozone precursors." Ozone precursors are categorized into two families of pollutants: oxides of nitrogen (NOx) and reactive organic compounds (VOCs). NOx and VOCs are emitted from a variety of stationary and mobile sources. While NOx is considered a criteria pollutant, VOCs are not in this category, but are included in this discussion as O3 precursors. O3 is the chief component of urban smog and the damaging effects of photochemical smog generally relate to the concentration of O3.

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.

THRESHOLDS OF SIGNIFICANCE

The Clean Air Act (CAA), as amended in 1990, is the federal law that governs air quality. Its California counterpart is the California Clean Air Act (CCAA) of 1988. These laws set standards for the quantity of pollutants that can be in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). Standards have been established for six criteria pollutants that have been linked to potential health concerns; the criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO2), ozone (O3), particulate matter (PM), lead (Pb), and sulfur dioxide (SO2). Conformity with CAA would be assessed in accordance with CEQA by each of the applicants identified in this General Exception as individual projects are planned and designed by applicants. Individual projects should discuss conformance at the regional level and at the project level. In general, projects must not cause the pollutant standard to be violated and must not cause any increase in the number and severity of violations. If a known violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s). Each applicant's individual project would assess the affected environment under National and California Air Quality Standards as part or their air quality evaluation.

For the purposes of this analysis, an air quality impact is considered significant if implementation of the proposed project would result in exceeding any of the following thresholds identified below. These thresholds of significance are based on the State CEQA Guidelines and relevant air quality standards. Consistent with State CEQA Guidelines, an air quality impact is considered significant in this analysis if implementation of the proposed project would result in potential for exceeding any of these air quality objectives.

A significant air quality impact would occur if the alternative would: Result in a violation of any State of national ambient air quality standard or contribute substantially to an existing or projected air quality violation. The significance thresholds recommended by each regional Air Quality Management District would be the specific basis for determining significance of an impact for this project. Construction and operational emissions are considered by a regional AQMD to be significant if they exceed the thresholds identified for that Region.

Result in an increase in carbon monoxide concentrations where: (1) an increase in CO concentrations is sufficient to cause an exceedances of the most stringent State or national CO standard (20 ppm for 1-hour concentrations and 9 ppm for 8-hour concentrations); or (2) in an area that already exceeds national or State CO standards, the project increase exceeds 1 ppm for a 1-hour average or 0.45 ppm for an 8-hour average.

In addition, the CEQA Guidelines checklist provides the following thresholds for determining significance with respect to air quality. Implementation of the proposed project would also result in significant air quality impacts if it would:

- ► Conflict with or obstruct the implementation of an applicable regional air quality plan
- ► Violate any air quality standard or contribute substantially to an existing or projected air quality violation
- ► Expose sensitive receptors to substantial pollutant concentrations; or
- ► Create objectionable odors affecting a substantial number of people

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

As part of the scoping and environmental analysis conducted for the General Exception project, these environmental resources were considered, but no potential for adverse impacts to these resources were identified. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on air quality. However, the State Water Board believes that mitigation is available to reduce any potential impacts to air quality to less than significant levels. The mitigation measures would be implemented at the project-specific level.

Impact 6.2-1 Direct Impacts Associated with Air Quality Standards and/or Contributing to an Existing or Projected Air Quality Violation.

The General Exception Project has the potential to have a potentially significant adverse effect on air quality. A significant air quality impact would occur if it would result in a violation of any State or national ambient air quality standard or contribute substantially to an existing or projected air quality violation. Significance thresholds are recommended by each Air Quality District and the basis for determining significance of an impact for this project. Construction and operational emissions are considered by the Air District to be significant if they exceed the thresholds indentified in a Regional ambient air quality standard. They are also considered significant if they result in an increase in carbon monoxide concentrations where: (1) an increase in CO concentrations is sufficient to cause an exceedance of the most stringent State or national CO standard (20 –m for 1-hour concentrations and 9ppm for 8-hour concentrations): or (2) exceed 1 ppm for a 1-hour average of 0.45 ppm for an 8-hour average. Impacts from Special Protections implementation activities include both short term and long term activities. Impacts evaluation is based on a calculation of the total emissions from travel of construction and BMP related vehicles that might be affected by implementation of the Special Protections.

Comparative evaluation, instead of the examination of the emissions from each individual source alone is one method typically used. Vehicle emissions are calculated using forecasts of total vehicle miles traveled for each alternative based on data provided in MOBILE6, which is a vehicle emission software developed by USEPA. MOBILE6 is used for predicting gram per mile emissions of Hydrocarbons (HC), Carbon Monoxide (CO), Nitrogen Oxides (NOx), Carbon Dioxide (CO2), Particulate Matter (PM), and toxics from cars, trucks, and motorcycles under various conditions. The data which this calculation is based on are from technical documents of MOBILE6. Considering the type of work involved in implementation of the Special Protection, the calculation assumes that non-tampered heavy-duty diesel vehicles (HDDV Class 6) are used for installation/construction/maintenance activities. The mileage is assumed to be 50,000 miles, which is the median mileage for HDDVs. The year of Vehicle is assumed to be 2001+ for HC, CO, NOx, and SO2 and 1994+ for PM.

Based on assumptions above, the exhaust emission rates are found to be 2.1, 9.92, and 6.49 grams per mile for HC, CO, and NOx, respectively. The PM standard for HDDVs is 0.1 g/bhp-hr. By applying a conversion factor of

1.942 bhp-hr/mi (from Update Heavy-Duty Engine Emission Conversion Factors for Mobile6 – Analysis of BSFCs and Calculation of Heavy-Duty Engine Emission Conversion Factors), the exhaust emission rate for PM is found to be 0.1942 grams per mile. There is no exhaust emission rate information available for SOx in MOBILE6. Instead by using diesel fuel sulfur level of 8 ppm (from MOBILE6 for years after 2006), diesel fuel economy of 8.71 miles per gallon (from Update Heavy-Duty Engine Emission Conversion Factors for Mobile6 – Analysis of BSFCs and Calculation of Heavy-Duty Engine Emission Conversion Factors), and diesel fuel density of 7.099 pounds per gallon (from Update Heavy-Duty Engine Emission Conversion Factors for Mobile6 – Analysis of Fuel Economy, Non-Engine Fuel Economy Improvements and Fuel Densities), exhaust emissions rate for SO2 could be 0.00592 grams per mile, assuming all sulfur in fuel would be transformed to SO2.

► **Mitigation Measure:** Mitigation measures for increased air emissions due to increased vehicle trips or increased use of construction equipment include: 1) use of construction, and maintenance vehicles with lower-emission engines, 2) use of soot reduction traps or diesel particulate filters, and 3) use of emulsified diesel fuel.

► **Implementation:** The emissions generated by construction equipment could be lower than the local authority AQMD daily construction emissions thresholds. Detailed analysis can only be done at project level. In the case that daily construction emission exceeds significance threshold, construction projects for different structural BMPs can be conducted on different days to reduce emissions rates. Comparative evaluation, as discussed above, instead of the examination of the emissions from each individual source alone is one method typically used. Detailed analysis can only be done at project level. In case that daily construction emission exceeds significance threshold, which is unlikely, construction projects for various structural BMPs can be conducted on different days to reduce emissions rates. Mitigation measures implemented at the project level would reduce anticipated impacts to less than significant.

► **Significance After Mitigation:** Less Than Significant.

Impact 6.2-2 Expose sensitive receptors to substantial pollutant concentrations

The General Exception Project has the potential to have short-term temporary emission levels of criteria pollutants during installation and maintenance of various BMPs to implement the Special Protections. Emission levels of criteria pollutants during installation and maintenance of BMPs may be below the local authority AQMD Air Quality Significance thresholds. Long-term increases in traffic caused by ongoing maintenance of catch basin inserts (e.g., delivery of materials, street sweeping) are potential sources of increased air pollutant emissions. When evaluating

comparatively as discussed in the previous section emissions of toxic air contaminants are expected to be below the thresholds, The emissions generated by construction equipment is considered significant if it violates any air quality standards or contributes substantially to an existing or projected air quality violation, or results in a cumulatively considerable net increase of any criteria pollutants for the project region. Based on the relatively small project areas typical of BMP construction sites. It is likely that the emission of toxic air contaminants will be lower than AQMD daily construction emissions thresholds not be significant.

► **Mitigation Measure:** Potential mitigation measures which could be implemented at the project level for increased air emissions due to increased vehicle trips or for construction equipment due to the installation of structural BMPs include: 1) use of construction and maintenance vehicles with lower-emission engines, 2) use of soot reduction traps or diesel particulate filters, and 3) use of emulsified diesel fuel. In case that daily construction emission exceeds significance threshold, which is unlikely, construction projects can be conducted on different days to reduce emissions rates. These measures would reduce impacts to less than significant level.

► **Implementation:** The emissions generated by construction equipments could be lower than the local authority AQMD daily construction emissions thresholds. Detailed analysis can only be done at project level.

► **Significance After Mitigation:** Less than Significant

Impact 6.2-3 Create Objectionable Odors Affecting a Substantial Number of People

The General Exception Project has the potential to have direct short term temporary creation of odors during maintenance or construction of Special Protections implementation projects such as VSS units. It is possible that foul air could be temporarily released to the atmosphere while enclosed sources are uncovered or piping is reconfigured. These releases could create objectionable odors at the nearest receptors. These impacts are temporary and unpleasant odors, if any, will be at minimum with completion of the installation. VSS devices may be a source of objectionable odors if design allows for water stagnation or collection of water with sulfur-containing compounds. Storm water runoff is not likely to contain sulfur-containing compounds, but stagnant water could create objectionable odors.

► **Mitigation Measure:** Mitigation measures to eliminate odors caused by stagnation could include covers, aeration, filters, barriers, and/or odor suppressing chemical additives. Devices could be inspected to ensure that intake structures are not clogged or pooling water. During maintenance, odorous sources could be uncovered for as short of a time period as possible. To the extent possible, pollution removal devices could be designed to minimize stagnation of water (e.g., allow for complete drainage within 48 hours) and installed to increase the distance to sensitive receptors in the event of any stagnation. Notably, the current conditions result in significant impacts from odor, especially following storm events, where upstream trash may collect downstream of rivers and streams and at shoreline, and beaches. The potential re-suspension of sediments and associated pollutants during construction could also impact air quality.

► **Implementation:** At the localized project level, Responsible Parties performing a CEQA analysis could develop an operations plan for the specific construction and/or maintenance activities designed to address the variety of available measures to limit the air quality impacts. These could include vapor barriers and moisture control to reduce transfer of small sediments to air. Mitigation measures applied would eliminate or reduce these impacts to less than significant

► **Significance After Mitigation:** Less than significant.

ANALYSIS OF VARIOUS BMPs IMPACTS – AIR RESOURCES

Catch Basin Inserts

Long-term increases caused by ongoing maintenance of catch basin inserts (e.g., delivery of materials, street sweeping) are potential sources of increased air pollutant emissions. Mitigation measures to mitigate any potential impacts to air quality due to increased traffic could include 1) use of construction, maintenance, and street sweeper vehicles with lower-emission engines, 2) use of soot reduction traps or diesel particulate filters, 3) use of emulsified diesel fuel, 4) use of vacuum-assisted street sweepers to eliminate potential re-suspension of sediments during sweeping activity, and 5) the design of trash removal devices to minimize the frequency of maintenance trips. As a requirement of the MS4 permit, **catch basins** are cleaned out on varying schedules at a minimum frequency of once a year. This implementation measure does not require an increase in cleaning frequency above what is already required for existing permits, therefore no significant increase in air emissions is anticipated.

Nonetheless, mitigation measures are available to mitigate any potential impacts to air quality due to increased traffic. Mitigation measures could include 1) use of construction, maintenance, and street sweeper vehicles with lower-emission engines, 2) use of soot reduction traps or diesel particulate filters, 3) use of emulsified diesel fuel, 4) use of vacuum-assisted street sweepers to eliminate potential re-suspension of sediments during sweeping activity.

Vortex separation system

Short term increases in traffic during the construction and installation of VSS units and long-term increases in traffic caused by ongoing maintenance of these devices (e.g., delivery of materials and deployment of vacuum trucks) are potential sources of increased air pollutant emissions. A detailed analysis of emissions generated by construction equipment can only be done at the project level. If daily construction emissions exceed significance thresholds, construction projects for different VSS units can be conducted on different days to reduce emissions rates. Mitigation measures for increased emissions due to increased vehicle trips of increased use of construction equipment could include: 1) use of construction and maintenance vehicles with lower-emission engines, 2) use of soot reduction traps or diesel particulate filters, and 3) use of emulsified diesel fuel. VSS units may be a source of objectionable odors if design allows for water stagnation or collection of water with sulfur-containing compounds. Mitigation measures to eliminate odors caused by stagnation could include covers, aeration, filters, barriers, and/or odor suppressing chemical additives. Devices could be inspected to ensure that intake structures are not clogged or pooling water. During maintenance, odorous sources could be uncovered for as short of a time period as possible. The potential re-suspension of sediments and associated pollutants during construction could also impact air quality. An operations plan for the specific construction and/or maintenance activities could be completed to address the variety of available measures to limit the air quality impacts. These could include vapor barriers and moisture control to reduce transfer of small sediments to air.

Road and Parking Lot Street Sweeping

Increased road and parking lot sweeping would increase traffic and therefore increase air pollutant emissions. Applicants implementing the Special Protections would analyze the impacts of increased sweeping at the project level. Increased sweeping may increase objectionable odors and mitigation measures are available to mitigate any potential impacts to air quality due to increased sweeping. Mitigation measures could include 1) use of street sweeper vehicles with lower-emission engines, 2) use of soot reduction traps or diesel particulate filters, 3) use of emulsified diesel fuel, 4) use of vacuum-assisted street sweepers to eliminate potential re-suspension of sediments during sweeping activity.

Increased street sweeping would increase traffic and therefore increase air pollutant emissions. Increased street sweeping would not foreseeably be implemented alone for the Special Protections. It is not clear how often street sweeping would be increased to fulfill the requirements at this point. If the stakeholders make decisions on the frequency of street sweeping, the impacts on air quality caused by increased street sweeping could be analyzed at project level. Nevertheless, the impacts of increased street sweeping have been included in alternatives, such as catch basin inserts, that may also include increased street sweeping.

Public Education

Public education is not expected to have an impact on air quality, as it does not involve physical changes to the environment. There are no foreseeable impacts on air quality.

Each applicant, as part of their individual Special Protections BMP implementation project and CEQA analysis, may assess impact to air quality related to construction activities. Such impacts to be considered may include exhaust emissions and potential odors from construction equipment used on the construction site and vehicles used to transport materials to and from the site, and exhaust emissions from the motor vehicles of the construction crew. Stationary or mobile-powered on-site construction equipment may include trucks, tractors, signal boards, excavators, backhoes, concrete saws, crushing and/or processing equipment, graders, trenchers, pavers, and other equipment.

Installation and maintenance of structural BMPs to implement the Special Protections could result in potentially significant environmental effects with regard to air quality. However, mitigation measures which can be applied to reduce and/or eliminate these impacts are available. These mitigation measures are within the responsibility and jurisdiction of the applicants of this General Exception and can or should be adopted by them. The State Water Board does not direct which compliance measures be applied in order that potential environmental impacts be reduced or avoided. It is foreseeable that these mitigation measures may not always be capable of reducing these impacts to levels that are less than significant in every conceivable instance. In the event that a specific mitigation measure or alternative may not reduce impacts to levels that are less that significant, the project proponent may need to consider an alternative strategy or combination of strategies in their project CEQA analysis subsequent to comply with the Special Protections.

Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on air quality. However, the State Water Board staff believes that mitigation is available to reduce any potential impacts to air quality to less than significant levels. The mitigation measures would be implemented at the project-specific level.

6.3 ANALYSIS OF ENVIRONMENTAL IMPACTS - BIOLOGICAL RESOURCES

This section addresses biological resources that could be affected with implementation of the proposed project. The information presented is based on literature reviews and a review of existing documentation and research prepared explicitly for the project. As explained in the IS , impacts on marine biological resources range from “no impact” to “potentially significant. These issues are addressed in the impact analysis.

Water quality issues that may affect biological resources may be caused by a large spectrum of constituents which may be introduced by a number of different sources. Most impacts on biological resources occur indirectly as a result of degradation of surface water quality, whether a stream, creek, estuary or bay adjacent to ASBS.

The potential for the Responsible Parties’ existing discharges identified herein to cause water quality impacts that would affect biological resources is dependant on the magnitude of the contamination or mass loading from these flows. A single discharge would not likely have a substantial effect on the mass loading of contaminants to the

ASBS; however, the mass loading from high densities of discharges within a watershed together with inputs from other sources such as agricultural, recreational (golf courses, etc), storm, or urban runoff, can have a substantial effect on ASBS ocean water quality which could lead to adverse impacts on biological resources.

Many watersheds adjacent to the ASBS identified herein contain 303(d)-listed water bodies known to contribute sediment, pathogens, nutrients as well as other constituents to the marine environments located within an ASBS. Some impairment metrics to the nearshore waters of ASBS may be assessed visually such as eutrophication which results in excessive algal and aquatic plant growth, low oxygen levels. This type of contamination to marine life can also lead to human health advisories such as shellfish harvesting advisories or closure of a fishery area.

Though each of the 25 ASBS listed herein is unique in its characteristics, some generalized assumptions are made with regard to contaminant loading via discharges of the Responsible Parties. Impacts to marine life from pollutants including the effects of constituents listed in the Ocean Plan are well known. The impact analysis for aquatic biological resources here compares existing conditions to conditions that would exist with implementation of the proposed statewide Special Protections. These comparisons are based primarily on the water quality impact analysis in Section 6.7 “Analysis of Hydrology and Water Quality,” because impacts to aquatic biological resources would occur as a result of impacts from discharges on ocean water quality. The construction and operation of BMPs can cause a variety of impacts on biological resources. However, these impacts can be difficult to quantify. The Ocean Plan water quality standards are enforceable limits composed of two parts: (1) the designated beneficial uses of water and (2) criteria (i.e., numeric or narrative limits) to protect those beneficial uses.

Biological resources are among the “beneficial uses” as defined in Section 13050(f) of the Porter-Cologne Water Quality Control Act, which defines them as uses of surface water and groundwater that must be protected against water quality degradation (beneficial uses are discussed in Section 4.1-4, “Beneficial Uses,” of this document). California Ocean Plan water quality objectives (or “criteria” under the Clean Water Act) are found in the Basin Plans adopted by the State Water Board and each of the nine Regional Water Boards. Some of these standards, as they pertain to biological resources, may be site specific or vary by season, such as for dissolved oxygen. Ammonia is pH and temperature dependent.

Toxicity thresholds may vary depending on some of these parameters and depend on length of exposure as well (e.g., 4-day average, 1-hour average). Therefore numeric water quality standards are often not explicitly defined for biological resources under federal, state, or local plans and regulations as they are for human health thresholds. Therefore, much of this impact discussion is based on qualitative information.

Indirect impacts to biological resources may occur during the construction of BMPs, which typically involves the excavation of trenches and other ground-disturbing work that can cause the erosion of soil, habitat loss, and displacement of wildlife. Furthermore, off-site erosion and storm water runoff can pollute streams and other receiving waters, especially if best management practices (BMPs) for standard storm water and erosion controls are not followed or are not successful.

Operation of properly functioning BMPs generally would have no direct effects on terrestrial biological resources, but could still cause direct impacts on water quality in sensitive ASBS marine ecosystems, which in turn, could result in indirect adverse effects on aquatic habitat. Species that occupy aquatic systems or whose life cycles are interconnected to these systems could also be affected. Impacts would vary substantially because of many variables. These variables that control the potential for BMPs to affect surface water quality include storm water effluent quality and the reduction and subsequent elimination of discharges of wastes to ocean waters.

THRESHOLDS OF SIGNIFICANCE

The potential for the Special Protections to result in significant environmental effects was analyzed using information and criteria provided in the California Environmental Quality Act (CEQA) Guidelines. Pursuant to the suggested thresholds in Appendix G of the State CEQA Guidelines, the proposed project would have a significant impact on biological resources if it would:

► Have a substantial adverse effect, either directly or indirectly through habitat modifications, on the population of any species identified as a candidate, sensitive, or special-status species in regional or local plans, policies, or regulations, or by DFG or USFWS;

► Have a substantial adverse effect on any riparian or other sensitive natural community identified in local or regional plans, policies, or regulations or by DFG or USFWS;

► Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

► Conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or

► Conflict with the provisions of an adopted habitat conservation plan, natural communities conservation plan, or other approved local, regional, or state habitat conservation plan.

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES BIOLOGICAL RESOURCES

Impact 6.3-1 Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special

status species in local or regional plans, policies, or regulations, or by the DFG or USFWS.

> **As described under Impact 6.7 in "Hydrology and Water Quality," the proposed regulations could lead to an increase in BMP repairs, replacements, and upgrades. These changes would occur on sites that already have been disturbed and contain existing BMPs or other drainage conveyances and associated residential or commercial structures, and by virtue of their ongoing use are highly unlikely to support sensitive habitat that could be affected by repairs or replacement. With respect to new BMPs, as previously described these regulations do not alter the local land use agency process associated with ground-disturbing activities from residential and commercial development. A substantial adverse effect would occur if an individual project at the local level modified habitat of any species identified as a candidate, sensitive, or special status species. These effects would be significant. However, the implementation of Special Protections only affect the design of BMPs and their effectiveness to eliminate the discharge of waste to ASBS, not whether land uses associated with BMPs would be permitted. Therefore, impacts on biological resources related to typical ground-disturbing activities and water quality effects associated with the new BMPs regulations are considered less than significant with mitigation incorporated.**

► **Mitigation Measure:** Modify the proposed Special Protections to Require the Implementation of coordination with local or regional plans, policies, or regulations, or by the DFG or USFWS.

► **Implementation:** The application of Mitigation Measures is the responsibility of the Responsible Party implementing the project.

► **Significance After Mitigation:** Less than significant.

Impacts 6.3-2, 6.3-3, 6.3-4, and 6.3-5 are discussed together. The implementation of the Special Protections measures by the Responsible Parties identified herein may have the potential to; have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the DFG or USFWS; interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory corridors, or impede the use of native wildlife nursery sites; conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

The implementation of the proposed Special Protections would require most Responsible Parties to assess their needs for waste discharge correction and potentially convert their existing conveyances to treatment BMPs, LID or with other supplemental treatment units. Such BMP upgrades or replacements would need to be completed within the time frame specified in the Special Protections. As discussed in the "Hydrology and Water Quality" section under Impact 6.7, construction of LID or BMPs could lead to the concentration of a large amount of construction activity within 600 feet of ASBS shoreline within a short time frame. Construction and replacement activities could cause sediment, storm water effluent, and debris to enter shoreline and/or perennial drainages, and ultimately the ocean waters of ASBS.

Additionally, storm events could cause newly constructed sites to erode, flushing sediment into receiving waters. As discussed previously, TSS and sediments could physically block sunlight, precipitate out of suspension and smother benthic macro invertebrates, fish and amphibian eggs, or aquatic plants, which could lead to suffocating fish and other aquatic life. TSS and turbidity are particularly problematic for fisheries, especially in those that are critical for recovery of a species (e.g., steelhead and Chinook salmon). Sediments could also transport other contaminants to receiving waters, including nutrients, pathogens, and other organic materials in storm water runoff. Nutrients may promote eutrophication and hypoxia within the receiving waters, which could increase the mortality of special status species, while pathogens that could be present in storm water runoff, such as *Toxoplasma* and *Cryptosporidium* could adversely affect mammals (i.e., harbor seals, sea otters) and other species as described above.

Where areas larger than 1 acre could be disturbed, the activities would be subject to the requirements of the statewide National Pollutant Discharge Elimination System General Permit for Storm water Discharges Associated with Construction Activity. However, in the majority of cases, construction activities at individual sites are not anticipated to affect more than 0.5 acre, and as discussed and addressed further in the "Hydrology and Water Quality" section under Impact 6.7, not all jurisdictions have local BMP requirements related to sedimentation and erosion control for construction activities disturbing less than 1 acre that are sufficient to avoid water quality impacts. Therefore, where targeted areas of impairment are located in jurisdictions with inadequate BMP requirements, compliance with implementation of the proposed draft Special Protection regulations could lead to sediments, erosion, or deposits of hazardous materials washing into adjacent waters, which could affect natural water quality and beneficial uses to the degree that it could degrade wetlands or sensitive aquatic habitat such as estuaries, bays, and marine aquatic life. The result would be harmful to fisheries and special status species. Therefore, this impact is considered **potentially significant**.

► **Mitigation Measure:** Modify the proposed implementations to require erosion and sediment control measures during BMP related construction activities. Erosion and sediment control measures are found in the Construction General Permit online at http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

► **Implementation:** The application of the site specific mitigation measure is the responsibility of the discharger identified herein the General Exception. Appropriate measures would be identified in the project proponents CEQA analysis.

► **Significance After Mitigation:** Less than significant with mitigation incorporated.

The General Exception project has the potential to impact species, habitat, and sensitive natural communities within each of the 26 ASBS identified in this General Exception, if existing inadequate controls currently in force are allowed to continue. The applicants (Responsible Parties) submitted biological monitoring reports characterizing near shore marine biota. Four reports provided data sufficient to statistically compare impact from reference locations at San Clemente and San Nicolas Islands (Navy), Del Mar Landing, and Trinidad ASBS. Based on comparison of community composition, there is evidence that at three ASBS the impact locations are different from reference locations, but there is some question whether the differences are due to discharges or sample design. Caltrans reports for multiple ASBS locations include Redwood National Park, James V. Fitzgerald, Año Nuevo, Point Lobos, Carmel, and Irvine Coast ASBS. While certain ASBS sites within Caltrans area of impact differed from reference sites, there was no strong support that this was due to discharges. Differences between impact and reference locations were also found at Duxbury Reef ASBS (County of Marin) and at the Pillar Point area of James V. Fitzgerald ASBS (Air force). Again at these locations, the data was inadequate to attribute the variation to the impacts of the discharge.

The project, granting an exception with special mitigating conditions (i.e., special protections) will allow the continued discharge of wastes from various origins including storm water runoff into ASBS. It is anticipated that the mitigating terms and conditions of the special protections will result in improved water quality conditions. Further, the terms and conditions of the special protections provide for continued water quality improvements over time if all of the special protections designed to limit discharges of waste from the applicants are implemented.

It is anticipated that, as the applicants identified in this General Exception plan for and design individual control projects to comply with the terms and conditions or "Special Protections," each applicant will assess biological impacts on a project-by-project basis. If it is determined that a project will have biological impacts, then potential mitigation measures must be considered. A technical biological impact analysis may include evaluation of terrestrial and marine biota of an individual project. The impact analysis may assess mitigation measures that are determined to be reasonable and feasible, and at the time of final design would then be incorporated into projects' plans and specifications. Indirect effects to biological resources may extend throughout the duration of construction and may include increased erosion, siltation, and runoff. Projects should result in long-term, beneficial effects to biological resources within each individual project.

Thresholds of Significance:
1 - Indirect impacts on marine biological resources associated with existing baseline inadequate pollution and dry-weather flows control measures.

ANALYSIS FOR IMPACTS VARIOUS BMPs TO BIOLOGICAL RESOURCES

Catch Basin Inserts

Catch basin inserts fit directly into curbside catch basins typically in urbanized areas where native habitat or special status species may be absent. As such, potential impacts to biological resources would likely be avoided, including impacts to species diversity, impacts to special status species, impacts to habitat, or impacts to wildlife migration. Typically, installation of catch basin inserts requires no construction or ground disturbance which could impact biological resources. It is anticipated that the use of catch basin inserts will improve biological resources and no mitigation is required since no impact is anticipated. However, during a proposed site specific projects CEQA analysis, these issues would be assessed and coordinated with the appropriate agency, DFG, FWS, NMFS.

Vortex Separation System

It is anticipated that vortex separation system units would be implemented in currently urbanized areas. Because these areas are already urbanized it is unlikely that the installation of VSS systems would cause the removal, disturbance or change in diversity of any plant species or cause a change or reduction in the number of any unique, rare or endangered species of plants. However, depending on the final location of facilities, potential impacts to biological resources including special status species and habitat, wetlands, and trees protected under local ordinances or policies could occur where facilities are located.

It is not reasonably foreseeable that implementation of VSS units would result in the introduction of exotic or invasive plant species into an area. Nor will it result in a barrier to the normal replenishment of existing species. However, in the case that landscaping is incorporated into the specific project design, there is a possibility of disruption of resident species. It is possible that direct or indirect impacts to special status animal species may occur at the project level. Because these animal species are protected by state and/or federal Endangered Species Acts, impacts to them would be considered potentially significant, even though it is expected that potential projects would occur in what would generally be described as urban areas. If these species are present during activities associated with the potential projects, it could conceivably result in direct impacts to special status species, including; direct loss of a sensitive species; increased human disturbance in previously undisturbed habitats; mortality by construction or other human-related activity; impairing essential behavioral activities, such as breeding, feeding or shelter/refugia; destruction or abandonment of active nests/den sites; direct loss of occupied habitat. In addition, potential indirect impacts may include but are not limited to; displacement of wildlife by construction activities; disturbance in essential behavioral activities due to an increase in ambient noise levels and/or artificial light from outdoor lighting around facilities.

It is not reasonably foreseeable that implementation of VSS units will result in the introduction of a new animal species. In addition, because it is anticipated that potential projects would be established in existing developed areas it is not expected that potential project sites would act as a travel route or regional wildlife corridor. It is anticipated that construction of these facilities would not considerably restrict wildlife movement. A travel route is generally described as a landscape feature such as a ridgeline, canyon, or riparian strip within a larger natural habitat area that is used frequently by animals to facilitate movement and provide access to necessary resources such as food, water and den sites. Generally, wildlife corridors are found in areas of habitat which connect two or more habitat patches that would otherwise be fragmented or isolated from one another. It may be unlikely that VSS units would be construction in areas such as these.

VSS units may potentially impact wildlife crossings, where the crossing is small, narrow, short or constricted. Such an area allows wildlife to pass under or through obstacles that would otherwise hinder movement. Crossings may typically be manmade and include culverts, underpasses and drainage pipes to provide access across or under roads, highways, or other physical obstacles.

Migratory avian species potentially may be impacted by the construction activities associated with the implementation of VSS units. Avian species have the potential to utilize potential project sites, including ornamental vegetation during breeding and nesting season, and may be protected under the Migratory Bird Treaty Act (MBTA). The MBTA includes provisions for protection of migratory birds under the authority of the USFWS and CDFG. The MBTA protects over 800 species including geese, ducks, shorebirds, raptors, songbirds and many other relatively common species.

It is not reasonably foreseeable that the implementation of VSS will result in the deterioration of existing fish and or wildlife habitat. It is anticipated that potential VSS locations will be in already developed areas and would not result in the removal of sensitive biological habitats. VSS would not be sited within a stream course, but within a storm drain system.

6.3.6 Mitigation which should be implemented to reduce or avoid potential project level impacts to biological resources include:

1. If any unique plant species are present at the proposed installation site, plants could be preserved prior, during and after construction or by re-establishing and maintaining the plant communities affected, post-construction.

2. When proposed project sites are identified, a search of the California Natural Diversity Database (CNDDB) could be employed to confirm that any potentially sensitive plant species or biological habitats in the site area are properly

identified and protected. Plant surveys for special-status plant species could be conducted at each site location. If sensitive plant species occur on the project site, mitigation would be required in accordance with the Endangered Species Act. Mitigation measures shall be developed in consultation with the California Department of Fish and Game (CDFG) and the United States Fish and Wildlife Service (USFWS). Applicants should take steps to avoid impacts to unique, rare or endangered species or sensitive habitats.

3. Proposed project designs which incorporate the use of landscaping, should avoid or minimize the disruption of resident native species by using plants native to the area. The use of exotic invasive species or other plants listed in the Exotic Pest Plant of Greatest Ecological Concern in California should be prohibited (CalEPPC, 1999). As Applicants select measures or projects to comply with Special Protections which have the potential to significantly impact unique, rare or endangered (special status) species or sensitive habitat, such projects should be avoided. When specific projects are developed a search of the CNDDB would confirm that any potentially special status animal species in the site area are properly identified and protected. Focused animal protocol surveys for special status animal species shall be conducted at each site location.

4. If special status animal species are potentially near the project site area, as required by the Endangered Species Act (ESA), two weeks prior to grading or the construction of facilities and per applicable USFWS and/or CDFG protocols, pre-construction surveys to determine the presence or absence of special status species would be conducted. They should extend off-site to determine the presence or absence of any special status species adjacent to the project site. If special Status species are found to be present on the project site or within the project site buffer area, mitigation would be required under the ESA. Mitigation measures would be developed with the USFWS and CDFG to reduce potential impacts.

5. If VSS units are implemented at locations where they would foreseeably adversely impact species migration or movement patterns, mitigation measures shall be implemented to ensure that impacts which may result in a barrier to the migration or movement of animals is less than significant. Any site specific wildlife crossings shall be coordinated in consultation with CDFG. If a wildlife crossing would be significantly impacted, the project design shall include a new wildlife crossing in the same general location.

6. If a project is proposed for construction during the avian breeding season for special status species and/or MBTA protected species, then prior to (within 2 weeks) to the onset of construction activities, surveys for nesting migratory avian species shall be conducted on the site following USFWS and/or CDFG protocols. Active nests identified on or within a distance stipulated by USFWS and/or CDFG would require mitigation in consultation with these agencies.

Road and Parking Lot Street Sweeping
It is anticipated that road and parking lot sweeping would not involve a direct change to the physical environment. Indirect impacts could include an increase in ambient noise levels, but should not result in a significant impact to wildlife species adapted to a developed environment. No mitigation would be required since no impact is anticipated.

Public Education
It is anticipated that public education would involve no change to the physical environment either directly or indirectly and is not foreseeable to result in impacts to biological resources. Public education measures employed to comply with Special Protections, which include interpretive signage or kiosks, shall be evaluated at the project level and incorporate mitigation measures to a less than significant level.

Installation and maintenance of some structural BMP's could result in potentially significant environmental effects with regard to biological resources. However, mitigation measures which can be applied to reduce and/or eliminate these impacts are available as described. These mitigation measures are within the responsibility and jurisdiction of the responsible parties of the General Exception, and can or should be adopted by them. The project proponent would perform CEQA analysis on a project to determine measures appropriate for their location. The State Water Board does not direct which compliance measures applicants choose to adopt or which mitigation measures they employ. The State Water Board does, however, recommend that appropriate mitigation measures be applied in order that potential environmental impacts be reduced or avoided to ASBS. It is foreseeable that these mitigation measures may not always be capable of reducing these impacts to levels that are less than significant in every conceivable instance. In the event that a specific mitigation measure or alternative may not reduce impacts to levels that are less than significant, the project proponent may need to consider an alternative strategy or combination of strategies to comply with the Special Protections.

6.4 ANALYSIS OF ENVIRONMENTAL IMPACTS - CULTURAL RESOURCES

Regulations adopted pursuant to CEQA (Title 14; Chapter 3; Article 5; § 15064.5) establish rules for the analysis of historical resources, including archaeological resources, in order to determine whether a proposed project may have a substantial adverse effect on the significance of the resource.

The National Historic Preservation Act (NHPA) of 1966, as amended, sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places (NRHP).

CEQA and California Public Resources Code (PRC) §5024.1 established the California Register of Historical Resources. PRC §5024 requires state agencies to identify and protect State-owned resources that meet NRHP listing criteria. Sections 5024(f) and 5024.5 require state agencies to provide notice and consult with the State Historic Preservation Office (SHPO) before altering, transferring, relocating, or demolishing State-owned historical resources that are listed on or are eligible for inclusion in the National Register or are registered or eligible for registration as California Landmarks.

PRC §5097.9 established the Native American Heritage Commission (NAHC), which maintains a statewide list of sacred sites, designates the "most likely descendants" when human remains are encountered, and can mediate disputes relating to the treatment of human remains. PRC §5097.991 states that Native American remains and associated grave artifacts shall be repatriated. PRC §5097.5 makes it a misdemeanor for anyone to knowingly disturb any archaeological, paleontological, or historical feature situated on public lands.

If a proposed project is determined to have a significant cultural resource impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. It is anticipated that each applicant will assess cultural resource impacts on a project-by-project basis as part of compliance with the terms and conditions of the General Exception and part of their CEQA project analysis.

THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis an impact to cultural resources is considered significant if the project would result in the potential to:

► disturb any human remains, including those interred outside of formal cemeteries

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Impact 6.4-1 Direct Impacts Associated with Effects on a Cultural Resource

The General Exception Project has the potential to have a substantial adverse effect on cultural resources during construction of various Special Protections implementation measures and the possibility of disturbance of any human remains including those interred outside of formal cemeteries. A program level of analysis of the potential for impacts to cultural resources related to the implementation of the Special Protections and potential impacts are evaluated for various BMPs considered as a method of compliance.

► **Mitigation Measure:** Upon determination of specific locations for BMPs, responsible agencies should complete further investigation, including consultation with Native American tribes, to make an accurate assessment of potential to affect historic, archaeological, or architectural resources or to impact any human remains. If potential impacts are identified, mitigation measures could include project redesign, such as the relocation of facilities outside the boundaries of archeological or historical sites. According to the California Office of Historic Preservation, avoidance and preservation in place are the preferable forms of mitigation for archeological sites. When avoidance is infeasible, a data recovery plan should be prepared which adequately provides for recovering scientifically consequential information from the site. Studies and reports resulting from excavations must be deposited with the California Historical Resources Regional Information Center (California Office of Historical Preservation, 2006). As such, with mitigation employed, it anticipated that any reasonably foreseeable impacts would be reduced to less than significant with mitigation.

► **Implementation:** Project-level impacts on cultural resources due to implementation of various BMPs would be similar.

► **Significance After Mitigation:** Less than significant

ANALYSIS OF VARIOUS BMPs IMPACTS - CULTURAL RESOURCES

Catch Basin Inserts

Catch basin inserts fit directly into curbside catch basins in urbanized areas and require no construction or ground disturbance. There is therefore no potential to impact cultural resources from this alternative means of compliance. No mitigation is required since no impact is anticipated**.**

Vortex Separation System

Vortex separation systems would be installed in currently urbanized areas where ground disturbance has previously occurred. Because these areas are already fully urbanized it is unlikely that their implementation would cause a substantial adverse change to historical or archeological resources, destroy paleontological resources, or disturb human remains. However, depending on the final location of facilities, potential impacts to cultural resources could occur. Paleontological resources can be found in areas of the coastal zone containing fossil-bearing formations. Archaeological resources have been found within the urbanized portions of the coastal zone. Historic and architectural resources have also been found within the coastal zone. The site-specific presence or absence of these resources is unknown because the specific locations for VSS will be determined by applicants at the project level. Installation of these systems could result in minor ground disturbances, which could impact cultural resources if they are sited in locations containing these resources and where disturbances have not previously occurred.

Upon determination of specific locations for VSS, applicants should complete further investigation, including consultation with Native American tribes, to make an accurate assessment of potential to affect historic, archaeological, or architectural resources or to impact any human remains. If potential impacts are identified, mitigation measures could include project redesign, such as the relocation of facilities outside the boundaries of archeological or historical sites. According to the California Office of Historic Preservation, avoidance and preservation in place are the preferable forms of mitigation for archeological sites. When avoidance is infeasible, a data recovery plan should be prepared which adequately provides for recovering scientifically consequential information from the site. Studies and reports resulting from excavations must be deposited with the California Historical Resources Regional Information Center. No impact is anticipated after mitigation.

Road and Parking Lot Street Sweeping
Road and parking lot sweeping would occur in areas along public rights of way and would have no potential to impact cultural resources. No mitigation is required since no impact is anticipated.

Public Education
Public education would involve no change to the physical environment either directly or indirectly and would have no impact on cultural resources. No mitigation is required since no impact is anticipated.

6.5 ANALYSIS OF ENVIRONMENTAL IMPACTS - GREENHOUSE GAS EMISSIONS

On June 1, 2005, the governor signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's greenhouse gas (GHG) emissions to: (1) 200 levels by 2010; (2) 1990 levels by 2020; and (3) 80% below the 1990 levels by the 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating the California Air Resources Board create a plan. It is anticipated that an individual project planned and designed by each applicant would also be assessed under CEQA for climate change related impacts as part of the project's air quality assessment report.

For most Special Protections implementation projects of small to moderate size, GHG emissions could be to some extent quantified, but the analysis would focus on qualitative compliance with the emission reduction strategies contained in the California Climate Action Team's Report to the Governor. This report proposes a path to achieve the GHG reduction targets found in AB 32 and Executive Order S-3-05. While the report and Executive Order S-3-05 do not specifically mention CEQA, they do include a list of various measures that can be employed to achieve the GHG reduction targets. It can be easily argued that proposed projects that implement all appropriate actions listed in the emissions reduction strategies relevant to the proposed project would have a less than significant impact to global climate change. This same type of approach can be used for projects within counties that have an adopted GHG Reduction Plan (currently Marin County is the only one). In cases where quantifying emissions is not reasonable or possible, such as Specific Plans where the development is at a very programmatic approach, this approach could still be used and is defensible. For projects that have an established emissions inventory (such as cities, counties, or specific plans) the analysis can rely more heavily upon the quantitative analysis by estimating the existing GHG emissions inventory, the past GHG emissions invent ory for year 2000, year 1990, and the future year emissions inventory with the project. This approach can then quantitatively show how the project will (or will not) meet the GHG emissions targets (i.e. achieve the year 2000 GHG emissions inventory by year 2010, and the 1990 GHG emissions inventory by year 2020) found in Executive Order S-3-05. The types of projects that can rely upon the quantities of GHG emissions in determining significance is fairly limited, but lend themselves to General Plan updates.

By combining both a qualitative and quantitative approach, the analysis can be tailored to the particular type and size of the General Exception Special Protections project and still provide, to the fullest extent feasible, a comprehensive analysis of global climate change impacts that includes a comparison of significance criteria and mitigation methods. This is the most legally defensible method currently available.

Recommended Climate Change impact analysis process, as discussed earlier, the most defensible method to assess the significance of a project's indirect or direct and/or cumulative contribution to global climate change involved: 1) project compliance with emission reduction strategies, or when available and feasible comparison of emissions inventories; and 2) an inventory of project GHG emissions.

THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis an impact to greenhouse gas emissions is considered significant if the project would result in:

► generating greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Impact 6.5-1 Direct Impacts Associated with Greenhouse Gas Emissions

The General Exception Project has the potential to have direct temporary short-term impacts from construction-related activities as associated with implementation of Special Protections. Construction activities and BMPs such as street sweeping have the potential to generate emissions related to GHG.

► **Mitigation Measure:** Onsite project mitigation. Project compliance with the greenhouse gas emission reduction strategies contained in the California Climate Action Team's Report to the Governor will be assessed. If new projects are consistent with those strategies, it follows that the project would not significantly contribute to a cumulative global climate change impact. To reduce California's greenhouse gas emissions to the levels proposed in Executive Order S-3-05, the California EPA Climate Action Team developed a report that outlines strategies for meeting the Governor's targets. Use of the strategies in the report to determine project consistency are the most appropriate to use at this time because the report "proposes a path to achieve the Governor's targets that will build on voluntary actions of California businesses, local government and community actions, and State incentive and regulatory programs" (CA 2006). AB 32 requires that a list of emission reduction strategies be published to achieve the goals set out in AB 32. However, until those reduction strategies are published, emission reduction strategies to meet Executive Order S-3-05 will be relied upon.

Emission strategies would be implemented by a Responsible Party and identified as part of a projects CEQA analysis. The strategies that CARB is to implement over the next two years are summarized in Appendix 9.

► **Implementation:** A project inventory of greenhouse gas emissions (carbon dioxide, ethane, nitrous oxide) forseeably generated by a local project would be presented for informational purposes and for full disclosure. The inventory would be compared to the California inventory and/or the County, when they become available. Emissions are typically estimated in tons per year, which are converted to teragrams of carbon dioxide equivalents (Tg CO2 Eq.) using the formula: Tg CO2 Eq. = (tons of gas) x (GWP) x (Tg / 1,000,000). One Tg is equal to one million metric tons. The global warming potential (GWP) for selected gases assessed are located in Appendix 9. The emissions are also compared with the current inventory for California, the air district, the county, and/or the city, as available. The Air Resources Board's website http://www.arb.ca.gov/homepage.htm provides additional AB32 information.

Motor vehicles emit carbon dioxide, methane, and nitrous oxide. URBEMIS2002 does not estimate emissions of carbon dioxide. However, URBEMIS2007 should estimate emissions of carbon dioxide. In the interim, carbon dioxide from motor vehicles can be manually calculated using emission factors from EMFAC2002 or EMFAC2007, whichever version of EMFAC the air district with jurisdiction over the basin in which the project is located has accepted. Emissions of methane from motor vehicles can also be calculated with EMFAC. Responsible Parties implementing a site specific project may, as part of their CEQA analysis utilize U.S. EPA emission factors available to calculate nitrous oxide and methane emissions from vehicles (EPA 2004, EPA 2004b).

► **Significance After Mitigation:** Less Than Significant.
Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on greenhouse gas emissions, either directly or indirectly. As such, since BMP construction projects are considered relatively small short-term and localized projects, the State Water Board believes that mitigation is

available to reduce any reasonably foreseeable potential GHG impacts to greenhouse gas emissions would be less than significant level.

6.6 ANALYSIS OF ENVIRONMENTAL IMPACTS - HAZARDS AND HAZARDOUS MATERIALS

CEQA requires an analysis to assess whether a proposed project would have a hazard or hazardous material impact. If a proposed project is determined to have a significant hazard or hazardous material impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. It is anticipated that each applicant will assess hazard or hazardous material impacts on a project-by-project basis as part of compliance with the terms and conditions of the General Exception. If it is determined that a project will have hazard or hazardous material impacts, then potential abatement measures must be considered. A hazards analysis may include materials or waste generated from construction of an individual project.

As part of the scoping and environmental analysis conducted for the General Exception project, the environmental resources and hazards were considered, but no potential for significant long-term adverse impacts were identified. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact from hazards and hazardous materials. However, the State Water Board believes that mitigation is available for the Responsible Parties to reduce any potential impacts from hazards and hazardous materials to less than significant levels.

THRESHOLDS OF SIGNIFICANCE

The potential for the Special Protections to result in significant environmental effects was analyzed using information and criteria provided in the State CEQA Guidelines. Pursuant to the suggested thresholds in Appendix G of the Guidelines, the proposed project would have a significant impact if it would:

- ► Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- ► Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Impact 6.6-1 Direct Impacts Associated with Construction of General Exception Special Protections BMP Implementation.

The potential exists for Special Protections-related construction to create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment. Construction activities related to installation on various BMPs may include soil disturbance, potential involvement with aerially deposited lead, structures with lead-based paint and asbestos-containing materials, and hazardous materials. These activities may be considered reasonably foreseeably minimal and localized to the immediate area.

Hazards and hazardous materials have the potential to be located throughout more urbanized portions of the coastline and/or may occur as naturally occurring or man-made hazards. The potential for contaminated soil or associated groundwater from commercial and industrial sites such as gas stations, dry cleaners and manufacturing facilities also may occur in more urbanized portions adjacent to ASBS. Aboveground and underground storage tanks may contain hazardous substances and have the potential to leak petroleum fuels, solvents or other hazardous substances into the subsurface soils. Both naturally occurring hazards and anthropogenic contaminated soils could be encountered during the installation of structural treatment alternatives for implementation of the Special Protections. The California Department of Toxic Substances Control is the repository for cleanup sites and hazardous waste permitted facilities and their webpage http://www.envirostor.dtsc.ca.gov contains a searchable database to locate areas of potential hazardous materials concern.

In general, most BMP installation, replacement, repair, or upgrade projects would disturb less than 1 acre, and are regulated by the local land use agency with regard to implementation of appropriate siting and erosion control measures. Counties and cities have requirements in place that include sediment and erosion control measures. The Regional Water Boards, in addition to the cities and counties, also have requirements in place that include sediment and erosion control measures. While existing BMPs at the local level may be adequate to avoid significant water quality impacts in many or most situations, local agencies vary widely in the management measures required, and there may be some situations where those BMPs are not sufficient to avoid such impacts. Therefore, in instances where new BMPs are being installed, replaced, repaired, or upgraded would disturb less than 1 acre, the potential exists for construction to affect water quality related to sedimentation and erosion. However, the likelihood of uncontrolled releases of sediment from erosion or other releases of pollutants from such activities may be small. Furthermore, these impacts, as with the initial construction impacts potentially would be minimal and associated with other development on generally the same sites; for instance, a storm water conveyance system would be constructed on the same site, and future repairs would occur on that site. Water quality impacts relating to typical ground disturbance from BMP installation, repair, replacement, and upgrade in areas other than targeted areas of impairment are considered less than significant. In the few instances where the area of ground disturbance affected by construction of new facility infrastructure and construction of staging areas would exceed 1 acre, BMPs installation, replacement, repair and upgrade would be subject to the requirements of the statewide NPDES storm water general permit for construction activity (Order 99-08-DWQ). In these situations, before construction activities can be approved, the project applicant is required under existing state law to apply for permit coverage. This would result in the project applicant preparing a storm water pollution prevention plan (SWPPP) and any other necessary engineering plans and specifications for pollution prevention and control. The SWPPP would identify and specify BMPs that must be in place throughout all site work and construction.

Typical BMPs include the following:

1) Use erosion and sediment control measures, including construction techniques that would reduce the potential for runoff and minimize discharge of sediment into nearby drainage conveyances; these BMPs may include silt fences, staked straw bales or wattles, sediment/silt basins and traps, geofabric, sandbag dikes, and temporary vegetation.

2) Establish permanent vegetative cover to reduce erosion in areas disturbed by construction by slowing runoff velocities, trapping sediment, and enhancing filtration and transpiration.

3) Use drainage swales, ditches, and earth dikes to control erosion and runoff by conveying surface runoff down sloping land, intercepting and diverting runoff to a watercourse or channel, preventing sheet flow over sloped surfaces, preventing runoff accumulation at the base of a grade, and avoiding flood damage along roadways and facility infrastructure.

4) Identify the means of disposal of waste materials (i.e., brush, vegetation) removed from the site.

5) Identify pollutants that are likely to be involved in construction activities that could be present in storm water drainage and non-storm water discharges and in other types of materials used for equipment operation.

6) Establish spill prevention and contingency measures, including measures to prevent or clean up spills of hazardous waste and of hazardous materials used for equipment operation, and emergency procedures for responding to spills.

Several technical studies (California Storm water Quality Association 2003, Huffman & Carpenter 2003, and EPA 1999) have established that water quality control features such as revegetation, erosion control measures, and detention and infiltration basins are successful techniques for avoiding or minimizing construction-related water quality impacts (e.g., metals and organic compounds from storm water are typically filtered out within the first few feet of soil beneath retention basins for groundwater). Technical studies by Huffman and Carpenter (2003) demonstrated that the use of various BMPs, such as source control, detention basins, revegetation, and erosion control, have maintained surface water quality conditions in adjacent receiving waters. Given the adequacy of the existing NPDES, and SWPPP program where applicable (for areas of disturbance of 1 acre or more) and the effectiveness of BMPs when used appropriately in such situations, the project's potential construction-related impacts on water quality are also considered less than significant for BMPs construction disturbing 1 acre or more.

► **Mitigation Measure:** As discussed above, when hazardous materials are encountered during construction operations, formal procedures specified by a hazardous waste management plan, which are developed during a projects' CEQA analysis phase, would be implemented immediately, per a previously approved plan. Since most Special Protections BMP projects are anticipated to be site specific and localized, the CEQA threshold of significance that a project would reasonably foreseeable created a significant hazard to the public or the environment through release of hazardous materials, would be reduced to a less than significant level with mitigation.

► **Implementation:** All hazardous materials involvement would be coordinated with the appropriate federal, state, and local regulatory agencies. The plan should follow current laws and regulations governing hazardous waste. Relevant federal Resource Conservation and Recovery Act (RCRA) and California Hazardous Waste Control Law (HWCL) laws and regulations are relied upon when making any determinations about a waste. It is anticipated that each project implemented at a local level perform relevant CEQA site assessment prior to construction.

► **Significance After Mitigation:** Less than significant with mitigation employed

Impact 6.6-2 Indirect Impacts Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

> **Construction activities related to installation of various BMPs such as vortex separation systems could result in the temporary interference of emergency response or evacuation plans if construction equipment, road closures, or traffic interfered with emergency vehicles traveling through the installation area.**

► **Mitigation Measure:** Project-level emergency response plans and/or traffic and circulation plans would be prepared as part of a proposed projects' CEQA analysis and as recommended in accordance with local city or county ordinances.

► **Implementation:** Project-level by Applicant.

► **Significance After Mitigation:** Less than significant

ANALYSIS OF BMPS IMPACTS - HAZARDS AND HAZARDOUS MATERIALS

Catch Basin Inserts

Catch basin inserts fit directly into curbside catch basins and require no construction or ground disturbance. There is therefore no potential to encounter contaminated soils or groundwater or other hazards from this alternative means of compliance. Since no construction is required, the use of hazardous materials or potential for construction accidents is unlikely during installation. However, catch basin cleaning and maintenance could pose risks to maintenance workers. To the extent that catch basin cleaning and maintenance could pose risks to maintenance workers, mitigation measures to avoid these risks include requiring workers to obtain hazardous materials maintenance record keeping and disposal activities training. OSHA-required Health and Safety Training, and OSHA Confined Space Entry training.

Vortex Separation System

It is reasonably foreseeable that hazards or hazardous materials could be encountered during the installation of vortex separation systems. Contamination could exist depending on the current and historical land uses of the area. Depending on their location, VSS could be proposed in areas with contaminated soils or groundwater. The use of hazardous materials such as oil, gasoline and potential for accidents is also likely during installation. Debris that is trapped by VSS could become hazardous to the public or to maintenance workers who collect and transport the material if it is not handled in a timely manner and disposed of appropriately. Installation of VSS could result in the temporary interference of emergency response or evacuation plans if construction equipment, road closures, or traffic interfered with emergency vehicles traveling through the installation area. It is anticipated that VSS will be located in urbanized areas; it is not reasonably foreseeable that their installation would expose people too wild land fires. VSS would not result in a safety hazard for people residing or working within two miles of a public airport or public use airport.

To the extent that installation of VSS could involve work with of near hazards or hazardous materials, potential risks of exposure can be mitigated with proper handling and storage procedures. The health and safety plan prepared for any project should address potential effects from cross contamination and worker exposure to contaminated soils and water and should include a plan for temporary storage, transportation and disposal of contaminated soil and water. Compliance with the requirements of California Occupational Health and Safety Administration (Cal OSHA) and local safety regulations during installation, operation, and maintenance of these systems would prevent any worksite accidents or accidents involving the release of hazardous materials into the environment, which could harm the public, nearby residents and sensitive receptors such as schools. Systems can be redesigned and sites can be properly protected with fencing and signage to prevent accidental health hazards.

To the extent that trash and debris trapped by VSS could become hazardous, impacts to maintenance workers and the public could be avoided or mitigated by educating the local community of the effects of improper disposal of such wastes, enforcing litter ordinances, and timely cleaning out inserts and structural controls.

To the extent that installation of VSS interfered with emergency response or evacuation plans, traffic control plans could be used to manage traffic through installation zones.

To the extent that VSS become a source of standing water and vector production, design at the project-level can help mitigate vector production from standing water.

Road and Parking Lot Street Sweeping
Road and parking lot sweeping would occur in public rights of way and would have no potential impact related to hazards, hazardous material, or human health. No mitigation is required since no impact is anticipated.

Public Education
Public education would involve no change to the physical environment either directly or indirectly and would have no impact related to hazards, hazardous materials, or human health. No mitigation is required since no impact is anticipated.

Installation and maintenance of some structural BMP's could result in potentially significant INDIRECT SHORT-TERM environmental effects with regard to hazards and hazardous materials. However, mitigation measures which can be applied to reduce and/or eliminate these impacts are available as described. These mitigation measures are within the responsibility and jurisdiction of the applicants of the General Exception, and can or should be adopted by them. The State Water Board does not direct which compliance measures applicants choose to adopt nor which mitigation measures they employ. The State Water Board does, however, recommend that appropriate mitigation measures be applied in order that potential environmental impacts be reduced or avoided. As such, a Responsible Party's proposed project, in their CEQA analysis develop appropriate strategies to eliminate or reduce possible impacts. It is foreseeable that these mitigation measures may not always be capable of reducing these impacts to levels that are less than significant in every conceivable instance. In the event that a specific mitigation measure or alternative may not reduce impacts to levels that are less than significant, the project proponent may need to consider an alternative strategy or combination of strategies to comply with the Special Protections.

6.7 ANALYSIS OF ENVIRONMENTAL IMPACTS HYDROLOGY AND WATER QUALITY

The State Water Board's California Ocean Plan for Areas of Special Biological Significance

Section 13170.2 of the California Water Code directs the State Water Board to formulate and adopt a water quality control plan for ocean waters of California. The State Water Board first adopted this plan, known as the California Ocean Plan, in 1972. Over the years the plan and Public Resources Code have been amended to bolster the protection of important coastal and marine areas. The California Ocean Plan establishes water quality objectives for California's ocean waters and provides the basis for regulation of wastes discharged into the state's coastal waters. The plan applies to point and nonpoint source discharges and the plan provides numeric and narrative water quality objectives for discharges to marine environments (Table 6.7-1), including bacterial, physical, chemical, biological, and radioactivity standards for offshore water quality. For the most part, these standards, which are intended to protect aquatic resources, are more stringent than those for contact recreation, but are less stringent than those applied to drinking water to protect public health (see Ocean Plan, "Water Quality Objectives Addressing Bacteria or Pathogens").

THRESHOLDS OF SIGNIFICANCE

For the purpose of this analysis, a water quality impact is considered significant if implementation of the proposed project would result in exceeding any of the thresholds identified below and in Table B of the Ocean Plan. These thresholds of significance are based on the California Environmental Quality Act (CEQA) Guidelines (State CEQA Guidelines) and relevant adopted water quality objectives. Consistent with State CEQA Guidelines, a water quality impact is considered significant in this analysis if implementation of the proposed project would result in potential for exceeding any of these adopted water quality objectives related to State's ocean waters.

Implementation of the proposed project would also result in significant water quality impacts if it would:

- ► Violate federal, state, or local criteria concerning exposure to pollutants or pathogenic microorganisms;
- ► Violate any ambient natural ocean water quality objective, contribute substantially to an existing or projected water quality violation, or expose sensitive receptors to substantial waterborne pollutant concentrations; or
- ► Create a substantial water quality hazard or involve the use, production, or disposal of materials that pose a hazard to marine biota in the area affected.

TABLE 6.7.1 Ocean Plan Table B Water Quality Objectives

	Units of Measurement	Limiting Concentrations 6-Month Median	Daily Maximum	Instantaneous Maximum
OBJECTIVES FOR PROTECTION OF MARINE AQUATIC LIFE				
Arsenic	ug/l	8.	32.	80.
Cadmium	ug/l	1.	4.	10.
Chromium (Hexavalent)	ug/l	2.	8.	20.
Copper	ug/l	3.	12.	30.
Lead	ug/l	2.	8.	20.
Mercury	ug/l	0.04	0.16	0.4
Nickel	ug/l	5.	20.	50.
Selenium	ug/l	15.	60.	150.
Silver	ug/l	0.7	2.8	7.
Zinc	ug/l	20.	80.	200.
Cyanide	ug/l	1.	4.	10.
Total Chlorine Residual	ug/l	2.	8.	60.
Ammonia (expressed as nitrogen)	ug/l	600.	2400.	6000.
Acute Toxicity*	*TUa N/A*	*0.3*	*N/A*	
Chronic* Toxicity	TUc	N/A	1.	N/A
Phenolic Compounds (non-chlorinated)	ug/l	30.	120.	300.
Chlorinated Phenolics	ug/l	1.	4.	10.
Endosulfan	ug/l	0.009	0.018	0.027
Endrin	ug/l	0.002	0.004	0.006
HCH*	ug/l	0.004	0.008	0.012
Radioactivity	Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30253 of the California Code of Regulations. Reference to Section 30253 is prospective, including future changes to any incorporated provisions of federal law, as the changes take effect.			

Table B Continued

Chemical	30-day Average (ug/l) Decimal Notation	Scientific Notation
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – NONCARCINOGENS		
acrolein	220.	2.2×10^{2}
antimony	1,200.	1.2×10^{3}
bis(2-chloroethoxy) methane	4.4	4.4×10^{0}
bis(2-chloroisopropyl) ether	1,200.	1.2×10^{3}
chlorobenzene	570.	5.7×10^{2}
chromium (III)	190,000.	1.9×10^{5}
di-n-butyl phthalate	3,500.	3.5×10^{3}
dichlorobenzenes*	5,100.	5.1×10^{3}
diethyl phthalate	33,000.	3.3×10^{4}
dimethyl phthalate	820,000.	8.2×10^{5}
4,6-dinitro-2-methylphenol	220.	2.2×10^{2}
2,4-dinitrophenol	4.0	4.0×10^{0}
ethylbenzene	4,100.	4.1×10^{3}
fluoranthene	15.	1.5×10^{1}
hexachlorocyclopentadiene	58.	5.8×10^{1}
nitrobenzene	4.9	4.9×10^{0}
thallium	2.	$2. \times 10^{0}$
toluene	85,000.	8.5×10^{4}
tributyltin	0.0014	1.4×10^{-3}
1,1,1-trichloroethane	540,000.	5.4×10^{5}
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS		
acrylonitrile	0.10	1.0×10^{-1}
aldrin	0.000022	2.2×10^{-5}
benzene	5.9	5.9×10^{0}
benzidine	0.000069	6.9×10^{-5}
beryllium	0.033	3.3×10^{-2}
bis(2-chloroethyl) ether	0.045	4.5×10^{-2}
bis(2-ethylhexyl) phthalate	3.5	3.5×10^{0}
carbon tetrachloride	0.90	9.0×10^{-1}
chlordane*	0.000023	2.3×10^{-5}
chlorodibromomethane	8.6	8.6×10^{0}

Table B Continued

Chemical	30-day Average (ug/l) Decimal Notation	Scientific Notation
OBJECTIVES FOR PROTECTION OF HUMAN HEALTH – CARCINOGENS		
chloroform	130.	1.3×10^{2}
DDT*	0.00017	1.7×10^{-4}
1,4-dichlorobenzene	18.	1.8×10^{1}
3,3'-dichlorobenzidine	0.0081	8.1×10^{-3}
1,2-dichloroethane	28.	2.8×10^{1}
1,1-dichloroethylene	0.9	9×10^{-1}
dichlorobromomethane	6.2	6.2×10^{0}
dichloromethane	450.	4.5×10^{2}
1,3-dichloropropene	8.9	8.9×10^{0}
dieldrin	0.00004	4.0×10^{-5}
2,4-dinitrotoluene	2.6	2.6×10^{0}
1,2-diphenylhydrazine	0.16	1.6×10^{-1}
halomethanes*	130.	1.3×10^{2}
heptachlor	0.00005	5×10^{-5}
heptachlor epoxide	0.00002	2×10^{-5}
hexachlorobenzene	0.00021	2.1×10^{-4}
hexachlorobutadiene	14.	1.4×10^{1}
hexachloroethane	2.5	2.5×10^{0}
isophorone	730.	7.3×10^{2}
N-nitrosodimethylamine	7.3	7.3×10^{0}
N-nitrosodi-N-propylamine	0.38	3.8×10^{-1}
N-nitrosodiphenylamine	2.5	2.5×10^{0}
PAHs*	0.0088	8.8×10^{-3}
PCBs*	0.000019	1.9×10^{-5}
TCDD equivalents*	0.0000000039	3.9×10^{-9}
1,1,2,2-tetrachloroethane	2.3	2.3×10^{0}
tetrachloroethylene	2.0	2.0×10^{0}
toxaphene	0.00021	2.1×10^{-4}
trichloroethylene	27.	2.7×10^{1}
1,1,2-trichloroethane	9.4	9.4×10^{0}
2,4,6-trichlorophenol	0.29	2.9×10^{-1}
vinyl chloride	36.	3.6×10^{1}

ANALYSIS OF BMPS IMPACTS ON HYDOLOGY AND WATER QUALITY

The proper siting, construction, and operation of BMPs implemented as part of the Special Protections can affect water quality through various mechanisms. In general, these mechanisms are divided into three categories: construction, operation, and maintenance. Each of these mechanisms provides distinct avenues by which BMP's could affect water quality as described below.

Construction of BMPs is regulated by local agencies through the land use and development approval process (described in Chapter 3.0, "Regulatory Setting," and in Section 4.3, "Land Use and Planning"). The draft Special Protections do not alter the authority of local agencies to approve construction of BMP's or the processes by which local agencies determine whether to allow development of specific properties and construction of BMP's on those properties.

BMPs construction procedures typically involve the excavation of trenches and other earthwork that can cause the erosion of soil into nearby streams and other receiving waters, especially if standard BMPs for erosion control are not implemented successfully. This impact mechanism is evaluated below in Impacts 6.7-1 and 6.7-2. In addition, the draft Special Protections could affect the number of BMP's installed in areas that have been designated an ASBS SCCWRP discharge.

The potential increase in installation in these areas is addressed as well. After they are operating, different types of BMPs treat the pollutants found in the discharge to varying levels, and then discharge the treated flows during wet weather, or divert to dry weather flow unit or system. Some of these pollutants, if not adequately removed, may adversely affect beneficial uses.

The primary method used in the water quality and marine life health impact analysis consists of comparing water quality objectives (Ocean Plan Table B) to Natural Ocean Water Quality concentrations expected to result from the proposed project.

The impact headings below make a distinction between "**direct" and "indirect"** impacts. State CEQA Guidelines Section 15064(d) provides guidance on the definition of these terms and how to assess such effects in an EIR:

1. A direct physical change in the environment is a physical change in the environment that is caused by and immediately related to the project.

2. An indirect physical change in the environment is a physical change in the environment that is not immediately related to the project, but which is caused indirectly by the project and is still reasonably foreseeable.

3. An indirect physical change is to be considered only if that change is a reasonably foreseeable impact that may be caused by the project. A change that is speculative or unlikely to occur is not reasonably foreseeable.

It should be noted the key term “reasonably foreseeable” is not further defined in either CEQA or the State CEQA Guidelines.

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Environmental Impacts: This subsection identifies the impacts of the proposed project on the existing environment, in accordance with State CEQA Guidelines, Sections 15125 and 15143. Before presenting an evaluation of impacts, the section describes the analysis methodology used, and thresholds of significance used to identify impacts are then listed. Project impacts are identified alphanumerically and sequentially throughout this section. For example, impacts in Section 6.1 are identified as 6.1-1, 6.2-2, and so on. An impact statement preceded the discussion of each impact and provides a summary of the impact and its level of significance. The discussion that follows the impact statement included the evidence on which a conclusion is made regarding the level of impact. The discussions of cumulative impacts and growth-inducing impacts are presented in Section 8.0.

► **Mitigation Measures:** This subsection identifies potentially feasible mitigation measures to reduce significant and potentially significant impacts of the proposed project, in accordance with State CEQA Guidelines Sections 15002(a)(3), 15021(a)(2), and 15091(a)(1). Each mitigation measure is identified alphanumerically to correspond with the number of the impact being reduced by the measure. For example, Impact 6.1-1 would be mitigated with Mitigation Measure 6.1-1. This subsection also describes whether the mitigation measures would reduce impacts to less-that-significant levels. Significant and unavoidable impacts are identified as appropriate in this subsection, as well as in the “Residual Significant Impacts” subsection described below. Significant and unavoidable impacts are also summarized in Section 8.0.

► **Implementation:** This section identifies the agency responsible for the implementation of the mitigation measures.

► **Significance After Mitigation:** This section identifies impacts that would be reduced to less than significant and any significant impacts that would remain significant following implementation of the mitigation measures.

Impact 6.7.1 Direct Impacts Associated with Discharge of Waste by Existing inadequate Controls, with the reasonably foreseeable potential to violate federal, state, or local criteria concerning exposure to pollutants or pathogenic microorganisms; violate any ambient natural ocean water quality objective, contribute substantially to an existing or projected water quality violations, or expose sensitive receptors to substantial waterborne pollutant concentrations.

The General Exception Project has the potential to violate the ASBS waste discharge prohibition of the Ocean Plan if existing inadequate controls currently in force are allowed to continue. The project, granting an exception with special mitigating conditions (i.e., special protections) will allow the continued discharge of wastes from various origins including storm water runoff into ASBS. Existing ocean water quality conditions within ASBS have had measured concentrations of constituents which exceed the Table B water quality objectives of the Ocean Plan. Exceedances of the Table B Ocean Plan water quality objectives were also found in the storm water runoff of some of the applicants. It is expected that the mitigating terms and conditions of the special protections will result in improved water quality conditions. Further, the terms and conditions of the special protections provide for continued water quality improvements over time if all of the conditions designed to limit discharges of waste from the 27 applicants are implemented.

► **Mitigation Measure:** Granting the general exception will not violate federal antidegradation requirements because water quality will not be lowered, but rather, will be improved within the ASBS affected. Further, allowance of the General Exception will not violate the State Water Board's antidegradation policy (SWRCB 1968) since water quality conditions are anticipated to improve; the discharges will not unreasonably affect present and anticipated beneficial uses; the discharge will not result in water quality lower than that prescribed in the Ocean Plan; and beneficial uses will be protected and potential impacts will be less than significant with mitigation incorporated.

► **Implementation:** It is anticipated that the applicants identified in this General Exception project will implement various individual or collaborative projects to comply with the terms and conditions or "Special Protections." (See Special Protections Appendix 1).

► **Significance After Mitigation:** Less than significant with mitigation incorporated.

Impact 6.7.2 Direct Impacts Associated with Degradation of Water Quality otherwise substantially degrade water quality, or have the potential to reasonably and forseeably create a substantial water quality hazard or involve the use, production, or disposal of materials that pose a hazard to marine biota in the area affected.

It is anticipated that the applicants identified in this General Exception project will implement various individual or collaborative projects to comply with the terms and conditions or "Special Protections." As part of the scoping and environmental analysis conducted for the General Exception project, project types identified include: Low Impact

Development (LID); dry-weather flow diversions; and Best Management Practices (BMPs), such as Pollution Prevention BMPs and Treatment BMPs, such as infiltration basins and Gross Solids Removal Devices (GSRDs). Under the State Water Board's storm water program, these types of projects may require coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit). Dischargers whose projects disturb 1 or more acres of soil or whose project disturbs less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under this permit. The activity would include clearing, grading, and disturbances to the ground such as stockpiling, or excavation. Additional requirements of the Construction General Permit require the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and storm water collection and discharge points and drainage patterns across the project. The SWPPP includes a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs during a project's construction.

► **Mitigation Measure:** Implementation of mitigation measures as applicable on a project by project basis in the Construction General Permit. These hydrology and water quality resource impacts were considered to be short-term and no potential for adverse impacts to these resources were identified.

► **Implementation:** Project-level by Applicant

► **Significance After Mitigation:** Less than significant with mitigation incorporated.

ANALYSIS VARIOUS BMPS IMPACTS - HYDROLOGY AND WATER QUALITY

Catch Basin Inserts

Catch basin inserts are manufactured frames that typically incorporate filters or fabric and placed in a curb opening or drop inlet to remove trash, sediment or debris. They can also be perforated metal screens placed horizontally or vertically within a catch basin. These devices have less hydraulic effect than the VSS systems, however, flooding is still a potential hazard if the filters or screens became blocked by trash and debris and prevent the discharge of storm water. This would be of particular concern in areas susceptible to high leaf litter rates. This potential impact can be mitigated through the use of inserts that are designed with automatic release mechanisms or retractable screens that allow flow-through during wet-weather and by performing regular maintenance to prevent the build up of trash and debris. Therefore the exposure of people and property to flooding hazards after mitigation should be less than significant.

Vortex separation system

VSS units are designed to allow the incoming flow of urban or storm water to pass through the device while capturing trash and other debris within the unit. These types of devices may result in a potentially significant impact due to flooding hazards if the screens became blocked by trash and debris and prevent the discharge of storm water, or it the VSS system was not properly designed and constructed to allow for bypass of storm water during storm events that exceed the design capacity. This potential impact can be mitigated through the design of the system with overflow/bypass structures and by performing regulate maintenance to prevent the build up of trash and debris. Therefore, the exposure of people and property to flooding hazards after mitigation is less than significant.

The VSS unit may cause a significant change in the drainage patterns, rate and amount of surface water runoff. These units may impede or slow overland flow to the storm drain system. Any device installed in a storm drain, especially in an older, under-capacity drain could have a negative effect on the drain's ability to convey surface waters including flood waters. This negative impact can be mitigated through design of the VSS system with overflow/bypass structures and by performing regular maintenance of these devices and if necessary enlargement of the storm drain upstream of the device.

Road and Parking Lot Street Sweeping

It is not reasonably foreseeable that increased road and parking lot sweeping would negatively impact hydrology or water quality.

Public Education

It is not reasonably foreseeable that public education would negatively impact hydrology or water quality.

Installation and maintenance of some structural BMP's could result in potentially significant environmental effects with regard to hydrology. However, mitigation measures which can be applied to reduce and/or eliminate these impacts are available as described. These mitigation measures are within the responsibility and jurisdiction of the applicants of the General Exception, and can or should be adopted by them. The State Water Board does not direct which compliance measures applicants choose to adopt or which mitigation measures they employ. The State Water Board does, however, recommend that appropriate mitigation measures be applied in order that potential environmental impacts be reduced or avoided. It is foreseeable that these mitigation measures may not always be capable of reducing these impacts to levels that are less than significant in every conceivable instance. In the event that a specific mitigation measure or alternative may not reduce impacts to levels that are less than significant, the project proponent may need to consider an alternative strategy or combination of strategies to comply with the Special Protections.

► **Significance After Mitigation:** Less than significant with mitigation incorporated.

DISCUSSION IMPACTS GENERAL EXCEPTION PROJECT

The General Exception Project has the potential to violate the ASBS waste discharge prohibition of the Ocean Plan if existing inadequate controls currently in force are allowed to continue. The project, granting an exception with special mitigating conditions (i.e., special protections) will allow the continued discharge of wastes from various origins including storm water runoff into ASBS. Existing ocean water quality conditions within ASBS have had measured concentrations of constituents which exceed the Table B water quality objectives of the Ocean Plan. Exceedances of the Table B Ocean Plan water quality objectives were also found in the storm water runoff of some of the applicants. It is expected that the mitigating terms and conditions of the special protections will result in improved water quality conditions. Further, the terms and conditions of the special protections provide for continued water quality improvements over time if all of the conditions designed to limit discharges of waste from the 27 applicants are implemented.

Granting the general exception will not violate federal antidegradation requirements because water quality will not be lowered, but rather, will be improved within the ASBS affected. Further, allowance of the General Exception will not violate the State Water Board's antidegradation policy (SWRCB 1968) since water quality conditions are anticipated to improve; the discharges will not unreasonably affect present and anticipated beneficial uses; the discharge will not result in water quality lower than that prescribed in the Ocean Plan; and beneficial uses will be protected and potential impacts will be less than significant with mitigation incorporated.

It is anticipated that the applicants identified in this General Exception project will implement various individual or collaborative projects to comply with the terms and conditions or "Special Protections." As part of the scoping and environmental analysis conducted for the General Exception project, project types identified include: Low Impact Development (LID); dry-weather flow diversions; and Best Management Practices (BMPs), such as Pollution Prevention BMPs and Treatment BMPs, such as infiltration basins and Gross Solids Removal Devices (GSRDs). Under the State Water Board's storm water program, these types of projects may require coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit). Dischargers whose projects disturb 1 or more acres of soil or whose project disturbs less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under this permit. The activity would include clearing, grading, and disturbances to the ground such as stockpiling, or excavation.

Additional requirements of the Construction General Permit require the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and storm water collection and discharge points and drainage patterns across the project. The SWPPP includes a chemical monitoring program for “non-visible” pollutants to be implemented if there is a failure of BMPs during a project’s construction.

These hydrology and water quality resource impacts were considered to be short-term and no potential for adverse impacts to these resources were identified.

Thresholds of Significance:
1 - Exceedances of Table B water quality objectives in storm water
2 - Dry weather flows
3 - Violate federal antidegradation requirements
4 – Discharge of waste materials into the ASBS

6.8 ANALYSIS OF ENVIRONMENTAL IMPACTS - NOISE

The California Health and Safety Code Section 46022 defines noise as “excessive undesirable sound, including that produced by persons, pets and livestock, industrial equipment, construction, motor vehicles, boats, aircraft, home appliances, electric motors, combustion engines, and any other noise-producing objects ”the degree to which noise can affect the human environment range from levels that interfere with speech and sleep (annoyance and nuisance) to levels that cause adverse health effects (hearing loss and psychological effects). Human response to noise is subjective and can vary greatly from person to person. Factors that influence individual response include the intensity, frequency, and pattern of noise; the amount of background noise present before the intruding noise; and the nature of work or human activity that is exposed to the noise source.

CEQA requires an analysis to assess whether a proposed project would have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. It is anticipated that each applicant will assess noise impacts on a project by project basis as part of compliance with the terms and conditions of the General Exception. If it is determined that a project will have noise impacts, then potential abatement measures must be considered. A technical noise impact analysis may include evaluation of traffic and construction noise of an individual project. Other factors to consider as part of the analysis would be decibel, distance, and duration of construction. The impact analysis may assess noise abatement measures that are determined to be reasonable and feasible, and at the time of final design would then be incorporated into projects’ plans and specifications.

Construction noise impacts and the degree of construction noise may vary depending on the location and type of construction activity.

THRESHOLDS OF SIGNIFICANCE

- ► Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- ► Exposure of persons to, or generation of, excessive ground borne vibration or ground borne noise levels
- ► A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project
- ► A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Impact 6.8-1 Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

The General Exception Project has the potential to result in the generation of construction-related noise with the implementation of Special Protections.

Construction noise levels generated during construction must comply with applicable local, state, and federal regulations and all equipment must be fitted with adequate mufflers according to the manufacturers' specifications. Table 3.2.7-7 summarizes noise levels produced by construction equipment that is commonly used on construction projects. Construction equipment is expected to generate noise levels ranging from 70 to 90 dB at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 3.2.7-7. Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers	89
Bulldozers	85
Heavy trucks	88
Backhoe	80
Pneumatic tools	85
Concrete pump	82

Source: Federal Transit Administration 2006.

No long-term adverse noise effects from construction are anticipated, because construction would be conducted in accordance with applicable local noise standards. Construction noise would be short-term, intermittent, and potentially masked by local traffic noise in some cases.

► **Mitigation Measure:** Minimize Construction Noise. It is anticipated that at the project-level, measures will be implemented to minimize noise effects from construction. In addition, the following measures may be implemented to further minimize noise effects from construction:

1) Use of equipment with sound-control devices that are no less effective than those provided on the original equipment.

2) Prohibition of the use of any equipment with an unmuffled exhaust.

3) Changing the location of stationary construction equipment to maximize the distance to noise sensitive uses.

4) Turning off idling equipment.

5) Rescheduling construction activity to non-sensitive hours of the day.

6) Notifying adjacent residents in advance of construction work.

7) Installing acoustic barriers around stationary construction noise sources.

► **Implementation:** It is anticipated that each applicant will assess noise levels on a project-by-project basis as part of compliance with the terms and conditions of the General Exception. Some of the Special Protections implementation alternatives have the potential to affect noise levels within the local project area. Noise within the counties and cities are regulated by noise ordinances, which are found in the municipal code of the county and each city. These noise ordinances limit intrusive noise and establish sound measurements and criteria, minimum ambient noise levels for different land use zoning classifications, sound emission levels for specific uses, hours of operation for certain activities (such as construction and trash collection), standards for determining noise deemed a disturbance of the peace, and legal remedies for violations. If a proposed project is determined to have a significant noise level impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. If it is determined that a project will have noise level impacts, then potential mitigation measures must be considered.

► **Significance After Mitigation:** Less than significant with mitigation incorporated.

The following impacts are discussed collectively: Impact 6.8-2,direct Impacts Associated with Construction of General Exception Special Protections; BMP Implementation as exposure of persons to, or generation of, excessive ground-borne vibration or ground-borne noise levels; Impact 6.8-3, substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; Impact 6.8-4, substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The General Exception Project has the potential to result in the generation of construction-related noise with the implementation of Special Protections. A certain degree of disruptive noise is inevitable during construction activities. Overall, installation noise levels are governed primarily by the noisiest pieces of equipment. For most construction equipment, the engine is the dominant noise source. Table 4.2-2 identifies the major pieces of construction equipment associated with the various stages of installation. Typical maximum noise emission levels (Lmax) are summarized, based on construction equipment operating at full power at a reference distance of 50 feet, and an estimated equipment usage factor based on experience with other similar installation projects. The usage factor is a fraction that accounts for the total time during an eight-hour day in which a piece of installation equipment is producing noise under full power. Although the noise levels in Table 7.17-3 represent typical values, there can be wide fluctuations in the noise emissions of similar equipment based on two important factors: (1) the operating condition of the equipment (e.g., age, presence of mufflers and engine cowlings); and (2) the technique used by the equipment operator (aggressive vs. conservative).

Table 7.13-3: Typical Installation Equipment Noise Emission Levels

Equipment	Maximum Noise Level, (dBA) 50 feet from source	Equipment Usage Factor	Total 8-hr Leq exposure (dBA) at various distances	
			50ft	100ft
Foundation Installation			83	77
Concrete Truck	*82*	*0.25*	76	70
Front Loader	*80*	*0.3*	75	69
Dump Truck	*71*	*0.25*	65	59
Generator to vibrate concrete	*82*	*0.15*	74	68
Vibratory Hammer	*86*	*0.25*	80	74
Equipment Installation			83	77
Flatbed truck	*78*	*0.15*	70	64
Forklift	*80*	*0.27*	74	69
Large Crane	*85*	*0.5*	82	76

Source; Caltrain, 2004

Special Protections BMP implementation projects would be short-term and localized. As such, the potential to expose persons, wildlife and marine life to substantial excessive permanent ground borne vibration of ground borne noise levels can be mitigated with common industry standard mitigation measures available. It is not anticipated that the potential for substantial, permanent increases in ambient noise levels would occur in the project area. Given the natural features of the landscape within each ASBS identified herein and its unique characteristics, during the CEQA analysis of each proposed implementation project by the Responsible Party appropriate consideration and mitigation must occur to eliminate or reduce impacts below threshold limits.

► **Mitigation Measure:** Noise and vibration abatement criteria would include the following measures to minimize impacts caused by construction.

1) Equipment Noise Control: Newer equipment that is quieter would be used. All equipment items would have intact and operational manufacturers' recommended noise abatement measures, such as mufflers, engine covers, and engine vibration isolators.

2) Administrative measures: Maintenance yard and other construction-oriented operations staging areas would be placed in the locations that would minimize disruption to the community.

3) Community Relations: Good public relations would be maintained with the community to minimize objections to the impact of unavoidable construction nose. Community members and visitors would be notified in advance of the construction schedule through the public awareness campaign.

► **Implementation:** Specific construction noise levels could be estimated for each project to be implemented by the Applicants of the General Exception. Noise level estimation is dependant on the type of activities and equipment expected to be employed during construction. Typical noise protocols would require consideration of noise abatement measures when predicted noise levels from a project substantially increase existing noise levels or when the project noise levels approach or exceed the individual project's local ordinances or noise abatement criteria for residences. Noise levels would be considered on a project-by-project basis and adjusted for urban or for passively used open spaces and evaluated as what is considered normally acceptable for that site.

► **Significance After Mitigation:** Less than significant with mitigation incorporated.

ANALYSIS OF VARIOUS BMPs IMPACTS NOISE

Catch Basin Inserts

Installation of catch basin inserts should not involve any construction activity or the use of major equipment, therefore no significant increase in ambient noise levels is anticipated. Catch Basins need to be cleaned regularly. Frequency of cleaning would be site specific and dependant on the amount of debris accumulated in the insert. Increased street sweeping efforts would help to reduce the amount of debris caught by the catch basin inserts. It is not anticipated that ambient noise levels will be adversely affected by the use of catch basin inserts.

Vortex Separator System

Installation of VSS units would potentially involve removal of asphalt and concrete from streets and sidewalks, excavation and shoring, installation of reinforced concrete pipe, installation of the unit, and repaving of the streets and sidewalks. It is anticipated that installation activities would occur in limited, discrete, and discontinuous areas over a short duration. No major construction activities are anticipated. It is anticipated that excavation, for the purposed of installation, and repaving would result in the greatest increase in noise levels during the period of installation. The manufacturer of the VSS unit recommends that the unit receive maintenance 2 to 4 times a year depending on amount and frequency of precipitation. Maintenance involves cleaning using vacuum trucks, which would increase ambient noise levels. The increase in noise levels would be dependent on the proximity of sensitive receptors to the site. Maintenance is also expected to generate 2-4 vehicle trips per year which is not expected to increase ambient noise levels noticeably.

Contractors and equipment manufacturers have been addressing noise problems for many years, and through design improvements, technological advances, and a better understanding of how to minimize exposures to noise, noise effects can be minimized. An operations plan for the specific construction and/or maintenance activities could be developed to address the variety of available measures to limit the impacts from noise to adjacent homes and businesses. To minimize noise and vibration impact at nearby sensitive site, installation activities should be conducted during daytime hours to the extent feasible. There are a number of measures that can be taken to reduce intrusion without placing unreasonable constraints on the installation process or substantially increasing costs. These include noise and vibration monitoring to ensure that contractors take all reasonable steps to minimize impacts when near sensitive areas; noise testing and inspections of equipment to ensure that all equipment on the site is in good condition and effectively muffled; and an active community liaison program. A community liaison program should keep residents informed about installation plans so they can plan around noise or vibration impacts; it should also provide a conduit for residents to express any concerns or complaints.

Measures that would minimize noise and vibration disturbances at sensitive areas during installation include:

1) The use of newer equipment with improved noise muffling and ensure that all equipment items have the manufacturers' recommended noise abatement devices, such as mufflers, engine covers, and engine vibration isolators intact and operational. Newer equipment will generally be quieter in operation than older equipment. All installation equipment should be inspected at periodic intervals to ensure proper maintenance and presence of noise control devices.

2) Perform all installation in a manner to minimize noise and vibration. Use installation methods or equipment that will provide the lowest level of noise and ground vibration impact near residences and consider alternative methods that are also suitable for the soil condition. The contractor should select installation processes and techniques that create the lowest noise levels.

3) Perform noise and vibration monitoring to demonstrate compliance with the noise limits. Independent monitoring should be performed to check compliance in particularly sensitive areas. Require contractors to modify and/or reschedule their installation activities if monitoring determines that maximum limits are exceeded at residential land uses.

4) Conduct truck loading, unloading and hauling operations so that noise and vibration are kept to a minimum by carefully selecting routes to avoid going through residential neighborhoods to the greatest possible extent. Ingress and egress to and from the staging area should be on collector streets or higher street designations (preferred).

5) Turn off idling equipment.

6) Temporary noise barriers shall be used and relocated, as practicable, to protect sensitive receptors against excessive noise from installation activities. Consider mitigation measures such as partial enclosures around continuously operating equipment or temporary barriers along installation boundaries.

7) The installation contractor should be required by contract specification to comply with all local noise and vibration ordinances and obtain all necessary permits and variances.

Road and Parking Lot Street Sweeping

Increased road and parking lot street sweeping would involve an increase in current street sweeping frequencies in order to reduce the amount of accumulated debris. Any increases in these sweeping frequencies would be focused in areas which generate higher amounts of trash and debris such as those with greater commercial and industrial land uses. The increase in ambient noise levels is expected to be limited in duration. In areas where noise levels have the potential to be considered a nuisance, efforts should be employed to reduce noise impacts.

Public Education
Public education efforts are not expected to create an increase in ambient noise levels, as such, no mitigation would be required.

Installation and maintenance of some structural BMP's could result in potentially significant environmental effects with regard to noise. However, mitigation measures which can be applied to reduce and/or eliminate these impacts are available as described. These mitigation measures are within the responsibility and jurisdiction of the responsible parties of the General Exception, and can or should be adopted by them. The State Water Board does not direct which compliance measures applicants choose to adopt or which mitigation measures they employ. The State Water Board does, however, recommend that appropriated mitigation measures be applied in order that potential environmental impacts be reduced or avoided. It is foreseeable that these mitigation measures may not always be capable of reducing these impacts to levels that are less than significant in every conceivable instance. In the event that a specific mitigation measure or alternative may not reduce impacts to levels that are less than significant, the project proponent may need to consider an alternative strategy or combination of strategies to comply with the Special Protections.

6.9 ANALYSIS OF ENVIRONMENTAL IMPACTS – PUBLIC SERVICES

CEQA requires an analysis to assess whether a proposed project would have public services impacts. If a proposed project is determined to have a significant public services impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. It is anticipated that each applicant will assess public services impacts on a project-by-project basis as part of compliance with the terms and conditions of the General Exception. If it is determined that a project will have public services impacts, then potential mitigation measures must be considered. A technical public services impact analysis may include evaluation of community facilities or services, or result in any removal or change of access to facilities or services, or create new demand for community services of an individual project. The impact analysis may assess mitigation measures that are determined to be reasonable and feasible, and at the time of final design would then be incorporated into projects' plans and specifications. Impacts to public services and the degree of impact may vary depending on the location and type of construction activity. Indirect effects to public services may extend throughout the duration of construction within the Project Limits.

Recreational resources include public parks, golf courses, beaches, wildlife areas. As part of the scoping and environmental analysis conducted for the General Exception project, impacts to these resources were considered for some structural and non-structural controls, but no potential for adverse impacts to these resources were identified. The General Exception project does not include recreational facilities or require the construction or expansion of recreational facilities.

THRESHOLDS OF SIGNIFICANCE

A public services impact is considered significant if implementation of the proposed project would result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service rations, response times or other performance objectives for any of the following public services:

- ► fire protection
- ► police protection
- ► recreational resources
- ► other public facilities

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Impact 6.9-1 Indirect Impacts Associated with Construction of General Exception Special Protections BMP Implementation.

> **While the potential exists for Special Protections-related construction to result in an impact to public services or facilities, it is reasonably foreseeable that these impacts would be temporary, short-term. Substantial adverse physical impacts associated with the provision of new or physically altered government facilities, is not foreseeable.**

- ► **Mitigation Measure:** None required due to less than significant impact.
- ► **Implementation:** None required.
- ► **Significance After Mitigation:** N/A.

As part of the scoping and environmental analysis conducted for the General Exception project, these resources were considered, but no potential for adverse impacts to these resources were identified and are not expected to result in permanent, direct, or indirect impacts to public services, nor would it create new demand for community services since no capital improvements are included in this General Exception project. Reasonably foreseeable impacts for some structural compliance measures such as vortex separation systems, catch basin inserts and non-structural alternatives such as road and parking lot sweeping and public education are analyzed. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on public services. However, the State Water Board believes that mitigation is available to reduce any potential impacts to public services to less than significant levels.

APPROACH AND ANALYSIS OF VARIOUS BMPs IMPACTS PUBLIC SERVICES

Catch Basin Inserts

The environmental impacts associated with the installation, maintenance and monitoring of catch basin inserts are anticipated to be of a short duration and limited to traffic delays. It is not reasonably foreseeable that installation of catch basin inserts will not contribute to an increase in the cumulative demand for fire and police emergency services.

Vortex Separation System

There is potential for temporary delays in response times of fire and police vehicles due to road closure or traffic congestion during installation of the vortex separation systems. To mitigate potential delays the applicants identified in this General Exception could notify local emergency and police service providers of construction activities and road closures, if any, and coordinate with the local fire and police providers to establish alternative routes and traffic control during the installation activities. Most jurisdictions have in place guidelines to ensure safe passage of emergency and police vehicles during periods of road maintenance, construction, or other activities. It is anticipated that installation of a VSS unit would be subject to existing applicable building and safety codes and permits. Therefore, the potential delays in response times for fire and police vehicles after mitigation are less than significant. The installation of vortex separation systems will not result in development of land uses for residential, commercial, and/or industrial uses, nor will these units result in increased growth, it is reasonably foreseeable that the vortex separation systems would not result in a need for new or altered fire or police protection services. In addition, Emergency Preparedness Plans could be developed in consultation with local emergency providers to ensure that the new vortex separation systems will not contribute to an increase in the cumulative demand for fire and police emergency services.

Road and Parking Lot Street Sweeping

It is not reasonably foreseeable that road and parking lot street sweeping would result in an impact to fire and police emergency services.

Public Education

It is not reasonably foreseeable that public education would result in the need for new or altered government services.

Installation and maintenance of structural BMPs should not result in potentially significant effects with regard to public services. However, mitigation measures can be applied by the applicants identified in this General Exception to reduce and/or eliminate any potential impact. In the event that a specific mitigation measure or alternative may not reduce impacts to levels that are less than significant, the project proponent may need to consider an alternative to comply with the terms and conditions of the General Exception.

6.10 ANALYSIS OF ENVIRONMENTAL IMPACTS - TRANSPORTATION/TRAFFIC

As part of the scoping and environmental analysis conducted for the General Exception project, these resources were considered, but no potential for adverse impacts to these resources were identified and are not expected to result in permanent, direct, or indirect impacts to transportation and circulation. Depending on what measures each applicant uses to comply with the proposed exception, there may be an impact on transportation/traffic. However, the State Water Board believes that mitigation is available to reduce any potential impacts to transportation/traffic to less than significant levels.

THRESHOLDS OF SIGNIFICANCE

► Exceed the capacity of the existing circulation system, based on an applicable measure of effectiveness (as designated in a general plan policy, ordinance, etc.), taking into account all relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit

► Result in inadequate emergency access

IMPACTS OF THE PROPOSED PROJECT AND MITIGATION MEASURES

Impact 6.10-1 Direct Impacts Associated with Construction of General Exception Special Protections BMPs.

While the potential exists for Special Protections-related construction to create a potentially significant impact to transportation and circulation, these construction activities related to installation of various BMPs, may be considered foreseeably minimal and localized to the immediate area of the project.

► **Mitigation Measure:** Implementation of a Traffic Management Plan would be developed to increase driver awareness, ease congestion, and minimize delay during construction. Depending on the localized project to be implemented, the Plan could be broadened to allow for consideration of recommendations resulting from consultation and feedback from a community advisory group. The community advisory group could potentially include representation from local tourist and commerce bureaus and businesses, representatives of the Sherriff's Department, California Highway Patrol, local emergency service providers and others. Development of a Plan could be initiated during the design phase of a project and include agreements reached with the community advisory group that would inform and may constrain the construction contractor for the purpose of minimizing traffic impacts during construction. A Traffic Management Plan would cover construction scheduling, limitations of lane closures, noticing requirements, emergency response, and other topics as necessary. It would describe the manner in which to inform travelers of potential traffic delays and road closures and other construction-related activities that could inconvenience local businesses, residents and travelers, so that they could plan accordingly. The project contract could contain provisions required for emergency services (police, fire, and ambulances) to be notified before any required roadways or lane closures.

It is reasonably foreseeable that traffic impacts during construction may include impedance of traffic flow affected by any large amount of equipment and materials that would need to be transported over the roadway or highway and from lane closures needed to provide room for construction.

► **Implementation:** Transportation and circulation would be assessed in accordance with CEQA by each of the applicants identified in this General Exception as individual projects are planned and designed by each applicant. Individual projects should discuss the transportation and circulation concerns as they relate to project design and construction. Transportation and circulation are prime considerations within the coastal zone communities and each applicant would be responsible for assessing these impacts in concert with their individual projects to ensure sufficient levels of service.

► **Significance After Mitigation:** Less than significant.

Impact 6.10-2 Indirect Impacts associated with Construction of General Exception Special Protections BMP Implementation.

While the potential exists for Special Protections-related construction to create inadequate emergency access, it is reasonably foreseeable that these impacts would be short-term, temporary and localized.

► **Mitigation Measure:** None required.

► **Implementation:** N/A

► **Significance After Mitigation:** Less than significant.

ANALISIS OF POTENTIAL BMPs IMPACTS - TRANSPORTATION/TRAFFIC
Catch Basin Inserts

Installation of catch basin inserts is not anticipated to involve the use of heavy construction equipment, therefore additional vehicular movement during installation of the catch basin inserts is unlikely to be significant. Any potential impact would be limited and of short-term during the installation process, and not anticipated to have an adverse effect on traffic and transportation. Catch basins are required to be cleaned regularly at a minimum frequency or once per year. Mitigation measures which could be implemented would be the same as those used with vortex separation systems. It is anticipated that impacts after mitigation will be less than significant.

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Vortex Separation Systems

During installation of these devices, additional vehicle movement will occur. However, these impacts will be temporary and limited in duration to the period of installation. Maintenance requirements for trash removal devices demonstrate that devices could be emptied when they reach 85% capacity. However, devices could be designed so that they need to be cleaned once per storm season. As site-specific projects are implemented, mitigation measures could include construction barricades, traffic-flow controls such as signals or personnel in compliance with authorized local police or California Highway Patrol requirements. These methods would be selected and implemented by responsible local agencies considering project level concerns. Standard safety measures should be employed including fencing, other physical safety structures, signage, and other physical impediments designed to promote safety and minimize pedestrian/bicyclists accidents. It is not foreseeable that implementation of VSS will result in significant increased in traffic hazards to motor vehicles, bicycles, or pedestrians.

To reduce the impact of construction traffic, implementation of a construction management plan for specified facilities could be developed to minimize traffic impacts upon the local circulation system. A construction traffic management plan could address traffic control for any street closure, detour, or other disruption to traffic circulation. The plan could identify the routes that construction vehicles will use to access the site, hours of construction traffic, and traffic controls and detours. The plan could also include plans for temporary traffic control, temporary signage and tripping, location points for ingress and egress of construction vehicles, staging areas, and timing of construction activity which appropriately limits hours during which large construction equipment may be brought on or off site. Potential impacts could also be reduced by, limiting or restricting hours of construction so as to avoid peak traffic times and by providing temporary traffic signals and flagging to facilitate traffic movement. It is anticipated that impacts after mitigation will be less than significant.

Road and Parking Lot Street Sweeping

The number of trips generated by increased road and parking lot sweeping will depend on the sweeping frequency determined by the applicant implementing this alternative. It is not anticipated that a significant impact will result; however, mitigation measures employed could include noticing any affected residents, businesses and property owners in the vicinity of the areas which this activity will occur.

Public Education
No adverse impacts to traffic or transportation is anticipated with this alternative.

6.11 CONCLUSION

Under the less stringent and somewhat inadequate controls currently in force, 27 applicants discharge waste into the 26 ASBS and are in violation of the ASBS discharge prohibition. The project, granting a general exception with special mitigating conditions (i.e., special protections), will allow the continued discharges from nonpoint sources and storm water runoff, and therefore has some potential to degrade water quality and biological resources unless mitigating conditions are implemented. However, under the mitigating conditions composing these special protections, the quality of the discharges will improve from current conditions, with an important reduction in the potential to degrade water quality. If all of the conditions designed to limit the discharge are met, the discharges will not compromise the protection of ocean waters of the ASBS for beneficial uses, and the public interest will be served.

Granting the conditional exception, likewise, will not violate federal antidegradation requirements because water quality will not be lowered, but rather will be improved. Further, allowance of the exception will not violate the State Water Board's antidegradation policy (SWRCB 1968) since water quality conditions will improve; the discharge will not unreasonably affect present and anticipated beneficial uses; the discharge will not result in water quality lower than that prescribed in the Ocean Plan; and the people of California benefit from the terms and conditions implemented while beneficial uses will still be protected.

7.0 ECONOMIC ANALYSIS OF SPECIAL PROTECTIONS

This section discusses a range of potential costs associated with the General Exception project implementation of the Special Protections and various selected monitoring and management practices which could be used by the dischargers identified herein.

7.1 MONITORING

One large problem faced by both ASBS dischargers and regulators is a lack of information. The lack of information falls into at least three categories. First, it is uncertain what constitutes natural water quality. Second, it is uncertain which discharges cause alterations in natural water quality. Finally, it is uncertain what the extent and magnitude of natural water quality impacts are on a statewide basis.

In response to the need for additional information, the State Water Board is working with ASBS dischargers to collaboratively conduct regional ASBS monitoring programs that are consistent statewide. The goal of this monitoring program is to determine water quality at each of the ASBS and analyze discharged water quality from applicants subject to these Special Protections. This will allow the State Water Board to assess potential impacts to the ASBS from specific discharges. Three regional monitoring groups are being established to perform the required core and regional monitoring requirement. The estimated costs for these monitoring programs are provided below. It should be noted that participation in the regional monitoring programs is an option and is not mandatory.

7.1.1 Southern California Regional Monitoring Group

In southern California, the regional monitoring group has been organized by SCCWRP and operated in conjunction with the Bight 08 program. This group will address the regional monitoring program required as part of the Special Protections. This monitoring group will include an extensive series of reference sites as part of their monitoring program as this fits nicely with the Bight 08 sampling project.

A. Wet Weather Chemistry and Toxicity

1) Site Selection

Since there is little or no historic water quality data available in ASBS sites prior to anthropogenic discharges, reference sites have been selected that will be used to determine the range of natural water quality and natural condition of marine life. The following primary criteria were established for reference sites:

- Located in receiving water at the mouth of watersheds with limited anthropogenic influences and with no offshore discharges in the vicinity.

- Limited anthropogenic influence defined as a minimum of 90% open space. Preferably, the few anthropogenic sources in a reference watershed will be well attenuated (e.g., natural space buffers between a highway and the high tide line).
- There should be no 303(d) listed waterbodies either in the reference watershed or in the coastal zone.

There are additional secondary criteria that are deemed important, but may not lead to complete exclusion:

- A range of reference watershed sizes that are inclusive of the ranges observed in watersheds that discharge to ASBS.
- A range of reference watershed geologies that are inclusive of the geologies observed in watersheds that discharge to ASBS.
- A range of reference beach substrate that includes sand, cobble, and rock.
- Reference watersheds that include channel island and mainland sites.

A minimum of eight reference sites have been selected for sampling as part of the regional monitoring survey.

In addition to reference sites, receiving water sites near ASBS discharges will also be sampled. These receiving water sites are located directly in front of discharges from regulated ASBS outfalls. The number of sites in ASBS was based on the following criteria:

- Minimum of 1 site/stakeholder/ASBS.
- Sample receiving waters near at least 10% of all regulated outfalls in an ASBS (> 18 inches opening).
- Discharge must reach receiving water (i.e., ocean).
- Approval by Regional Water Board and State Water Board.

A minimum of 10 receiving water sites near discharges have been targeted for sampling. Additional sites may be selected for contingency measures due to impaired sampling logistics or limited rainfall.

A cost estimate for each participant in the southern California regional receiving water monitoring effort is about $50,000 to $80,000 for chemistry and toxicity at one discharge and one reference station. For approximately 10 participants, receiving water chemistry and toxicity costs may cumulatively range from $500,000 to $800,000.

It is important to note that core monitoring will also be performed by the southern California dischargers and is not included in the costs of the regional receiving water study. Core monitoring is estimated to cost about $2,000 to $5,000 per outfall (sampling and analysis) per year, depending on size. It is estimated that in southern California, about 200 discharges may be sampled at $400,000 to $1,000,000 per year, depending on outfall size. Assuming a roughly equal distribution of outfalls > 18 inches and >36 inches, the cost would be about $700,000. Because southern California dischargers participated in the Bight "08 Regional Monitoring Program, core sampling for runoff will occur in only the first year, and there will be no additional runoff sampling for the remainder of the permit cycle for those parties.

B. Biological Monitoring

The Southern California regional monitoring program is focused on assessing the status of biological communities associated with rocky subtidal reefs located between one and 30 m (3 and 90 feet) depth. High and low relief substrates, nearshore and offshore reefs, as well as areas of persistent kelp are all included in this regional monitoring program. For the program to assess the spatial distribution among reefs, a probabilistic sampling design is used that consists of 60 sites stratified by mainland vs. islands and warm temperature vs. cold temperature marine habitats. The sampling methodology utilizes a modified PISCO/CRANE style biodiversity protocol that is conducted using trained scuba divers. The protocols include transects and unified point contact grids to quantify invertebrate, algal, and vertebrate species assemblages.

Bight 08 Rocky and Bight 08 ASBS investigators worked together to identify what sampling design specifics would be needed to integrate the two programs. Since the Bight 08 Rocky program is already a portion of the Bight Regional Survey, the primary data gap was site selection. Other important design specifics, such as sampling methods, have already been developed for the survey.

While 60 sites are targeted, many have yet to be sampled. In fact, approximately 40 sites are currently being sampled. Of these, 22 are located in or near an ASBS. This provides a broad base of coverage as a starting point for the Bight 08 ASBS program. Like the rocky intertidal program, there are at least three data gaps that still exist: (1) additional sites to ensure coverage for every ASBS in southern California; (2) additional sites to ensure adequate coverage for reference locations; and (3) resource matching to ensure the existing sites can be used for ASBS purposes. In order to address the first data gap, at least three additional mainland sites (Robert E. Badham ASBS, Heisler Park ASBS, La Jolla ASBS) and five Channel Island sites (East end Catalina, San Clemente, San Nicolas) will need to be added to cover the remaining ASBS locations. In order to address the second data gap, at least two additional mainland sites (Santa Barbara/Ventura Counties, Northern San Diego/Southern Orange Counties) and three additional Channel Island sites (Catalina, San Clemente, San Nicolas) will be needed to assess unsampled reference locations. Finally, the ASBS Planning Committee agreed to support nine of the existing sites to ensure these sites can be used for ASBS purposes.

Cost estimates for rocky subtidal monitoring are $12,500 per participant and for rocky intertidal monitoring is $22,000 per participant. For all participants combined, the collective costs for biological monitoring may total about $345,000.

In summary, for regional receiving water and biological monitoring, combined with core runoff monitoring, costs would be about $1,545,000.

7.1.2 Central Coast ASBS Regional Monitoring

In order to maintain comparability between regions, the basic questions, methods, and reference criteria will be the same for central and northern California as what was described above for southern California.

One proposal for central coast ASBS regional monitoring has been for the applicants to work with CCLEAN, which is a regional monitoring program that has been collecting, interpreting, and reporting water quality data in the Monterey Bay area since 2001. Currently, the participants in CCLEAN are the City of Santa Cruz, City of Watsonville (Lead Agency), Moss Landing Power Plant, Monterey Regional Water Pollution Control Agency, Carmel Area Wastewater District, and the Central Coast Regional Water Board. However, no decision has been made by the applicants to join CCLEAN or to initiate their own separate regional monitoring program.

Three scenarios have been developed for consideration that would provide for a regional monitoring program to monitor storm water runoff into ASBS in the Monterey Bay area. These scenarios have been developed with consideration of the Draft Special Protections for Selected Storm Water and Nonpoint Source Discharges into Areas of Special Biological Significance dated March 3, 2008.

The three scenarios that have been discussed by the dischargers are:

1) A regional monitoring program that is not part of CCLEAN,
2) A regional program that includes collection of data to allow estimates of contaminant loads, also not part of CCLEAN, and
3) A regional program that is part of CCLEAN.

These are presented and compared in the following sections. Implementation of either scenario would require the agreement of State and Regional Water Board. Scenario 3 would also require the agreement of current CCLEAN program participants. It should be emphasized that no agreement has been reached by the ASBS storm water/nonpoint source dischargers and CCLEAN participants.

This scenario makes use of the Monterey Bay National Marine Sanctuary's First Flush program to collect runoff samples, and includes funds to augment their effort by monitoring approximately 25 discharges currently not sampled by them. These additional sites include all discharges >18 inches, and those at Pebble Beach and Carmel Meadows. Biennial receiving water monitoring would be performed at seven sites and would include water sampling before and after a storm, and one-time sampling of benthic communities and bioaccumulation.

Table 7.1.1. Comparison of monitoring elements required by the Draft Special Protections and a proposed regional ASBS monitoring program that is not part of CCLEAN

Monitoring Element	Scenario 1 - Special Protections Requirements	Scenario 2 – Flow-proportioned Sampling
Runoff Flow Measurements	Estimate from rain gauges and % impervious surface with ground-truthing	Estimate from rain gauges and % impervious surface with ground-truthing
Runoff Samples	Annual in wet season at all discharges >18 inches (total of 37) Analyze for Table A; Table B acute toxicity annually at 1/5 outfalls (total of 7)	Annual in wet season at all discharges >18 inches (total of 37) Analyze for Table A; Table B acute toxicity annually at 1/5 outfalls (total of 7)
	Annual in wet season at all discharges >36 inches (total of 5) Table B for marine aquatic life, PAHs, pyrethroids, OP pesticides, nitrates, phosphates	Annual in wet season at 2 discharges >36 inches Table B for marine aquatic life, nitrates, phosphates, urea; and flow-proportioned samples for endosulfan, endrin, HCH, PAHs, PCBs, chlorinated pesticides, pyrethroids, OP pesticides, PBDEs
Receiving Water	Biennially in wet season at 2 reference sites and 5 ASBS sites, before and after a storm Table B for marine aquatic life, nitrates, phosphates, urea, endosulfan, endrin, HCH, PAHs, PCBs, chlorinated pesticides, pyrethroids, OP pesticides, PBDEs	Biennially in wet season at 2 reference sites and 5 ASBS sites, before and after a storm Table B for marine aquatic life, nitrates, phosphates, urea, endosulfan, endrin, HCH, PAHs, PCBs, chlorinated pesticides, pyrethroids, OP pesticides, PBDEs
Benthic Fauna	Biennially in wet season at 2 reference sites and 5 ASBS sites Infaunal abundance and sediment grain size and concentrations of TOC, endosulfan, endrin, HCH, PAHs, PCBs, chlorinated pesticides, pyrethroids, OP pesticides and PBDEs	Biennially in wet season at 2 reference sites and 2 ASBS sites on a rotating basis Infaunal abundance and sediment grain size and concentrations of TOC, endosulfan, endrin, HCH, PAHs, PCBs, chlorinated pesticides, pyrethroids, OP pesticides and PBDEs
Bioaccumulation	Biennially in wet season at 2 reference sites and 5 ASBS sites	Biennially in wet season at 2 reference sites and 2 ASBS sites on a rotating basis

Monitoring Element	Scenario 1 - Special Protections Requirements	Scenario 2 – Flow-proportioned Sampling
	Concentrations of endosulfan, endrin, HCH, PAHs, PCBs, chlorinated pesticides, pyrethroids, OP pesticides and PBDEs	Concentrations of endosulfan, endrin, HCH, PAHs, PCBs, chlorinated pesticides, pyrethroids, OP pesticides and PBDEs

There are seven ASBS dischargers on the central Coast that would be subject to the general exception. Cumulative cost estimates range from $325,000 per year under scenario 1 (ASBS discharges perform analysis within their own group) to $286,000 per year under scenario 2 (regional monitoring performed by group including ASBS dischargers and current NPDES monitoring group CCLEAN). Water quality monitoring will be required for only the first two storm seasons. Therefore the first permit cycle costs for runoff and receiving water monitoring are estimated to be $572,000 - $650,000. In addition, rocky intertidal monitoring would be required to be comparable with other regional monitoring efforts. It is estimated that rocky intertidal monitoring would collectively cost about $154,000. Using the above figures, the estimated total for central California would therefore be about $726,000 to $804,000.

7.1.3 <u>Northern California Regional Monitoring Group</u>

Unlike in other parts of the state, there is no existing regional monitoring organization. The Southern California Water Research Project (SCCWRP) has been retained by the Water Boards to initiate a regional monitoring program in central and northern California. There are twelve ASBS storm water/nonpoint source dischargers in northern California north of Point Año Nuevo.

The following is a cost estimate prepared by State Water Board staff based on available information. The estimate is based on requirements as outlined in the March 3, 2008 draft Special Protections document and February 3, 2012 updates and also includes before and after storm sampling events for receiving water and reference sites. As with other ASBS regional monitoring, applicants for individual point source exceptions, or holders of existing individual point source exceptions, would participate with applicants for the general exception; costs for parties with individual exceptions are not included below.

For this estimate, runoff flow measurement would use estimates from rain gauges and percent impervious surface, and checked with ground-truthing at selected sites. The core runoff monitoring would sample all discharges >18 inches three times annually for oil and grease, total suspended solids and indicator bacteria in the range of the southern sea otter, and once annually for Table B chronic toxicity (one species). This would be required for two storm seasons. Additional core runoff monitoring at larger discharges (>36 inches) would be done three times annually for Table B metals and ammonia, PAHs, pyrethroids, OP pesticides, nitrates, and phosphates, and once annually for Table B chronic toxicity (one species). This would also be required for two storm seasons. Core monitoring is estimated to cost about $2,000 to $5,000 per outfall per year depending on size. For the entire permit cycle (two storm seasons) for core monitoring, it is expected to cost $4,000 to $10,000 per outfall depending on outfall size. Staff estimates about 50 municipal and industrial outfalls in northern California of sufficient size to monitor runoff, with roughly an equal distribution of >18 inch and >36 inch sizes. Therefore we estimate core monitoring for runoff to be about $350,000 for a permit cycle.

For regional monitoring, receiving water would be sampled at twelve ASBS discharges and twelve reference sites, pre- and post-storm for the same constituents analyzed in southern California. Staff estimates that receiving water monitoring would cost about $500,000 during the first year and $500,000 in the second year, for a total of $1,000,000 for ocean water monitoring. In addition, intertidal monitoring would be required to be comparable with other regional monitoring efforts. It is estimated that intertidal monitoring would cost about $220,000.

The total program cost for northern California runoff and regional monitoring is estimated to be about $1,570,000.

7.1.4 Regional Monitoring Summary Costs

Combined, the Northern, Central, and Southern California regional monitoring efforts are estimated to cost as much as $3.92 million during their first permit cycle.

7.2 IMPLEMENTING THE ABSOLUTE DISCHARGE PROHIBITION (NO PROJECT ALTERNATIVE)

Caltrans has provided a cost estimate of eliminating all discharges from a set of properties into adjacent ASBS. Their estimate is based on eliminating all highway infrastructure and related discharges into ASBS.

Caltrans calculates that there are 57 miles (91.7 km) of State Coastal Highways, 1 and 101, that are adjacent to 10 ASBS. State Coastal Highways 1 and 101 are estimated to have 184 drainage conveyances that carry highway runoff into the ASBS. Of these, 85 carry runoff directly to ASBS. Caltrans estimates that 100% compliance with the ASBS absolute waste discharge prohibition would necessitate pumping storm water runoff to adjacent basins or discharge points outside of the ASBS. Initial calculations made in 2005 show that capital costs for installing the infrastructure to do this (e.g., drainage inlets, subsurface piping, pumping stations, power supply, etc.) may exceed $500 million.[13] For 184 discharges, it is estimated that this cost would be $2.7 million per Caltrans discharge.

There are approximately 1,673 total storm water and nonpoint source discharges from the applicants and property owners currently not subject to individual exceptions. Using the same figure used by Caltrans, installing infrastructure to eliminate all these discharges into ASBS would cost $4.5 billion. This is a minimum estimate, probably only applicable to storm drains and small nonpoint source runoff. Moving some discharges would involve completely removing entire businesses and infrastructure, as well as the complete disruption of military operations. Undoubtedly, the costs would actually be vastly greater than what is estimated above.

7.3 BEST MANAGEMENT PRACTICES (BMP) COSTS USING COMPARISON WITH CLEAN BEACHES INITIATIVE (CBI) PROJECTS

The CBI provides funding for infrastructure improvements with the end goal of improving water quality conditions at California's beaches. Examples of some of the costs associated with some of the projects which have successfully been implemented are listed in Table 22.

The State Water Board administers many innovative water bond projects. Over $1.5 billion in loans and grants managed by the State Water Board since 2006 are aimed, in whole or in part, at improving water quality and reducing sediment impacts to our coasts and ocean. Of this amount, almost $70 million dollars has been spent directly on projects to improve beach water quality in California. These projects have not been aimed at ASBS discharges but directed to improve beach water quality at the most impacted beaches. Still some CBI projects were performed at ASBS that were also contact recreation beaches.

These are a set of large projects that have been funded through California Bond funds administered by the State Water Board. In extreme cases of poor water quality in an ASBS that result from adjacent applicant facilities, these types of projects may be required. State Bond funds may be available at those places to help implement potentially required projects.

[13] Caltrans Memorandum from CTC meeting of December 14-15, 2005. Prepared by Jay Norvell for Cindy McKim regarding "Regulation by the State Water Quality Control Board for Discharge in Areas of Special Biological Significance".

Table 7.3.1. Costs - Clean Beaches Initiative Water Quality Projects 2006

CBI Projects	Diversions	Piers	Treatment	Wetlands
Number	34	3	18	2
Minimum	$ 350,000	$ 402,500	$ 272,000	$ 575,000
Maximum	$ 3,823,868	$1,800,000	$ 5,351,485	$ 600,000
Average	$ 1,160,647	$ 868,333	$ 1,546,275	$ 587,500
Total	$38,301,344	$2,605,000	$27,832,957	$1,175,000

7.4 STORM WATER RUNOFF BEST MANAGEMENT PRACTICES

BMP will be required to control discharge volume and quality from areas under the applicants' control in order to attain natural water quality. Examples of types of controls and relative costs provided by U.S. EPA are provided in Table 7.4.1. The costs of BMPs are highly dependent on the types of practices chosen, size of area to be controlled, and the volumes of water quality to be addressed. There are many references available to help choose which practices are appropriate in a given circumstance.

Table 7.4.1. Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring

Relative Rankings of Cost Elements and Effective Life of BMP Options			
BMP	**Capital Costs**	**O&M Costs**	**Effective Life**[1]
Structural BMPs			
Infiltration Trench	Moderate to High	Moderate	10 - 15 years
Infiltration Basin	Moderate	Moderate	5 - 10 years before deep tilling required
Bioretention	Moderate	Low	5 - 20 years[2]
Detention Ponds	Moderate	Low	20 - 50 years
Wetlands	Moderate to High	Moderate	20 - 50 years
Detention Tanks	Moderate to High	High	50 - 100 years
Underground Sand Filters	High	High	5 - 20 years
Surface Sand Filters	Moderate	Moderate	5 - 20 years
Organic Media Filters	High	High	5 - 20 years
Vegetated Swales	Low to Moderate	Low	5 - 20 years
Vegetated Filter Strips	Low	Low	20 - 50 years
Oil-Grit Separators	Moderate	High	50 - 100 years
Catch Basin Inserts	Low	Moderate - High	10 - 20 years
Manufactured Systems	Moderate	Moderate	50 - 100 years
Porous Pavement	Low	Moderate	15 - 20 years
Nonstructural BMPs			
Road and parking area street sweeping	Moderate	NA	4 - 8 years
Proper chemical and fuel storage, use, handling, containment, and spill response procedures	Moderate - High	Low	4 - 8 years
Vehicle and equipment, maintenance, storage and washing areas	Moderate	Low	long term
Bridge cleaning, maintenance and deck drainage (painting and sanding activities)	Moderate	NA	NA
Litter and debris management (dumpsters,	Low	Low	4 - 8 years

trash piles, equipment storage, waste management practices)			
Modification of existing nonstructural BMP programs or structural BMP maintenance schedule or procedure	Low to Moderate	Low to Moderate	long term
Nonstructural BMPs			
Education programs (employee, adopt-a-road, adopt-a-stream, outreach	Low	Low	long term
Elimination of illicit discharge and connections	Moderate	Low	long term
New and Innovative Practices			
Alum Injection	Moderate	Moderate	5 - 20 years[3]
MCTT	High	High	5 - 20 years[3]
Biofilters (e.g., StormTreat System)	Moderate	Moderate	5 - 20 years[3]
Vegetated Rock Filters	High	High	5 - 20 years
Adapted from Young et al. (1996); Claytor and Schueler (1996); U.S. EPA (1993); and others NA = Not Applicable or Not Available [1]Assumes regular maintenance, occasional removal of accumulated materials, and removal of any clogged media. [2]As a relatively new BMP, the effective life is uncertain. It is reasonable to assume an effective life at least as long as that of a vegetated swale. [3]Estimated based on best professional judgment.			
http://www.fhwa.dot.gov/environment/ultraurb/uubmp6p4.htm			

7.5 TYPES OF BMPS APPROVED BY CALTRANS

Nine types of BMPs are being used in these studies representing a broad base of state-of-the-art BMP technology:

- Extended Detention Basin: These basins capture storm water runoff and allow for an extended drain time to remove particulates and other associated pollutants through sedimentation. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/ed_basins/index.htm
- Drain Inlet Inserts: Devices are inserted into storm drain inlets to filter or absorb sediment, oil and grease, and other pollutants.

http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/di_inserts/index.htm

- Infiltration Basins and Trenches: Trenches are lined with filter fabric and filled with rock. Stormwater runoff captured in the trenches then infiltrates into the soil. Basins are excavated depressions that infiltrate captured storm water. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/ib_trenches/index.htm
- Oil/Water Separator: These plate separators treat runoff from Caltrans facilities that generate oil and grease. Vertical plates separate oil from water, while a vault traps and collects sediments. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/ow_separator/index.htm
- Media Filters: Fine sediments and pollutants are filtered through chambers containing sand or perlite/zeolite media. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/m_filters/index.htm
- Multi-Chambered Treatment Trains (MCTT): Three vaults capture sediment and debris, remove oil and grease with absorbent pillows, and filter pollutants through fabric and a mixture of peat and sand. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/mctt/index.htm
- Biofiltration Swales and Strips: Grassy pathways, also known as biofilters, filter and deposit pollutants from storm water when water flows through the vegetation. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/bs_strips/index.htm
- Vortex seperation systems (VSS): VSS™ units treat runoff by screening sediment and debris and depositing the debris in a sump. Pre-cast VSS™ units create a vortex of water that allows water to escape through the screen, while pollutants are deflected into the storage sump. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/cds/index.htm
- Wet Basin: A wet basin removes sediment, nutrients, and particulate metals from storm water runoff. An in-line permanent pool or basin enhances settling. http://www.dot.ca.gov/hq/env/stormwater/ongoing/pilot_studies/bmps/details/w_basin/index.htm

7.6 PROPOSITION 84 ASBS GRANT PROGRAM

In 2006, the Public Resources Code[14] required that the Proposition 84 ASBS Grant Program funds be used to provide matching grants to local public agencies to fund a variety of water quality improvement projects to assist local public agencies to comply with the discharge prohibition into ASBS. Following this legislation and in 2008, the

[14] Proposition 84- The Safe Drinking Water, Water Quality and Supply, Flood Control, River and Coastal Protection Bond Act of 2006 (§ 1. Division 43 Chapter 1)

Division of Financial Assistance solicited and received funding proposals from many of the Applicants included in this General Exception.

Proposals, which were approved by the State Water Board, include detailed analysis and project costs related to compliance with the ASBS discharge prohibition. Proposals submitted factored into their project's requirements contained in the March 3, 2008 "Draft Special Protections," considerations that only allowable discharges to the ASBS are those that occur during wet weather and are composed only of storm water runoff. As a result, many projects presented plans to build and operate diversion systems designed to eliminate the discharge of flows to the ASBS during dry weather (dry weather flows) when flows are composed largely of non-storm water.

Some projects consider eliminating runoff that would normally be discharged from the outfalls during non-rainfall periods, but would instead be captured by plugging the outfall pipes, and either diverting the non-storm water to the sanitary sewer. Alternatively, captured water may be vacuumed or removed by pump and then trucked to a treatment facility. Table 7.6.1 provides a summary of project related costs.

Table 7.6.1. Project Related Costs

ASBS AREA	PROJECT TYPE	PROJECT DESCRIPTION	OVERALL COST	COST PER DISCHARGE
Marin County	Catch basin treatment; LID	8 storm drains; 5 considered high threat, 3 moderated threat; LID parking lot retrofit	$1.48 million	~ $ 184,875
Carmel	Dry-weather flow diversions	17 storm drains; 10 considered high threat	$2.5 million	~ $ 147,000
Carmel	Dry-weather flow diversions	Multiple diversions	$2.5 million	~ $ 250,000
Carmel	Dry-weather flow diversion, multiple drainage treatments	Includes constructed wetland basin treatment and 6 dry-weather flow diversions	$ 2.4 million	--------
San Mateo County	Catch basin treatment; LID	10 storm drains considered high threat; LID parking lot retrofit	$2.5 million	----------
La Jolla	Dry-weather flow diversion; LID	1 large storm drain dry-weather flow diversion; parking lot LID retrofit	$1.69 million	

ASBS AREA	PROJECT TYPE	PROJECT DESCRIPTION	OVERALL COST	COST PER DISCHARGE
Latigo to Laguna	Catch basin treatments	2 major storm drains	$.54 million	--------
Latigo to Laguna	Catch basin treatments; linear highway facility LID	8 storm drains; 1 mile coastal hwy LID	$ 2.25 million	
Pacific Grove	Dry-weather flow diversions; parking lot bios wale	Multiple urban and roadway runoff treatment	$2.4 million	----------

Structural improvement costs vary and are dependant on project type, location, and number of storm water conveyances to be addressed (Table 24). Each applicant has a unique set of runoff issues within their ASBS. For example, at the Duxbury Reef ASBS, Marin County plans to begin work on correcting eight storm drains and address one asphalt parking lot immediately adjacent to the ASBS. Catch basin treatments are designed for each of the storm drains. The parking lot will be retrofitted into a LID structure. Marin County estimates that these projects, combined, will cost approximately $1.48 million, or about $185,000 per discharge. As another example, the City of Carmel by the Sea selected dry weather flows as a primary target for control. Seventeen storm drains were proposed for control, totaling $2.5 million or $147,000 per discharge.

The cost figures derived from the Prop 84 proposals may not represent all situations. For example, a more expensive large structural BMP (e.g., a moderate size VSS unit with a diversion) may cost $500,000 per priority discharge, and an inexpensive vegetated filter strip or small swale on a small discharge may cost only $10,000 to $20,000 per discharge. Still, an estimate of $147,000 to 185,000 per discharge is reasonable to assume as a general estimate, with some discharges being more or less expensive. There are about 294 total discharges greater than 18 inches in width or diameter. If all these discharges are controlled with structural BMPs, the total cost would range from $43 to $54 million statewide.

7.7 SUMMARY AND CONCLUSIONS OF SPECIAL PROTECTIONS COST

Combined, the costs for Northern, Central, and Southern California regional monitoring groups are estimated at about $3.9 million. Staff estimates the cost of BMPs on priority discharges would be about $43 to $54 million statewide. This is two orders of magnitude less than the minimum figure of $4.5 billion to eliminate ASBS discharges by moving all storm drains outside of ASBS into other ocean areas, an alternative that would have harmful environmental effects as well.

8.0 OTHER STATUTORY REQUIREMENTS

8.1 CUMULATIVE IMPACTS

According to Section 15355 of the State CEQA Guidelines:

> "cumulative impacts" refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
>
> (a) The individual effects may be changes resulting from a single project or a number of separate projects.
>
> (b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

An EIR must discuss cumulative impacts of a proposed project when the incremental effect of the project is "cumulatively considerable" (State CEQA Guidelines Section 15130[a]). This chapter provides information about past, present, and reasonably foreseeable future projects that could result in cumulative environmental impacts; describes the contribution of the proposed statewide Special Protections to those cumulative impacts; and determines whether the project's contribution to those cumulative impacts would be cumulatively considerable.

This cumulative impacts analysis evaluates existing statewide conditions and proposed implementation projects that could contribute to cumulative impacts along with the implementation of the proposed project. Where land-based discharges have been determined by local Regional Water Boards to be contributing to impairment (defined for purposes of this EIR as "targeted impaired areas"), extra attention is given to cumulative impacts where they correspond to the intersection of ASBS and 303(d)-listed impaired waters. Many of the 303[d] listed water bodies draining to ASBS are impaired for sediments and bacteria (i.e. Redwoods ASBS and James V. Fitzgerald ASBS).

Projects considered in this analysis consist of past, present, and probable future projects that may contribute to discharge-related cumulative impacts, including local projects outside of the regulatory purview of the state. These projects include regulatory programs and actions (e.g., the total maximum daily load [TMDL] process) in addition to other types of related projects such as general plans, specific plans, resource management plans, and other planning projects.

8.2 GROWTH INDUCING IMPACTS

The California Environmental Quality Act (CEQA) requires EIRs to address growth-inducement potential of a project and the related environmental effects. The General Exception project and Special Protections proposed by State Water Board staff would establish minimum requirements for the permitting and monitoring, of discharges into ASBS to prevent pollution and protect beneficial uses of ASBS including the protection of marine aquatic life within the ASBS throughout California. Therefore, this growth inducement analysis considers a broad context to characterize the potential effects of implementating the new ASBS regulations at a statewide level.

8.2.1 Basis for Analysis of Growth-Inducing Impacts

In accordance with Section 15126.2(d) of the State CEQA Guidelines, an EIR must discuss the growth-inducing impacts of the proposed project. The regulation states that the EIR shall: Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristics of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

Growth-inducing impacts would result from a project that would directly or indirectly foster (promote or encourage) additional economic or population growth or construction of additional housing. Growth can be fostered when an obstacle to growth is removed, as when expansion of infrastructure resolves growth-constraining capacity problems. In the case of the project, growth could be fostered if the Special Protections would allow the construction of discharge conveyances in locations where they currently cannot be constructed, or would otherwise reduce the cost or other barriers to the placement and re-direction of discharges to wastewater treatment plants. Development requires wastewater treatment, and regulations that would reduce barriers to construction of conveyances would remove one barrier to growth.

The State CEQA Guidelines do not distinguish between planned and unplanned growth for purposes of considering whether such growth could result in environmental impacts. Therefore, in order to reach the conclusion that a project is growth inducing as defined by CEQA, the EIR must find that it would foster (i.e., promote or encourage) additional growth in economic activity, population, or housing, regardless of whether the growth is already approved by and consistent with local plans. The conclusion does not determine that induced growth is beneficial or detrimental, consistent with Section 15126.2(d) of the State CEQA Guidelines.

If the EIR determines that a project is growth inducing, the next question is whether that growth may cause adverse effects on the environment. Environmental effects resulting from induced growth (i.e., growth-induced effects) fit the CEQA definition of “indirect” effects in Section 15358(a) (2) of the State CEQA Guidelines. These indirect or secondary effects of growth may result in significant environmental impacts. CEQA does not require that the EIR speculate unduly about the precise location and site-specific characteristics of significant, indirect effects caused by induced growth, but a good-faith effort is required to disclose what is feasible to assess.

Potential secondary effects of growth could include consequences—such as conversion of open space to developed uses, increased demand on community and public services and infrastructure, increased traffic and noise, degradation of air and water quality, or degradation or loss of plant and wildlife habitat—that are the result of the growth fostered by a project. If significant, indirect environmental effects of growth may occur, a final question to consider is whether those effects have already been considered and mitigated, or are appropriate for a statement of overriding considerations, if unavoidable, in a completed CEQA process.

If the induced growth is consistent with an approved general plan or community plan for the area, and a CEQA document on that plan adequately addresses the effects of growth in the plan, the environmental effects of growth induced by the proposed project should have already been evaluated and considered by the lead agency in which the growth could occur. In this circumstance, the EIR for a proposed project may incorporate the completed CEQA document by reference and need not re-evaluate previously identified impacts. A project that would induce growth that is not consistent with an adopted general plan or community plan could indirectly cause additional significant environmental impacts beyond those evaluated in the earlier CEQA document on the plan.

The decision to allow potentially induced growth is the subject of separate decision making by the lead agency responsible for allowing such projects to move forward. The proposed Special Protections specifically address how existing discharges, which already would be approved or operating under local land use authorities, would be cited and operated; they do not address or approve permits for development of projects, nor does it approve the discharges. Because the decision to allow growth is subject to separate discretionary decision making, and such decision making itself is subject to CEQA, the analysis of growth-inducing effects is not intended to determine site-specific environmental impacts and specific mitigation for the potentially induced growth. Rather, the discussion is intended to disclose the potential for environmental effects to occur more generally, such that decision makers are aware that additional environmental effects are a possibility if growth inducing projects are approved. The decision of whether impacts do occur, their extent, and the ability to mitigate them is appropriately left to consideration by the agency responsible for approving such projects, at such times as complete applications for development are submitted.

8.2.2 Growth Variables and Mechanisms of Growth Inducement

The timing, magnitude, and location of land development and population growth in a community or region are based on various interrelated land use and economic variables. Key variables include regional economic trends, market demand for residential and nonresidential uses, land availability and cost, the availability and quality of transportation facilities and public services, proximity to employment centers, the supply and cost of housing, and regulatory policies or conditions. As discussed in Chapter 3.0, "Regulatory Setting," the general plan of a community defines the location, type, and intensity of growth and it is the primary means of regulating development and growth in the State of California. Mechanisms by which a project may induce growth include creating jobs that attract economic or population growth to the area, promoting the construction of homes that would bring new residents to the area, or removing an existing obstacle that impedes growth in the area.

8.2.3 Potential for the Proposed Statewide Special Protections to Restrict Growth

Other comments submitted at public meetings and during the scoping period for the project suggested that approval and adoption of the proposed statewide regulations would restrict growth. The central idea expressed by these comments is as follows:

- ► The proposed Special Protections will render existing coastal lots and properties throughout the coastline of the state's ASBS unbuildable or prevent people from building in areas already designated for development i.e. impose a "building moratorium."

As discussed previously, the nine Regional Water Boards were established in their current form by the Porter-Cologne Water Quality Control Act of 1969 (Water Code Section 13000 et seq.). Six of these nine Regional Water Boards have coastal jurisdiction over the ASBS described in the General Exception and carry out the requirements of the Ocean Plan. In addition, development, adoption, and approval of Basin Plans followed during the 1970s. In some parts of California, legal lots of record were created preceding enactment of the Porter-Cologne Water Quality Control Act of 1969.

During the years that followed, the new water quality protection standards set forth in the Basin Plans in accordance with state and federal law rendered some existing legal lots unbuildable in places throughout California. As discussed above, six of the nine Regional Water Boards may include additional localized restrictions that are more protective of ocean water of ASBS than the proposed statewide Special Protections. Implementation of the proposed statewide Special Protections would not change the requirements and provisions contained in the Ocean Plan or approved Basin Plans for the respective Regional Water Boards. Ongoing enforcement of existing water quality protection standards that have been in effect since the 1970s would continue to render certain legal lots unbuildable.

It is not known where implementation of the proposed statewide Special Protections could inhibit growth. The proposed statewide Special Protections would likely increase the cost to install BMPs in some areas or re-direct existing waste discharge conveyances; consequently, in some instances it is probable that compliance costs could make development of some properties too costly. In those instances, it is likely that Special Protections could moderately reduce potential growth. It is not known, and there is no data available, to quantify the degree to which growth would be restricted by increased costs.

8.3 SIGNIFICANT AND UNAVOIDABLE IMPACTS

Section 6.0 of this draft EIR describes the potential environmental impacts of the proposed project and recommend various mitigation measures to reduce these impacts, to the extent feasible. After implementation of the recommended mitigation measures, most of the impacts associated with the proposed project would be reduced to a less-than-significant level. Impacts on ASBS ocean water quality and protection of marine biological resources and beneficial uses of the ASBS would remain significant and unavoidable if existing inadequate controls currently in force are allowed to continue. Summary discussions of significant and unavoidable impacts by issue are provided in the following text. Section 4.0, "Alternatives to the Proposed Project," considers alternatives to the proposed project that may be capable of reducing or avoiding some of the impacts of the proposed project.

8.3.1. Determining Significance under CEQA

The *CEQA Guidelines* (§15000, et seq., California Code of Regulations, 2009) define a "significant effect" as:

"…*a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic and aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant" (CEQA Guidelines §15382, 2009).*

The *CEQA Guidelines* further state that "An ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area *(CEQA Guidelines §15064, 2009).* Appendix G of the *CEQA Guidelines* describes impacts that the California Resources Agency has determined are normally considered significant. These guidelines require that physical changes in the environment be evaluated based on factual evidence, reasonable assumptions supported by facts, and expert opinion based on fact.

8.3.2. Significance Criteria

Analysis of each project alternative was conducted to determine if there would be an impact to a particular environmental resource (Section 6.0 Environmental). This review included a determination of whether an impact occurring from the implementation of an alternative would be rated as "significant" under CEQA. Table 8.3.2 summarizes the significance of temporary, long-term, and cumulative environmental impacts of the General Exception/Special Protections Project alternatives under CEQA. Levels of significance stating "less than significant with mitigation incorporated" are based on the application of successful mitigation measures, meaning the impact would not be diminished until mitigation successfully accomplishes the desired goals.

Table 6.7.1 summarizes the Thresholds of Significance for Ocean Plan water quality objectives. For the purposes of this analysis, a water quality impact is considered significant if implementation of the proposed project would result in exceeding any of the Ocean Plan water quality objectives. Section 6.0 Environmental Analysis of this document provides a detailed discussion of the impacts for each resource category. Significant impacts were identified for the No—Project Alternative which is used as the baseline for comparison with other alternatives.

8.3.3. Thresholds of Significance

For the purposes of the Analysis of Environmental Impacts, a water quality impact is considered significant if implementation of the proposed project would result in exceeding any of the thresholds identified in Table B of the Ocean Plan (OP water quality objectives). These thresholds of significance are based on the CEQA Guidelines (State CEQA Guidelines) and relevant water quality objectives. Consistent with State CEQA Guidelines, a water quality impact is considered significant in this analysis if implementation of the proposed project would result in potential for exceeding any of these adopted water quality objectives related to ASBS.

8.3.4. Potential Impacts

This section discusses the resources which will experience potential impacts as a result of the General Exception/Special Protections Project.

The General Exception project has the potential to impact species, habitat, and sensitive natural communities within each of the 26 ASBS identified in this General Exception, if existing inadequate controls currently in force are allowed to continue. The applicants submitted biological monitoring reports characterizing near shore marine biota. Four reports provided data sufficient to statistically compare impact from reference locations at San Clemente and San Nicolas Islands (Navy), Del Mar Landing, and Trinidad ASBS. Based on comparison of community composition, there is evidence that at three ASBS the data show that sampled discharge locations are different from sampled reference locations. However, there is some question whether these differences are attributed to the discharges or an artifact of the sample design. For example, Caltrans reported data for their multiple ASBS discharge locations that include Redwood National Park, James V. Fitzgerald, Año Nuevo, Point Lobos, Carmel, and Irvine Coast ASBS. While data results from certain ASBS sites within Caltrans area of potential discharge impact differed from selected reference sites, there was no strong support that this was due to discharges. Differences between impact and reference locations were also found at Duxbury Reef ASBS (County of Marin) and at the Pillar Point area of James V. Fitzgerald ASBS (Air force). Again at these locations, the data was inadequate to attribute the variation to the impacts of the discharge.

The project, granting an exception with special mitigating conditions (i.e., special protections) will allow the continued discharge of wastes from various origins including storm water runoff into ASBS. It is anticipated that the mitigating terms and conditions of the special protections will result in improved water quality conditions. Further, the terms and conditions of the special protections provide for continued water quality improvements over time if all of the special protections designed to limit discharges of waste from the applicants are implemented.

It is anticipated that, as the applicants identified in this General Exception plan for and design individual control projects to comply with the terms and conditions or "Special Protections," each applicant will assess biological impacts on a project-by-project basis. If it is determined that a project will have biological impacts, then potential mitigation measures must be considered. A technical biological impact analysis may include evaluation of terrestrial and marine biota of an individual project. The impact analysis may assess mitigation measures that are determined to be reasonable and feasible, and at the time of final design would then be incorporated into projects' plans and specifications. Indirect effects to biological resources may extend throughout the duration of construction and may include increased erosion, siltation, and runoff. It is anticipated that cumulative proposed projects to implement Special Protections should result in long-term, beneficial effects to biological resources within each individual project.

Thresholds of Significance:
1 - Indirect impacts on marine biological resources associated with existing baseline inadequate pollution and dry-weather flows control measures.

The General Exception Project has the potential to violate the ASBS waste discharge prohibition of the Ocean Plan if existing inadequate controls currently in force are allowed to continue. The project, granting an exception with special mitigating conditions (i.e., special protections) will allow the continued discharge of wastes from various origins including storm water runoff into ASBS. Existing ocean water quality conditions within ASBS have had measured concentrations of constituents which exceed the Table B water quality objectives of the Ocean Plan. Exceedances of the Table B Ocean Plan water quality objectives were also found in the storm water runoff of some of the applicants. It is expected that the mitigating terms and conditions of the Special Protections will result in improved water quality conditions of ASBS. Further, the terms and conditions of the special protections provide for continued water quality improvements in storm water and nonpoint source discharges over time.

Granting the general exception will not violate federal antidegradation requirements because water quality will not be lowered, but rather, will be improved within the ASBS affected. Further, allowance of the General Exception will not violate the State Water Board's antidegradation policy (SWRCB 1968) since water quality conditions are anticipated to improve; the discharges will not unreasonably affect present and anticipated beneficial uses; the discharge will not result in water quality lower than that prescribed in the Ocean Plan; and beneficial uses will be protected and potential impacts will be less than significant with mitigation incorporated.

It is anticipated that the applicants identified in this General Exception project will implement various individual or collaborative projects to comply with the terms and conditions or "Special Protections." As part of the scoping and environmental analysis conducted for the General Exception project, project types identified include: Low Impact Development (LID); dry-weather flow diversions; and Best Management Practices (BMPs), such as Pollution Prevention BMPs and Treatment BMPs, such as infiltration basins and Gross Solids Removal Devices (GSRDs). Under the State Water Board's storm water program, these types of projects may require coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit). Dischargers whose projects disturb 1 or more acres of soil or whose project disturbs less than 1 acre but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under this permit. The activity would include clearing, grading, and disturbances to the ground such as stockpiling, or excavation.

Additional requirements of the Construction General Permit require the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and storm water collection and discharge points and drainage patterns across the project. The SWPPP includes a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs during a project's construction.

These hydrology and water quality resource impacts were considered to be short-term and no potential for adverse impacts to these resources were identified.

Thresholds of Significance:
1 - Exceedances of Table B water quality objectives in storm water
2 - Dry weather flows
3 - Violate federal antidegradation requirements
4 – Discharge of waste materials into the ASBS

8.4 DETERMINATION

The implementation of the General Exception to the Ocean Plan and associated terms and conditions, the Special Protections, will result in improved water quality in the waters of the State's 26 ASBS listed herein and will have significantly positive impacts to the environment, including preservation and enhancement of beneficial uses of the ASBS[15], and the economy over the long term. Enhancement of the beneficial uses will have positive social and economic effects by decreasing potential waste discharges and trash and increasing the aesthetic experience along the shoreline and waters of ASBS. Specific projects employed to implement Special Protections may have some adverse impacts to the environment, but these impacts are generally expected to be limited, short-term or may be mitigated through design and scheduling.

The FEIR, Initial Study and the Special Protections provide the necessary information pursuant to Public Resources Code section 21159 to conclude that properly designed and implemented BMPs or other waste discharge capture systems generally should not foreseeably have a significant adverse effect on the environment. Any potential impacts can be mitigated at the subsequent project level when specific sites and methods have been identified, and Responsible Parties identified herein can and should implement the recommended mitigation measures. These mitigation measures in most cases are routine measures to ease the expected and routine impacts attendant with ordinary minor construction projects and infrastructure maintenance in an urbanized environment. Routine construction and maintenance of power lines, sewers, streets, etc. are regular and expected incidents of living in urban and infrastructure improved environments (i.e. highways and roadways) along the coast. Sewer and power line maintenance, street sweeping, traffic alterations, and environmental impacts from them already occur and are expected.

This Special Protections project will foreseeably require many more such waste discharge prevention projects, but their individual impacts are not expected to be extraordinary in magnitude or severity. Specific projects, that may have a significant impact, would therefore be subject to a separate environmental review. The lead agency for subsequent projects would be obligated to mitigate any impacts they identify, for example by mitigating potential flooding impacts by designing the BMPs with adequate margins of safety. Notably, in almost all circumstances, where unavoidable or unmitigable impacts would present unacceptable hardship upon nearby receptors or venues, the Responsible Parties and/or associated local agencies have a variety of alternative implementation measures available instead. For instance, they can locate BMPs further down the storm drain system away from such receptors, or impose increased street sweeping or enforcement at that location instead.

All of the potential impacts discussed in this EIR must, however, be mitigated at the subsequent, project level because they involve specific sites and designs not specified at the program level. At this stage, any more particularized conclusions would be

[15] California Ocean Plan § I.A. Beneficial Uses

speculative. The State Board does not have legal authority to specify the manner of compliance with its orders or regulations (Wat. C. § 13360), and thus cannot dictate that an appropriate location be selected for any particular project. It is anticipated that compliance projects will be designed consistent with standard industry practices and that routine and ordinary mitigation measures be employed. These measures are all within the jurisdiction and authority of the Responsible Parties that will be responsible for implementing the Special Protections. The Responsible Parties can and should employ those alternatives and mitigation measures to reduce any impacts as much as feasible (14 Cal. Code Regs., §15091(a)(2).

Implementation of the General Exception Project and Special Protections is both necessary and beneficial. To the extent that the alternatives, mitigation measures, or both, that are examined in this analysis are not deemed feasible by those 27 Responsible Parties identified herein , the necessity of implementing the Project and removing the discharge of waste into ASBS (an action required to achieve the express, national policy of the Clean Water Act) remains.

On the basis of this evaluation and staff Program FEIR, which collectively provides the required information:

The State Water Board finds that the proposed General Exception and Special Protections could have a significant adverse effect on the environment. However, there are feasible alternatives and/or feasible mitigation measures that would substantially lessen any significant adverse impact. These alternatives are discussed above and in the Program FEIR.

Table 8.3.2. Summary of Project Impacts – (Refer to Section 6.0)			
Impacts	**Significance Before Mitigation**	**Mitigation Measures**	**Significance After Mitigation**
6.1 Aesthetics			
6.1-1: Direct Impacts Associated with Effects on a scenic vista	Potentially Significant, short-term temporary	Construction related mitigation project-by-project implemented by Applicant	Less than Significant
6.1-2: Direct Impacts Associated with effects on scenic highway	Potentially Significant, short-term temporary	Construction related mitigation project-by-project implemented by Applicant	Less than Significant
6.1-3: Direct Impacts Associated with Visual Character of site or surroundings	Potentially Significant, short-term temporary	Construction related mitigation project-by-project implemented by Applicant	Less than Significant
6.2 Air Quality			
6.2-1: Direct Impacts Associated with Air Quality Standards	Potentially Significant, short-term temporary	Construction related mitigation project-by-project implemented by Applicant	Less than Significant
6.2-2: Expose Sensitive Receptors to Substantial Pollutant concentrations	Potential short-term temporary	Construction and/or maintenance related mitigation project-by-project implemented by Applicant	Less than Significant
6.2-3: Create Objectionable Odors Affecting a Substantial Number of People	Potential direct short-term temporary	Construction and/or maintenance related mitigation project-by-project implemented by Applicant	Less than Significant
6.3 Biological Resources			
6.3-1: Substantial Direct/Indirect Adverse Effect to Candidate, sensitive or	Potential substantial adverse effect	Coordination by Applicant with local or regional plans, policies, or regulations and/or DFG or	Less than Significant

Special Status Species		USFWS	
6.3-2; 6.3-3; 6.3-4; 6.3-5: Substantial adverse effect on riparian habitat, interfere with fish passage, conflict with local resource protection, conflict with HCPs of NCCPs	Potentially significant short-term, temporary	Modify proposed implementations to require erosion and sediment control measures project-by-project implemented by Applicant	Less than Significant with mitigation incorporated
6.4 Cultural Resources			
6.4-1: Direct Impacts to Cultural Resources including historic, archaeological sites	Potential direct adverse impacts	Construction related mitigation project-by-project implemented by Applicant, coordination with SHPO	Less than Significant with mitigation incorporated
6.5 Greenhouse Gas Emissions			
6.5-1: Direct impacts associated with GHG emissions	Potential direct temporary short-term impacts	Construction and maintenance related equipment emissions mitigation implemented by Applicant	Less than Significant with mitigation incorporated
6.6 Hazards and Hazardous Materials			
6.6-1: Create a significant hazard via accidental release of hazardous materials	Potential direct temporary short-term impacts	Construction related mitigation project-by-project implemented by Applicant	Less than Significant with mitigation incorporated
6.6-2: Impair emergency response or evacuation	Potential direct temporary short-term impacts	Construction related mitigation project-by-project implemented by Applicant	Less than Significant
6.7 Hydrology and Water Quality			
6.7-1: Violate water quality criteria for pollutants and pathogens Violate ambient natural ocean water quality	Potential direct long-term impacts	Mitigating terms and conditions –Special Protections implemented by Applicant(s)	Less than Significant with mitigation incorporated
6.7-2: Create substantial water quality hazard to marine biota	Potential direct long-term impacts	Mitigating terms and conditions –Special Protections implemented by Applicant(s)	Less than Significant with mitigation incorporated

6.8 Noise			
6.8-1: Exposure to and generation of noise in excess of standards	Potential direct short-term	Construction and maintenance related equipment mitigation implemented by Applicant	Less than Significant with mitigation incorporated
6.9 Public Services			
6.9-1: Substantial adverse physical impacts to police, fire, recreational resources or public facilities	No reasonably foreseeable adverse impact	None required due to less than significant impact	N/A
6.10 Transportation/Traffic			
6.10-1: Adverse impact to transportation and circulation	Potential direct short-term	Construction and/or maintenance related mitigation project-by-project implemented by Applicant	Less than Significant with mitigation incorporated
6.10-2: Inadequate emergency access	Potential indirect short-term temporary	Non required due to less than significant impact	Less than Significant

9.0 REFERENCES

Abbot, I. and George Hollenberg. Marine Algae of California. Stanford, California: Stanford University Press. 1976.

Allen, L. G., D. J. Pondella II and M. H. Horn. 2006. Ecology of marine fishes: California and adjacent waters. University of California Press. Berkeley and Los Angeles, California. Pp. 346-347.

Ambrose & Lee. 2007. Summary of Biological Resources of the Malibu Area of Special Biological Significance, Mugu Lagoon to Latigo Point. By Richard F. Ambrose, Ph.D. and Steven F. Lee, M.S. Summary Performed for the City of Malibu and included in the Beneficial Uses and Marine Life section of the ASBS #24 Mugu Lagoon to Latigo Point Request for Exception.

Arnal et al. 1973. Sand Transport Studies in Monterey Bay, California.

Barry et al. 1995. Climate-Related, Long-Term Faunal Changes in a California Rocky Intertidal Community. Science. Vol. 267. no. 5198, pp. 672 – 675.

Borowitzka, M.A. 1972. Intertidal Algal Species Diversity and The Effect of Pollution. Australian Journal of Marine and Freshwater Research 23: 73-84.

Boyd, Milton J. and John DeMartini. 1977. Intertidal and Sub tidal Biota of Redwood National Park (1977). California Department of Fish and Game (DFG). 2001. California's Living Marine Resources: A Status Report. California Department of Fish and Game (DFG). 2005. California Natural Diversity Data Base.

Boyle, M. 1967. The Stratigraphy, Sedimentation and Structure of an Area Near Point Arena, California. MA Thesis, Univ. of California, Berkeley. 71 pp. (The geology of the Point Arena area including the region around Saunders Reef)

California Department of Fish and Game. 2001

California Department of Fish and Game. July 2005. State and Federally Listed Endangered and Threatened Animals of California.

California Department of Fish and Game 2008. Warden enforcement citation, April 2008. Arrest/Investigation Report 03/24/08, Humboldt County. Citation # AD1715524

California Department of Forestry. 2002. Census 2000 Block Level data. http://gis.ca.gov/BrowseCatalog.epl.

California State Coastal Conservancy. May 3, 2005. Derelict Fishing Gear Removal Pilot Program. SeaDoc Society. Davis, California.

California State University, Long Beach. 2005. Biology of the Southern California Bight: http://seis.natsci.csulb.edu/bperry/scbweb/BIOLOGY.HTM.

CalTrans, Department of Transportation. 2006. Additional information for consideration of exception to discharges into ASBS, CTSW-RT-06-132-018.3

CalTrans, Department of Transportation. 2006. ASBS Dept. of Transportation Direct and Indirect Discharge Points Information.

Calwater 2.2, California Geospatial Information Library. Planning Watersheds and The National Land Cover Characterization NLCD 2001. California Watersheds Meta File, Impervious Surfaces (Independent per-pixel estimates of Imperviousness) USGS/USEPA http://www.gis.ca.gov

Carr, Mark, P. Raimondi, S. Lonhart, M. Readdie, K. Kusic, R. Gaddam, H. Livingston, and D. Malone. 2006. Informing Decision-making for the Coastal Highway Management Plan: A Biological Sensitivity Assessment for Intertidal and Shallow Subtidal Habitats on the Big Sur Coast. A report submitted to the Monterey Bay Sanctuary Foundation.

Clean Water Act, Federal Water Pollution Control Act. As amended July, 2008. (33 U.S.C. § 1251 et seq.) http://www.waterboards.ca.gov/laws_regulations/docs/fedwaterpollutioncontrolact.pdf

City of Laguna Beach. 2006. Protection plan for the Heisler Park ecological reserve ASBS NO. 30.

City of Malibu. 2007. Area of Special Biological Significance, ASBS #24 Mugu Lagoon to Latigo Point Request for Exception.

City of Newport. 2006. Protection Plan for the Newport Beach (Robert E. Badham) Marine Life Refuge, ASBS No. 32.

City of Pacific Grove. 2006. Request for exception for discharger into Area of Special Biological Significance.

City of San Diego. 2006. Area of Special Biological Significance #29 Discharge exception application.

City of San Diego Municipal Code, City of San Diego Community Planning Department. 2004. La Jolla Community Plan and Local Coastal Program Land Use Plan, 2004. Appendix I, San Diego - La Jolla Underwater Park And Ecological Preserve. http://www.sandiego.gov/planning/community/profiles/pdf/cp/cpljappendiceshijkl.pdf

City of Trinidad. 2006. Application for an exception for discharge into ASBS to SWRCB division of Water Quality.

C.F.R. Code of Federal Regulations. 40 C.F.R. §§122.26(b)(9), 131.3i, 131.6 et seq. (Updated as of March 2009). http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?sid=767f137e1514cfc8be7d117aa113c733&c=ecfr&tpl=/ecfrbrowse/Title40/40tab_02.tpl

Connolly-Pacific Company. 2006. Request for Exception for Discharges into Area of Special Biological Significance.

Cox, et al. 2005. Marine Resources of Redwood National and State Parks. Humboldt State University. 161 pp.

Dailey, M.D., D.J. Reish, and J.W. Anderson. 1993. Ecology of the Southern California Bight: A Synthesis and Interpretation. University of California Press, Berkeley, California. Xvi+926 pp.

Dawson, E.Y. 1956. How to Know the Seaweeds. Berkeley- Los Angeles, California: University of California Press. Dawson, E. Y. 1966. Seashore Plants of Southern California. Berkeley- Los Angeles, California: University of California Press.

Department of Parks and Recreation. 2006. ASBS ocean plan exceptions.

Dugan J.E., et al. 2003. The Response of Macrofauna Communities and Shorebirds to Macrophyte Wrack Subsidies on Exposed Sandy Beaches of Southern California. Estuarine Coastal and Shelf Science 58S:133–148.

Eisler, R., 1998. Nickel hazards to fish, wildlife, and invertebrates: a synoptic review: U.S. Fish and Wildlife Service, Biological Science Report USGS/BRD/BSR-1998-0001, Contaminant Hazards Report No. 34.

Emery, K.O. 1960. The Sea off Southern California. John Wiley & Sons. New York, NY.

Fager, E.W. 1968. A sand-bottom epifaunal community of invertebrates in shallow water. Limnology and Oceanography 13(3): 448-464

Federal Water Pollution Control Act (Federal Clean Water Act). As amended July, 2008. (33 U.S.C. § 1251 et seq.) http://www.swrcb.ca.gov/laws_regulations/docs/fedwaterpollutioncontrolact.pdf

Federal EPA 2006. Consumer Factsheet on Lead in Drinking Water, "What happens to Lead when it is released to the environment?". Last updated on Thursday, August 24th, 2006. http://www.epa.gov/safewater/lcrmr/fs_consumer.html

Federal EPA 2006, Nickel. Ground Water and Drinking Water, Technical Factsheet on: NICKEL. Last updated on Tuesday, November 28th, 2006. http://www.epa.gov/safewater/dwh/t-ioc/nickel.html

Federal EPA 2006, PAH's. Ground Water and Drinking Water, Technical Factsheet on: POLYCYCLIC AROMATIC HYDROCARBONS (PAHs). Last updated on Tuesday, November 28th, 2006. http://www.epa.gov/safewater/dwh/t-soc/pahs.html

Federal EPA 2007. Lead In Drinking Water. Page last updated Wednesday, September 26th, 2007. http://www.epa.gov/safewater/lead/

Gabrielson, P.W., T.B. Widdowson & S.C. Lindstrom. 2004. Keys to the Seaweeds and Sea grasses of Oregon and California, North of Point Conception. Phycological Contribution #6, PhycoID, Hillsborough, NC, 181 pp.

Galloway, A.J. 1977. Geology of the Point Reyes Peninsula, Marin County, California. California Division of Mines and Geology. Bulletin 202.

Gotshall, Daniel. 1994. Guide to Marine Invertebrates, Alaska to Baja California. Third Printing. Sea Challengers, Monterey, California.

Greenstein, D., S. Bay, B. Anderson, G.T. Chandler, J.D. Farrar, C. Keppler, B. Phillips, A. Ringwood and D. Young. 2008. Comparison of methods for evaluating acute and chronic toxicity in marine sediments. Environmental Toxicology and Chemistry 27:933-944.

Griggs, Gary B., Kiki Patsch and Lauret E. Savoy. 2005. Living with the Changing California Coast, Article I. University of California Press.

Henson, Paul, Donald J. Usner, and Valerie A. Kells. 1996. The Natural History of Big Sur. University of California Press. Pages 388-389.

Hinton, Sam. 1969. Seashore Life of Southern California. University of California Press.

Humboldt County. 2006. Application for an exception to discharge storm water into an area of biological significance, Shelter Cove California.

Kacena, T. SIO. 2003. Raw data on water temperature.

Kayhanian, M., C. Stransky, S. Bay, S. -L. Lau, and M.K. Stenstrom. 2008. Toxicity of urban highway runoff with respect to storm duration. Science of the Total Environment 389:386-406.

Kozloff, Eugene, 1993. Seashore Life of the Northern Pacific Coast. University of Washington Press, Seattle, WA. 370 pp.

Los Angeles County. 2006. Request for exception for storm water discharges into the Mugu Lagoon to Latigo Point Area of Special Biological Significance.

Los Angeles County, Department of Regional Planning. 1983. Local Coastal Plan, Santa Catalina Island.

Macdonald, K. B. (1976). The natural resources of Mugu Lagoon. California Department of Fish & Game, Coastal Wetlands Series. 17: 1-119

Marin County. 2006. Proposal to Address Discharges into the Area of Biological Significance—Duxbury Reef, Bolinas California.

Marine Mammal Protection Act. 1972, by Marine Mammal Commission. As amended 2007 by NOAA's National Marine Fisheries Service. http://www.nmfs.noaa.gov/pr/laws/mmpa/

Marine Managed Areas Improvement Act. 2000. Assembly Bill 2800 (Chapter 385, Statutes of 2000).

MARINe Sampling Methods. (Multi-agency Rocky Intertidal Network). http://www.marine.gov/sampling-methods.htm

Martin, Bruce & Emery, K.O. 1967. Geology of Monterey Canyon, California

MBC, 2004. MBC Applied Environmental Sciences. Characterization of the Rocky Intertidal Crystal Cove State Park. March 2004. Prepared for California Department of Parks and Rec. by David G. Villas of MBC Applied Environmental Sciences.

McArdle, D. 1997. California Marine Protected Areas. California Sea Grant College System, University of California, La Jolla, California. Xiii+268 pp. http://www.csgc.ucsd.edu.

Mearns and Lauenstein. From Alan Mearns 2007 PowerPoint presentation, based on mussel watch data from NOAA National Status and Trends Program. NOAA Mussel Watch data is summarized in http://ccma.nos.noaa.gov/publications/MWTwoDecades.pdf

Michaels, Anthony. 2005. Various personal/verbal/email communications with State Water Board staff Connie Anderson and Dominic Gregorio. University of Southern California, Los Angeles, California.

Miller, DJ & Lea RN, 1972, Fish Bulletin 157, Guide to the Coastal Marine Fishes of California, Department of Fish and Game, 235 pp.

MLPA, California Master Plan for Marine Protected Areas (dated April 13, 2007). http://www.dfg.ca.gov/mlpa/masterplan.asp

MLPA SAT, California Master Plan Science Advisory Team. Military Use Areas Work Group DRAFT Analysis of Military Use Areas in the MLPA South Coast Study Region. February 23, 2009 Draft

Morris, Robert H., Donald P. Abbot, and Eugene C. Haderlie, 1980. Intertidal Invertebrates of California. Stanford University Press, Stanford, CA. 690 pp.

Moritz, Carl Arthur Jr. 1968. A Descriptive Survey of the Head of Carmel Submarine Canyon. United States Naval Postgraduate School M.S. Thesis. Monterey, California. 82 pp.

National Weather Service. 2004. Climate – Southern California Annual Average Precipitation website. http://www.wrh.noaa.gov/sandiego/climate/pcpn-avg.htm

NCCOS, National Centers for Coastal Ocean Science, December 2003. A Biogeographic Assessment off North/Central California: To Support the Joint Management Plan Review for Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries: Phase I – Marine Fishes, Birds and Mammals. http://ccma.nos.noaa.gov/ecosystems/sanctuaries/nwhi.html.

NOAA, National Oceanic and Atmospheric Administration. National Marine Fisheries Service Office of Protected Resources 2005. P. Edward Parnell, C E. Lennert-Cody, L Geelen, L D. Stanley, and P K. Dayton, "Effectiveness of a small marine reserve in southern California" (2005). Marine Ecology-Progress Series. 296, pp. 39-52.

Oliver, J., J. Oakden and D. Carney, 1999. Ecological Impacts of the Landslide Manipulations at the McWay Slide, Big Sur Coast, and Management Recommendations.

Pebble Beach Company. 2007. Pebble Beach Company's Application for exception from Ocean Plan Area of Special Biological Significance Prohibition.

PRBO, Point Reyes Bird Observatory, April 2005. The California Current Marine Bird Conservation Plan. PRBO Conservation Science Publication. www.prbo.org.

PRC, Public Resources Code. §36700(f), §36710(f), §36750. As added following the passage of Marine Managed Areas Improvement Act. 2000.

Raimondi, Peter. 2006. Data assessment for ASBS/ Ocean Plan for Cal Trans. California State Water Board. 284 pages.

Raimondi, Peter. 2006. Written summary of MARINe / PISCO intertidal biological data for Hopkins Marine Station, Fall 1999 through Spring 2006: Data assessment for ASBS/ Ocean Plan. California State Water Board. 179 pages.

Raimondi, Peter. 2007.

Raimondi, Peter. March 6, 2009, Evaluation of ASBS Assessments in rocky intertidal communities for the State Water Board.

Rand GM & Petrocelli SR, 1985. Fundamentals of Aquatic Toxicology, Taylor, and Francis, 666 pp.

Reish, Donald J, 1972, Marine Life of Southern California, 164 pp.

Regional Water Quality Control Board (RWQCB). 1969. Order No. 00-140: NPDES No. CA0056661, Waste Discharge Requirements for University of California Wrigley Marine Science Center, Los Angeles County.

San Clemente Island. About SCI website: http://www.scisland.org

Santa Catalina Island Company, including Santa Catalina Island Conservancy. 2006. Request for Exception for Discharges into Areas of Special Biological Significance.

Schiel et al. 2004. D.R., Steinbeck, J.R., & Foster, M.S. Ten years of induced ocean warming causes comprehensive changes in marine benthic communities. Ecology 85:1833-1839.

Senate Bill (SB) 512 (Chapter 854, Statutes of 2004). Effective January 1, 2005.

Silva, Paul C, Woodfield, Rachel A, Cohen, Andrew N, Harris, Leslie H & Goddard, Jeffrey H.R. 2002. First Report of the Asian Kelp Undaria pinnaitfida in the Northeastern Pacific Ocean. Biological Invasions 4: Kluwer Academic Publishers, Netherlands. 334-337 pp.

Sones et al. 2006. Baseline Inventory of the Rocky Intertidal Zone at the Del Mar Ecological Reserve. Sampling and Data Analysis by Dr. Vic Chow, Dr. Peter Connors, Jaqueline Sones, Sarah Ann Thompson, and Dr. Matt Bracken. Report Preparation by Jacqueline Sones for The Sea Ranch Association, May 2006. Appendix B of The Sea Ranch Association's (TSRA) Ocean Plan exception application.

Southern California Coastal Water Reasearch Project (SCCWRP). 2010. Summation of Findings; Natural Water Quality Committee 2006-2009. Technical Report 625. 37 pp.

Southern California Coastal Water Research Project (SCCWRP). 2003. Final Report: Discharges into State Water Quality Protection Areas. Final report to the State Water Resources Control Board, Contract 01-187-250. 26 pp. http://www.swrcb.ca.gov/water_issues/programs/ocean/docs/asbs/swqpa_finalsurveyreport_wlayouts.pdf

Southern California Coastal Water Research Project (SCCWRP). 1998. Southern California Bight 1994 Pilot Project. Stein, E.D. and D. Ackerman. 2007. Dry weather water quality loadings in arid, urban watersheds of the Los Angeles basin, California, USA. Journal of the American Water Resources Association 43:398-413.

Stein, E.D. and V.K. Yoon. 2008. Dry weather flow contribution of metals, nutrients, and solids from natural catchments. Water, Air, and Soil Pollution 190:183-195. Sumich, J.L. 1999. An Introduction to the Biology of Marine Life, Seventh Ed. WCB/McGraw Hill, Boston, Massachusetts. Xii+484 pp.

State Water Resources Control Board. (SWRCB). 1968. Resolution 68-16: statement of policy with respect to maintaining high quality of waters in California. 2 pp. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 1969. Porter-Cologne Water Quality Control Act. Updated and amended January 1, 2009. http://www.swrcb.ca.gov/laws_regulations/docs/portercologne.pdf

State Water Resources Control Board (SWRCB). 1972. Resolution 72-45: water quality control plan for ocean waters of California (Ocean Plan). 13 pp. http://www.swrcb.ca.gov/tmdl/docs/303d_policydocs/408.pdf

State Water Resources Control Board (SWRCB). 1972. Water Quality Control Plan For Control Of The Temperature In The Coastal And Interstate Waters And Enclosed Bays And Estuaries Of California (Thermal Plan). http://www.swrcb.ca.gov/water_issues/programs/ocean/docs/wqplans/thermpln.pdf

State Water Resources Control Board (SWRCB). 1974. Resolution 74-28: designating Areas of Special Biological Significance and authorizing notification of the Regional Water Quality Control Boards and the Environmental Protection Agency. 2 pp. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 1974. Resolution 74-32: designating the Newport Beach and Irvine Coast Marine Refuges as Areas of Special Biological Significance. 4 pp. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 1975. Resolution 75-61: designating a Portion of Carmel Bay in Monterey County as an Area of Special Biological Significance and Requesting the Development of Plans for Management of Wastewater Entering Carmel Bay. 3 pp. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Santa Catalina Island Sub areas One-Four, Los Angeles County Water Quality Monitoring Report No. 79-6. 192 pp.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Santa Cruz Island, Santa Barbara County. Water Quality Monitoring Report No. 79-8.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Point Lobos Ecological Reserve, Monterey County. Water Quality Monitoring Report No. 79-9.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Double Point, Marin County. Water Quality Monitoring Report No. 79-15.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Duxbury Reef Reserve and Extension, Marin County. Water Quality Monitoring Report No. 79-14.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Farallon Island. Water Quality Monitoring Report No. 79-13.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: James V. Fitzgerald Marine Reserve, San Mateo County. Water Quality Monitoring Report No. 79-12.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: King Range National Conservation Area, Humboldt and Mendocino Counties. Water Quality Monitoring Report No. 79-18.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Kelp Beds at Trinidad Head, Humboldt County. Water Quality Monitoring Report No. 79-19.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Bodega Marine Life Refuge, Sonoma County. Water Quality Monitoring Report No. 79-16.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Gerstle Cove, Sonoma County. Water Quality Monitoring Report No. 79-17.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Santa Catalina Island, Sub areas One-Four, Los Angeles County. Water Quality Monitoring Report No. 79-6.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Heisler Park Ecological Reserve, Orange County. Water Quality Monitoring Report No. 79-2.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Irvine Coast Marine Life Refuge, Orange County. Water Quality Monitoring Report No. 79-3.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Newport Beach Marine Life Refuge, Orange County. Water Quality Monitoring Report No. 79-4.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Mugu Lagoon to Latigo Point, Ventura and Los Angeles Counties. Water Quality Monitoring Report No. 79-5.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Anacapa Island, Ventura County. Water Quality Monitoring Report No. 79-7.

State Water Resources Control Board (SWRCB). 1979. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Pacific Grove Marine Gardens Fish Refuge and Hopkins Marine Life Refuge, Monterey County. Water Quality Monitoring Report No. 79- 11.

State Water Resources Control Board (SWRCB). 1980. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Bird Rock, Marin County. Water Quality Monitoring Report No. 80-2.

State Water Resources Control Board (SWRCB). 1980. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Point Reyes Headland Reserve and Extension, Marin County. Water Quality Monitoring Report No. 80-1.

State Water Resources Control Board (SWRCB). 1980. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Kelp Beds at Saunders Reef, Mendocino County. Water Quality Monitoring Report No. 80-3.

State Water Resources Control Board (SWRCB). 1980. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: San Diego Marine Life Refuge, San Diego County. Water Quality Monitoring Report No. 80-5. http://repositories.cdlib.org/cgi/viewcontent.cgi?article=1198&context=sio/lib

State Water Resources Control Board (SWRCB). 1980. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Julia Pfeiffer Burns Underwater Park, Monterey County. Water Quality Monitoring Report No. 80-4.

State Water Resources Control Board (SWRCB). 1981. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Ano Nuevo Point and Island, San Mateo County. Water Quality Monitoring Report No. 81-2

State Water Resources Control Board (SWRCB). 1981. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Redwoods National Park, Del Norte and Humboldt Counties. Water Quality Monitoring Report No. 81-5.

State Water Resources Control Board (SWRCB). 1981. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Santa Catalina Island-Sub area Three Farnsworth Bank Ecological Reserve, Los Angeles County. Water Quality Monitoring Report No. 81-4.

State Water Resources Control Board (SWRCB). 1982. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: Santa Rosa Island, Santa Barbara County. Water Quality Monitoring Report No. 81-6.

State Water Resources Control Board (SWRCB). 1982. California Marine Waters Areas of Special Biological Significance Reconnaissance Survey Report: San Miguel Island, Santa Barbara County. Water Quality Monitoring Report No. 81-7.

State Water Resources Control Board (SWRCB). 1983. Resolution 83-87: Water Quality Control Plan for Ocean Waters of California. 14 pp. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 2000. State Mussel Watch Program. www.waterboards.ca.gov/programs/smw.

State Water Resources Control Board (SWRCB). 2001. Resolution 2000-18: water quality control plan for ocean waters of California – California Ocean plan. 40 pp. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 2003. Resolution 2003-0009: approval of the 2002 federal Clean Water Act section 303(d) list of water quality limited segments.197 pp. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 2004. Resolution 2004-52: Approval of Exception to the California Ocean Plan for UC Scripps Institution's Discharges to San Diego Marine Life Refuge Area. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/2004/rs2004-0052.pdf

State Water Resources Control Board (SWRCB). April 2005. Resolution 2005-0035: amendments to the California Ocean Plan, Reasonable Potential and Areas of Special Biological Significance. http://www.swrcb.ca.gov/board_decisions/adopted_orders/resolutions/

State Water Resources Control Board (SWRCB). 2006. ASBS (Areas of Special Biological Significance) Status Report. http://www.swrcb.ca.gov/water_issues/programs/ocean/docs/asbs/status_report_aug06.pdf

State Water Resources Control Board (SWRCB). August 2008. Draft Data Report, ASBS Exception Applications. http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/asbs/draft_data_report.pdf

State Water Resources Control Board (SWRCB). July 8, 2009. Letter from Jonathan Bishop, Chief Deputy Director, to Alexis Strauss, Director, Water Division, United States Environmental Protection Agency, Region 9.

Tenera Environmental. 2007. Pillar Point Storm Water Outfall in the James V. Fitzgerald ASBS.

The Sea Ranch Association. 2006. California Ocean Plan exception request for Del Mar Landing ASBS.

Tinker et al., 2008. Food limitation leads to behavioral diversification and dietary specialization in sea otters. Proceedings of the National Academy of Sciences 105.02 (2008) 560-565.

U.S. Dept. of Defense, Air Force. 2007. Marine Resource description: Pillar Point storm water outfall in the James V. Fitzgerald ASBS.

U.S. Dept. of Defense, Navy. 2007. Naval Base Ventura County, San Nicolas Island ASBS exception application package.

U.S. Dept. of Defense, Navy. 2005. Final environmental assessment, San Clemente Island wastewater treatment plant outfall project.

U.S. Dept. of Defense, Navy. San Nicolas Island Integrated Natural Management Resources Plan 2006-2010.

U.S. Dept. of Interior, Point Reyes National Seashore. 2006. Request for exception for National Park Service (NPS) discharges into the Point Reyes Headlands Reserve and Extension ASBS and the Duxbury Reef Reserve and Extension ASBS.

U.S. Dept. of Interior, Redwoods National and State Park. 2006. National Park, Redwood ASBS, exception application.

U.S. Forest Service. Los Padres National Forest, about. http://www.fs.fed.us/r5/lospadres/about/.

U.S. Navy, U.S. Dept. of Defense. 2008. U.S. Southern California Range Complex Environmental Impact Statement. http://www.socalrangecomplexeis.com/Documents.aspx

US Navy San Nicolas Island Integrated Natural Management Resources Plan 2006-2010

United States Geological Survey (USGS). Hapke, Cheryl J. and Krystal R. Green▪ 2004. Rates of Landsliding and Cliff Retreat Along the Big Sur Coast, California—Measuring a Crucial Baseline http://pubs.usgs.gov/fs/2004/3099/fs2004-3099.pdf

United States Geological Survey (USGS). 2005. Geology at Point Reyes National Seashore and Vicinity, California: A Guide to San Andreas Fault Zone and the Point Reyes Peninsula, pg. 125. http://pubs.usgs.gov/of/2005/1127/chapter9.pdf

United States Geological Survey (USGS). PAHs 2007. National Water-Quality Assessment (NAWQA) Program, Parking-Lot Sealcoat: A Major Source of PAHs in Urban and Suburban Environments. Page last modified August 28, 2007 10:33:37 EDT.http://water.usgs.gov/nawqa/asphalt_sealers.html

Valencic, J.J., 1987. Crystal Cove Underwater Research Project. Final report prepared for the California Dept. of Parks and recreation.

Vedder, J. G., and R. M. Norris. 1963. Geology of San Nicolas Island. U.S. Geological Survey Professional Paper No. 369. U.S. Government Printing Office, Washington, D.C.

Viant, M. R., J. H. Walton, P. L. TenBrook, R. S. Tjeerdema. 2002. Sublethal actions of copper in abalone (Haliotis rufescens) as characterized by in vino 31P NMR. Aquatic Toxicology. 51:139-151.

Warme, J. E. (1971). Paleoecological Aspects of a Modern Coastal Lagoon. Univ. Calif. Publs Geol. Sci. 87: 1-131

Water Code, California Water Code. §§13050, 13170, 131702, 13391, 13243, 013263, 13269 http://www.leginfo.ca.gov/cgibin/calawquery?codesection=wat&codebody=&hits=20

Weaver, C. 1944. The Geology of the Cretaceous (Gualala Group) and Tertiary Formations along the Pacific Coast between Point Arena and Fort Ross, California. Univ. of Washington, Published in Geol., Seattle 6:1-29

Wentworth, C. 1966. The Upper Cretaceous and Lower Tertiary rocks of the Gualala area, northern coast ranges, California. Ph.D. thesis, Stanford Univ., Stanford. 200 pp.

GLOSSARY AND ACRONYMS

TERM/ABBREVIATION	DESCRIPTION
Areas of Special Biological Significance (ASBS)	Those areas designated by the State Water Board as ocean areas requiring protection of species or biological communities to the extent that alteration of natural water quality is undesirable. All Areas of Special Biological Significance are also classified as a subset of State Water Quality Protection Areas.
ASBS	Area(s) of Special Biological Significance
At the Point of Discharge(s)	In the surf zone, immediately where runoff from an outfall meets the ocean water (a.k.a. at point zero). For storm water discharges, outfall is defined in 40 CFR 122.26(b)(9).
BLM	Bureau of Land Management
BMPs	Best Management Practices
Caltrans	California Department of Transportation
CBI	Clean Beaches Initiative
CCC	California Coastal Commission
CCA	Critical Coastal Area
CCLEAN	Central Coast Long-term Environmental Assessment Network
CDO	Cease and Desist Order
CEQA	California Environmental Quality Act
COP	California Ocean Plan
CTR	California Toxics Rule
Cu	Copper
CWA	Clean Water Act
CWC	California Water Code
Design Storm	One inch of precipitation per day (for purposes of these Special Protections)
DFG	California Department of Fish and Game
DO	Dissolved Oxygen
FWS	United State Fish and Wildlife Service

TERM/ABBREVIATION	DESCRIPTION
LID	Low Impact Development:
Low Impact Development (LID)	A sustainable practice that benefits water supply and contributes to water quality protection. Unlike traditional storm water management, which collects and conveys storm water runoff through storm drains, pipes, or other conveyances to a centralized storm water facility, LID takes a different approach by using site design and storm water management to maintain the site's pre-development runoff rates and volumes. The goal of LID is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, and detain runoff close to the source of rainfall.
MARINe	Multi-Agency Rocky Intertidal Network
MEP	Maximum Extent Practicable
MMA	Marine Managed Area
MMs	Management Measures
MS4	Municipal Separate Storm Sewer Systems
Municipal Separate Storm Sewer Systems (MS4)	A municipally-owned storm sewer system regulated under the Phase I or Phase II storm water program implemented in compliance with Clean Water Act section 402(p). Note that an MS4 program's boundaries are not necessarily congruent with the permittee's political boundaries.
Natural Water Quality	Determined by comparison to reference areas agreed upon via the regional monitoring programs(s).
Nonpoint Source (NPS)	Sources of pollution that arise over a comparatively large area rather than from a single point (Non-point pollution sources generally are sources that do not meet the definition of a point source). Non-point source pollution typically results from land runoff, precipitation (except those discharges regulated by an NPDES permit), atmospheric deposition, drainage, seepage, or hydrologic modification. Non-point sources, for purposes of these Special Protections, include storm water discharges that are not required to be regulated under an NPDES permit.
NPDES	National Pollutant Discharge Elimination System
NPS Policy	Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program
OPP	Ocean Protection Projects
Parks and Recreation Facilities	State Parks
Person	"Person" is defined in Water code §13050(c)
Point Source	Defined in Clean Water Act §502(14)
POTWs	Publicly Owned Treatment Works

TERM/ABBREVIATION	DESCRIPTION
PRC	Public Resources Code
Regional Water Board	Regional Water Quality Control Board
SB	Senate Bill
SCCWRP	Southern California Coastal Water Research Project
SCI	San Clemente Island
SCICO	Santa Catalina Island Company
Sheet-Flow	Runoff that flows across land surfaces at a shallow depth relative to the cross-sectional width of the flow. These types of flow may or may not enter a storm drain system before discharge to receiving waters
Significant Difference	Statistically significant difference in the arithmetic means of two distributions of sampling results at the 95 percent confidence level.
SIO	Scripps Institution of Oceanography
SNI	San Nicholas Island
State Water Board	State Water Resources Control Board
Storm Water	Defined in 40 CFR 122.26(b)(13)
Surf Zone	The area between the breaking waves and the shoreline at any one time.
SWAMP	Storm Water Ambient Monitoring Program
SWMP	Storm Water Management Plan/Program
SWQPA	State Water Quality Protected Area
SWPPP	Storm Water Prevention Pollution Plan
TMDL	Total Maximum Daily Load
TSRA	The Sea Ranch Association
U.S. EPA	United States Environmental Protection Agency
Waterfront and Marine Operations	Activities that include boat launch, cleaning, maintenance, recreational, mooring , fishing and related infrastructure
Waste	Defined in Water Code §13050(d)
WDR	Waste Discharge Requirements