

## 4.2 SPILLS, LEAKS, COMPLAINT INVESTIGATIONS, AND CLEANUPS

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The Regional Board receives complaints of discharges through verbal or written notification from the public to staff at either of the Regional Board offices. The Regional Board responds to complaints of discharges (such as spills, leaks, intentional dumping, etc.) of substances which may impact water quality. It is the policy of the Regional Board to ensure that responses to all complaints involving threats to water quality be made in an expeditious manner. Proper response includes the following components:

- Thorough documentation of complaints.
- Appropriate follow-up, including: site inspections, referral to (or notification of) other regulatory agencies, corrective actions, enforcement actions, etc.
- Notification to complainant, as appropriate, of findings and subsequent actions.

Subsequent follow-up actions include determination of responsible party, enforcement, or issuance of waste discharge requirements.

The Regional Board notifies other responsible agencies (e.g., local public health, law enforcement, and fire officials, and/or the State Departments of Toxic Substances Control, Fish and Game, Pesticide Regulation, Integrated Waste Management Board, etc.) whenever the content of a complaint falls within another agency's jurisdiction.

Except for a discharge in compliance with waste discharge requirements, any person who causes or permits any reportable quantity of hazardous substance or sewage to be discharged in or on any waters of the State, or discharged or deposited where it is or probably will be discharged in or on any waters of the State, shall, as soon as possible, notify the Office of Emergency Services of the discharge in accordance with the spill reporting provision of the State toxic disaster contingency plan. The person shall also immediately notify the State Board or the appropriate Regional Board of the discharge (CA Water Code § 13271).

Similarly, any person who discharges any oil or petroleum product under the above stated conditions shall, as soon as possible, notify the Office of Emergency Services of the discharge in accordance with the spill reporting provision of the State oil spill contingency plan. Immediate notification of an appropriate agency of the federal government, or of the appropriate Regional Board (in accordance with the reporting requirements set under CA Water Code § 13267 or 13383) shall satisfy the oil spill notification requirements of this paragraph (CA Water Code § 13272).

### ***Major Hazardous Spills***

The Regional Board staff will respond to assist local agencies and work cooperatively at large-scale hazardous material releases resulting from surface transportation accidents. The Regional Board staff's role is primarily to provide immediate, onsite technical assistance concerning water quality in order to minimize the potential damage to the public health and safety, and the environment. Regional Board staff will interact with local authorities in an organized and predictable manner in accordance with the California Office of Emergency Services Railroad Accident Prevention and Immediate Deployment Plan, or RAPID (Public Utilities Code Section 7718). Regional Board staff activities include: (1) providing information on existing downstream beneficial uses and potential impacts from the substance being released, (2) providing toxicity information about the substance, (3) setting up a water and sediment monitoring program, (4) collecting samples or requesting that a local agency equipped to enter a hazardous area take samples for the Regional Board, and (5) coordinating available resources (lab support, vehicles, sampling equipment).

### ***Reportable Quantities Of Hazardous Waste And Sewage Discharges***

Water Code Section 13271 requires that the State Board and the Department of Toxic Substances Control adopt regulations establishing reportable quantities for substances listed as hazardous wastes or hazardous materials pursuant to Section 25140 of the Health and Safety Code. Reportable quantities are those which should be reported because they may pose a risk to public health or the environment if discharged to ground or surface water.

Similarly, the State Board was required to adopt regulations establishing reportable quantities for sewage. These requirements for reporting the

## Ch. 4, IMPLEMENTATION

discharge of sewage and hazardous materials do not supersede waste discharge requirements or water quality objectives.

The regulations for reporting spills of hazardous materials are given in Sections 2701, 2703, and 2705 of Chapter 2, Subchapter 3, of Title 19 of the California Code of Regulations and are incorporated by reference into this plan. This incorporation-by-reference is prospective including future changes to the incorporated provisions as the changes take effect.

The Water Code (Section 13272.1) requires Regional Boards to publish and distribute quarterly reports on methyl tert butyl ether (MTBE) discharges to public water system operators within their jurisdictions. The reports must list MTBE discharges which occurred within the quarter and locations where MTBE was detected in groundwater within the region.

### ***Proposition 65 Program***

The Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), became effective January 1, 1987. Proposition 65 (CA Health and Safety Code § 25249.5, et seq.) prohibits discharges of any chemical “known to the State to cause cancer or reproductive toxicity” to a potential source of drinking water, with certain exceptions. It also requires “clear and reasonable warnings,” with certain exceptions, to be provided prior to an exposure to any of the listed chemicals (list is described below). Implementation of the Proposition specifies certain actions for designated governmental employees and for private parties.

### ***Designated Governmental Employees***

Health and Safety Code Section 25180.7 requires designated governmental employees to disclose specific information to a local Board of Supervisors and a local health officer in the event of a hazardous discharge or threatened hazardous discharge (as defined below). A designated employee is an employee so identified by his or her (state or local) government agency who is required to sign a conflict of interest statement. A list of designated employee positions for the State and Regional Boards is available from the State Board's Office of the Chief Counsel.

Any designated employee who knowingly and intentionally fails to report information, as required by Proposition 65, shall be subject to imprisonment (not more than 3 years), fines (\$5,000 to \$25,000), and upon felony conviction, forfeit state employment.

There is no liability for designated employees who, in good faith, report hazardous waste discharges to the counties that are later determined not to be a substantial threat to the public health and safety.

Section 25180.7 of the Health and Safety Code states: “Any designated government employee who obtains information in the course of his official duties revealing the illegal discharge or threatened illegal discharge of a hazardous waste within the geographical area of his jurisdiction and who knows that such discharge or threatened discharge is likely to cause substantial injury to the public health or safety must, within seventy-two hours, disclose such information to the local Board of Supervisors and to the local health officer.” The information is disclosed via a Proposition 65 Notification Report, which includes the following information:

- discharge type
- how the discharge was discovered
- location of discharge
- probable discharger
- possible contacts
- concentration of contaminant in soil and/or water

### ***Private Party Responsibilities***

Private parties must examine workplace chemicals, facilities emissions and products to determine if chemicals subject to the Proposition are present. If the chemicals are determined to be present at levels which cause significant risks, the private parties must provide precautionary warnings as specified by the Proposition. The attorney general, or any district attorney or city attorney may initiate enforcement actions against a violator. Also, any person or organization may bring an action in the public interest if the above officials are notified and fail to diligently prosecute the violation within 60 days. Exceptions to these warning requirements and discharge prohibitions are included in the Proposition.

### ***Proposition 65 List***

The Proposition requires the State Governor to publish a list of chemicals known to cause cancer or reproductive toxicity, and revise and republish the list with any new information at least once per year. The first list was published in February 1989. More than 400 chemicals and substances have been listed as carcinogens, and more than 200 for reproductive toxicity, as of May 1998. The list is

## 4.2, Spills, Leaks, Complaint Investigations and Cleanup

included in the California Code of Regulations (22 Cal. Code of Regs. § 12000[b-c]). Subsection (b) lists the chemicals known to cause cancer; Subsection (c) lists the chemicals known to cause reproductive toxicity.

### **Requirements for Site Investigation and Remediation**

The State Board adopted State Board Resolution No. 92-49 "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304" in June of 1992, and amended it in April, 1994 and October, 1996. The Resolution contains the policies and procedures which all Regional Boards shall follow for the oversight and regulation of investigations and cleanup and abatement activities for all types of discharge or threat of discharge subject to Section 13304 of the Water Code. (CA Water Code § 13304 requires that any person who has discharged or discharges waste into waters of the State in violation of any waste discharge requirement or other order or prohibition issued by a Regional Board or the State Board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into waters of the State and creates, or threatens to create, a condition of pollution or nuisance may be required to clean up the discharge and abate the effects thereof. This Section authorizes the Regional Board to require complete cleanup of all waste discharged and restoration of affected water to background conditions, i.e., to the water quality that existed before the discharge.)

Thus, the Regional Board will follow State Board Resolution No. 92-49 for determining:

- when an investigation is required;
- scope of phased investigations necessary to define the nature and extent of contamination or pollution;
- cost-effective procedures to detect, clean up or abate contamination;
- reasonable schedules for investigation cleanup, abatement, or any other remedial action at a site.

State Board Resolution No. 92-49 outlines the five basic elements of a site investigation. Any or all elements of an investigation may proceed concurrently, rather than sequentially, in order to expedite cleanup and abatement of a discharge, provided that the overall cleanup goals and abatement are not compromised. State Board

Resolution No. 92-49 investigation and cleanup and abatement activity components are as follows:

- **Preliminary site assessment:** To confirm the discharge and identity of dischargers; to identify affected or threatened waters of the State and their beneficial uses; and to develop preliminary information of the nature, and horizontal and vertical extent of the discharge;
- **Soil and water investigation:** To determine the source, nature and extent of the discharge with sufficient detail to provide the basis for decisions regarding subsequent cleanup and abatement actions, if any are determined by the Regional Board to be necessary;
- **Proposal and selection of cleanup action:** To evaluate feasible and effective cleanup and abatement actions, and to develop preferred cleanup and abatement alternatives;
- **Implementation of cleanup action:** To implement the selected alternative and verify progress via monitoring; and
- **Monitoring:** To confirm short- and long-term effectiveness of cleanup and abatement.

State Board Resolution No. 92-49 directs the Regional Board to ensure that the discharger is aware of and considers techniques which provide a cost-effective basis for initial assessment of a discharge such as use of current and historical photographs and site records, soil gas surveys, shallow geophysical surveys, and remote sensing techniques, as well as standard site assessment techniques (e.g., sampling and analyses of surface water, sediment, aquatic biota, ground water, and/or soil).

As directed by State Board Resolution No. 92-49, the Regional Board will also ensure that the discharger is aware of and considers the following cleanup and abatement methods or combinations thereof, to the extent that they may be applicable to the discharge or threat thereof:

- Source removal and/or isolation
- In-place treatment of soil or water (bioremediation, aeration, fixation)
- Excavation or extraction of soil, water, or gas for on-site or off-site treatment (techniques include bioremediation, thermal destruction, aeration, sorption, precipitation, flocculation, sedimentation, filtration, fixation, evaporation)

## Ch. 4, IMPLEMENTATION

- Excavation or extraction of soil, water, or gas for appropriate recycling, re-use, or disposal.

In every case, effluent discharged to waters of the Region shall contain essentially none of the following substances:

- Chlorinated hydrocarbons
- Toxic substances
- Harmful substances that may bio-concentrate or bioaccumulate
- Excessive heat
- Radioactive substances
- Grease, oil, and phenolic compounds
- Excessively acidic and basic substances
- Heavy metals such as lead, copper, zinc, mercury, etc.
- Other deleterious substances

In addition, the following general discharge requirements are also applicable to discharges to waters of the Region:

- a. Neither the treatment nor the discharge shall cause a nuisance.
- b. The discharge of wastewater except to the designated disposal site is prohibited.
- c. All facilities used for collection, transport, treatment, or disposal of waste shall be adequately protected against overflow, washout, and flooding from a 100-year flood.
- d. A monitoring program shall be required. The monitoring program and reports shall include items and a time schedule to be determined by the Regional Board considering the needs and benefits to be obtained (CA Water Code § 13267).

### **Cleanup Levels**

State Board Resolution No. 92-49 also requires conformance with State Board Resolution No. 68-16 and applicable provisions of the California Code of Regulations, Title 23, Chapter 15, to the extent feasible. State Board Resolution No. 92-49 directs the Regional Board to ensure that dischargers are required to clean up and to abate the effect of discharges. This cleanup and abatement shall be done in a manner that promotes attainment of

background water quality, or the highest water quality which is reasonable if background levels of water quality cannot be restored. The determination of what is reasonable shall consider all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible, and intangible. Any cleanup less stringent than background shall be consistent with maximum benefit to the people of the State and shall not unreasonably affect present and anticipated beneficial uses of such water.

Where cleanup to background is infeasible, cleanup standards will be set:

- at the lowest concentrations for the individual pollutants which are technically and economically achievable;
- so as not to exceed the maximum concentrations allowable under applicable statutes and regulations for individual pollutants (including water quality standards in State and Regional Board water quality control plans and policies);
- so as not to pose a hazard to health or to the environment; and,
- so that theoretical risks from chemicals associated with the release are considered additive across all media of exposure and are considered additive for those pollutants which cause similar toxicologic effects and for those which are carcinogens.

### **Ground Water Cleanup Levels**

The overall cleanup level established for a waterbody is based upon its most sensitive beneficial use. In all cases, the Regional Board first considers high quality or naturally occurring "background" concentration objectives as the cleanup levels for polluted ground water and the factors listed above in "Cleanup Levels." Generally, compliance with approved cleanup levels must occur at all points within the plume of pollutants.

Ground water cleanup levels are approved on a case-by-case basis by the Regional Board, following the guidance and criteria found in the State Board's Resolution 92-49. Approved cleanup levels will consider the mobility, toxicity, and volume of pollutants. Further guidance for cleanup feasibility may be found in Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR Part 300); Section 25356.1(c) of the California Health and Safety Code; and USEPA's guidance documents on the Comprehensive

## 4.2, Spills, Leaks, Complaint Investigations and Cleanup

Environmental Response, Compensation and Liability Act (CERCLA).

### **Soil Cleanup Levels**

The Regional Board will determine soil cleanup levels for the unsaturated zone based upon threat to water quality. In its determination, the Regional Board will use guidance from the USEPA, and Cal/EPA's Office of Health Hazard Assessment, and Department of Toxic Substances Control.

If it is unreasonable to clean up soils to background concentration levels, the Regional Board may consider site-specific recommendations for soil cleanup levels above background provided that applicable ground water quality objectives are met and health risks from surface or subsurface exposure meet current guidelines. The Regional Board may require follow-up ground water monitoring to verify that ground water is not polluted by chemicals remaining in the soil. The Regional Board may require that soils with remaining pollutants are covered and managed to minimize pollution of surface waters and/or exposure to the public. If significant amounts of waste remain onsite, the Regional Board may implement provisions contained in the California Code of Regulations, Title 23, Chapter 15 to the extent applicable.

### **Spills, Leaks, Investigations, and Cleanups (SLIC Program)**

The SLIC Program was established by the State Board so that Regional Boards could oversee cleanup of illegal discharges, contaminated properties, and other unregulated releases adversely impacting the State's waters but not covered by another program.

Sites managed within the SLIC Program include sites with pollution from recent or historic spills, subsurface releases (e.g., pipelines, sumps), complaint investigations, and all other unauthorized discharges that pollute or threaten to pollute surface and/or ground waters. Investigation, remediation, and cleanup at SLIC sites proceed as directed in State Board Resolution No. 92-49 as described above.

### **Use of the Cleanup and Abatement Account to Fund Cleanups**

The State Water Resources Control Board manages the Cleanup and Abatement Account (CAA) Fund. The CAA receives funds statewide as a result of court judgments from civil and criminal actions and from administrative civil liabilities.

The California Water Code provides for the disbursement of funds from the CAA to:

- Public agencies with the authority to clean up waste or abate its effects; and
- Regional Boards attempting to remedy an actual or potential water pollution problem for which adequate resources have not been budgeted.

The State Board has the authority to approve funding. Applicants do not have a right to these funds.

The Regional Board's Executive Officer, his/her designee, or a public agency may request emergency funds orally for amounts up to \$50,000. These requests are to be directed to the Chief Counsel. In the absence of that individual, other designated staff should be called in the order listed: the Executive Director, the Chief Deputy Director, or the Administrative Services Division Chief. Any of these four individuals may review and approve the request. Within one week following the oral request, the requesting agency shall submit the terms in writing. Non-emergency requests must be written to be considered by the State Board, and must include a specific Regional Board Resolution.

The agency or Regional Board receiving the funds shall notify the Office of Chief Counsel (OCC) upon project completion and submit a follow-up report. This report must describe the work accomplished and fund recoupment. OCC will review the report to verify that the agency performed the work.

OCC shall pursue the recovery of CAA funds expended for cleanup and abatement when a discharger refuses to perform or pay for the work.

Any funds not committed or expended within 12 months of encumbrance or approved project end date (whichever is later) shall be disencumbered. The agency has 90 days to submit a bill. The Executive Director may grant a time extension if no additional funding is required. Disencumbered funds become available for other projects.

If additional funding is required, approval must be given by the State Board or the designated approval authority (for emergency requests).

### **Federal Superfund Program**

The federal "Superfund" program was established in 1980 with the passage of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The CERCLA provided funding and guidelines for the cleanup of the most

## Ch. 4, IMPLEMENTATION

threatening hazardous waste sites in the nation. High priority sites scheduled for cleanup under this program are placed on the National Priority List (see Section 4.12, "Military Installations")

### ***Risk Assessment***

In site-specific risk assessments, cleanup levels must be set to maintain the excess upperbound lifetime cancer risk to an individual less than 1 in 10,000 ( $10^{-4}$ ) or a cumulative toxicological effect as measured by the Hazard Index of less than one. For all sites performing risk assessments, an alternative with an excess cancer risk 1 in 1,000,000 ( $10^{-6}$ ) or less must also be considered. Risk assessment procedures are found in the USEPA's "Risk Assessment Guidance for Superfund" (Volume I, Parts A, B, C, and Supplemental Guidance, 1989). Additional information may be found in Cal/EPA's Office of Environmental Health Hazard Assessment guidelines.

## 4.3 STORMWATER RUNOFF, EROSION, AND SEDIMENTATION

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Water quality problems related to stormwater discharges, erosion and sedimentation are among the most frequent and widespread water quality problems in portions of the Lahontan Region which receive significant amounts of precipitation. Such problems are interrelated because eroded sediment is often carried to surface waters in stormwater. However, wind erosion and deposition are also locally important problems. Erosion and surface runoff are considered the most critical controllable sources of nutrient loading to Lake Tahoe (see Chapter 5). The following are general discussions of stormwater and erosion problems and relevant control measures. More specific information is included in subsequent sections on specific sources such as land development, agriculture, and resources management activities.

### Stormwater Problems and Control Measures

The term “stormwater” includes surface runoff resulting from rainfall and snowmelt. It is essentially synonymous with “urban runoff,” “highway runoff,” and “surface runoff” (as used in Chapter 5 of this Plan which deals with the Lake Tahoe Basin).

Under natural conditions, most rainfall and snowmelt is absorbed by soils and taken up by vegetation, and very little surface runoff occurs. Air pollutants in precipitation are largely removed by soils and vegetation before they reach surface waters. (Natural surface runoff events can be significant in the case of desert flash floods, and where soils and vegetation have been disturbed by natural events such as wildfires.) Human activities in watersheds, especially the creation of large amounts of impervious surface (e.g., roads, parking lots, and buildings) can greatly increase the potential for surface runoff, reduce the potential for soil/vegetation treatment of chemicals in rain and snow, and add a large variety of contaminants to the runoff discharge.

Human development of a watershed affects surface runoff quality by increasing the intensity of peak discharges, the volume of runoff per storm, the velocity of runoff during the storm, and the frequency and severity of flooding. These changes can lead to increases in stream bedload sediment transport and

streambank erosion, and to consequent degradation of aquatic habitat.

Urban runoff quality varies to some extent with land use (industrial vs. commercial vs. residential). Stormwater constituents of concern include sediment (from construction sites and unstabilized areas); other particulate matter (including glass and plastics); nutrients (from sediment, fertilizer, and animal wastes); and petroleum products, solvents, wood preservatives, paints, and heavy metals from wear and tear on roads, buildings, and vehicle parts. Organic matter (e.g., from animal wastes and fallen leaves) can give stormwater a significant biochemical oxygen demand (BOD). Coliform bacteria (from soils, animal excrement, and sewage spills) can also be present. Toxic “priority pollutants” in urban runoff include lead, zinc, copper, arsenic, chromium, cadmium, nickel, cyanide, and asbestos. In mountainous areas of the Lahontan Region, runoff containing salt and other deicing chemicals used on roads and parking lots during the winter is of concern (see the “Land Development” section of this Chapter). High intensity stormwater flows reaching surface waters can also raise stream temperatures, scour streambeds, and damage aquatic habitat, particularly fish spawning habitat.

Stormwater quality also varies with time. In California, which generally has dry summers and wet winters, pollutants can accumulate on pavement over the summer and can be flushed into surface waters in high concentrations by the first significant fall rainstorm. These high “first flush” concentrations may be especially stressful to aquatic organisms. Runoff from later storms may have lower pollutant concentrations. Spring snowmelt may also provide a flush of accumulated atmospheric acids and nutrients, including nitrogen, into surface waters (see the discussion of atmospheric deposition in the “Resources Management and Restoration” section of this Chapter). Flushing by desert flash floods and by summer thunderstorms in mountainous portions of the Lahontan Region are both of concern.

Nutrients and fine sediment particles from stormwater are considered a major source of pollution to Lake Tahoe. Fine sediment particles are defined as inorganic particles less than 16 micrometers in diameter. The Lake Tahoe TMDL has identified urban stormwater runoff as the largest source of these pollutants and the TMDL implementation plan emphasizes urban runoff treatment.

Although stormwater quality (particularly that of urban and highway runoff) has not been well

## Ch. 4, IMPLEMENTATION

studied elsewhere in the Lahontan Region, many communities and highways are located near surface waters. Stormwater runoff of metals, deicing agents, and petroleum products from paved surfaces may be contributing to water quality problems. Even in desert areas, infrequent flood events may flush pollutants from urban surfaces and lead to surface and/or ground water quality problems.

Surface water “in systems designed or modified to collect or treat...storm water runoff” is not considered a “source of drinking water” under State Board Resolution 88-63 (Appendix B), “provided that the discharge from such systems is monitored to assure compliance with all relevant water quality objectives as required by the Regional Boards.” The “source of drinking water” designation affects the implementation of Proposition 65 (see “Spills, Leaks, Complaint Investigations, and Cleanups” section of this Chapter) in relation to toxic substances in stormwater. However, most surface and ground waters in the Lahontan Region which receive treated or untreated stormwater **are** designated sources of drinking water. Protection of these sources is a major consideration in the Regional Board's regulatory process.

### **Stormwater Control Measures**

Implementation of control measures for the different types of nonpoint sources which are discussed throughout this Chapter will help to prevent water quality problems related to stormwater. Erosion control is particularly important.

Much of the information below is taken from the “State of California Stormwater Best Management Practices Handbooks,” prepared by the American Public Works Association Storm Water Task Force (APWA Task Force 1993). Also, see the general discussion of Best Management Practices (BMPs) in the introduction to this Chapter.

This Basin Plan does not include detailed discussion of specific stormwater BMPs. Such detail is provided in a variety of BMP Handbooks (e.g., TRPA 1988, APWA Task Force 1993, USEPA 1993). Different types of controls for stormwater may be justified in different locations depending upon the type of development and the sensitivity of the affected waters.

Examples of source control BMPs for stormwater problems include control of air pollutants (see “Resources Management and Restoration” section on atmospheric deposition), enforcement of anti-litter ordinances, educational programs (to limit fertilizer and pesticide use by home gardeners and dumping of waste motor oil in storm drains), street and storm

drain maintenance practices, spill prevention and cleanup, and BMPs for erosion control. Ultimately, nationwide efforts to redesign pollutant sources, comparable to the phaseout of leaded gasoline, may be necessary to reduce or eliminate some urban runoff constituents (e.g., zinc from tire wear and asbestos from brake linings).

Land use controls can also function as stormwater source controls. Protection and restoration of natural vegetation, soils and the duff layer, particularly in steep headwater areas, and in wetlands, floodplains, and riparian areas, preserves natural infiltration and nutrient uptake capabilities, as does limitation of impervious surface coverage. Naturally functioning soil/vegetation systems, particularly wetland systems, can act as buffers between urban areas and surface waters.

Examples of treatment control BMPs for stormwater include infiltration, wet ponds, extended detention basins, biofilters (such as grassy swales), media filtration (e.g., a settling basin followed by a sand filter), oil/water separators, and constructed wetlands. Because of differences in efficiency among BMPs, combinations of different methods often provide the best treatment.

The following are important considerations in the choice of treatment control BMPs:

- Because treatment methods are not 100 percent efficient, and the efficiency of treatment is difficult to predict, the highest priority should be given to source control. Source control is often less expensive than treatment.
- The type of pollutants to be treated (dissolved vs. particulate, nutrients vs. toxics, or combinations of pollutants) and the variability of pollutant concentrations among storms and/or snowmelt events will affect the efficiency of treatment.
- Many treatment BMPs using vegetation were developed in states with wetter climates than California's, where vegetation can be maintained without irrigation. The need for irrigation of vegetation in stormwater treatment systems during the summer is an important factor in the Lahontan Region. The long-term performance of vegetative treatment systems under the harsh winter climates of the mountainous portions of the Lahontan Region has also not been well documented.
- Treatment BMP measures often require frequent visual inspections and periodic maintenance to ensure operation at maximum efficiency.



### 4.3, Stormwater Runoff, Erosion and Sedimentation

- The “design storm” for sizing of treatment facilities varies with local precipitation regimes. The design storm for Lake Tahoe facilities is specified in the local BMP handbook (TRPA 1988, Vol. II). The Regional Board may specify design storms for other areas in stormwater permits.
- Treatment BMPs may have both extra environmental benefits (passive recreation opportunities, wildlife habitat, ground water recharge) and adverse environmental side effects (potential drowning and mosquito breeding hazards in ponds, ground water contamination by infiltration).

“Areawide treatment systems” for municipal stormwater which involve combinations of infiltration, retention and detention basins, and natural and artificial wetlands, are being proposed in the Lake Tahoe Basin (see Chapter 5). In some states, wastewater treatment plants similar to those used for domestic wastewater have been constructed to treat stormwater.

#### **Utilization of Wetlands for Stormwater Treatment**

Natural and artificial wetlands are employed elsewhere in the U.S. for treatment of municipal wastewater and acid mine drainage. Large scale wetland treatment systems for urban runoff are in service in California. The utilization of “Stream Environment Zones” for removal of fine sediment particles and nutrients from stormwater in the Lake Tahoe Basin is an important part of that area's water quality program (see Chapter 5). In general, wetlands slow the flow of stormwater, allowing time for settling out of fine sediment particles, adsorption of dissolved constituents onto soils, and uptake of nutrients by soil microorganisms and rooted vegetation (see “Wetlands Protection” in Section 4.9 of this Chapter for a more detailed discussion of wetland functions).

Natural wetlands in the Lahontan Region are waters of the State and of the United States. They have designated beneficial uses and are subject to all of the water quality objectives in Chapter 3 of this Basin Plan, including nondegradation objectives for water quality and for biological communities and populations. Because the long-term impacts of urban, highway, and mine stormwater discharges on beneficial uses of natural wetlands are unknown (particularly in terms of bioaccumulation and bioconcentration of toxic trace metals), such wetlands should ideally be used only for final dissolved nutrient removal after pretreatment by

other means has removed oil and grease, sediment, and sediment-bound metals. The quality of stormwater discharged to natural wetlands should be fully protective of designated beneficial uses. Long-term monitoring of stormwater impacts, especially biological impacts, on wetland ecosystems in the Lahontan Region is needed to support future Regional Board decisions on protection and utilization of such systems.

Artificial, or constructed wetlands, may be built specifically for the purposes of treating stormwater runoff. If not created as mitigation for the loss of natural wetlands, constructed wetlands need not attempt to replicate all of the functions (e.g., wildlife habitat) of natural wetlands. The Regional Board will not generally designate beneficial uses for or assign water quality objectives to wetlands created solely for the purpose of stormwater treatment. Such wetlands may be as simple as a gravel bed planted with cattails, or they may include pretreatment devices such as forebays or detention ponds, to reduce sediment loading and thus improve their efficiency.

Important considerations for those constructing artificial wetlands for the treatment of stormwater include:

- Wetlands can act as “sinks” for pollutants. If pollutants accumulate to levels that become toxic, remedial action(s) may be required.
- The efficiency of pollutant removal will vary with the seasons. Winter temperatures and ice formation will reduce or halt pollutant removal by plants and microorganisms. Nutrients may be released from the wetland seasonally as vegetation decays. Over a 12-month period, a constructed wetland may be no more effective than a wet pond.
- The ability of a constructed wetland to treat certain pollutants such as phosphorus may decline over time as soils become saturated with the pollutant and plants reach maximum density. Cleanout of accumulated sediments, harvesting and replanting of wetland vegetation, or other maintenance activities may be necessary to preserve the stormwater treatment function. A qualified wetland ecologist should be involved in the design and installation of wetland vegetation. Constructed wetlands should be designed to facilitate access for maintenance. (As of 1992, constructed wetlands were exempt from the requirement to obtain a Section 404 permit for the removal of accumulated material.)

## Ch. 4, IMPLEMENTATION

Because the ability of constructed wetlands to meet effluent limitations for discharges to other waters has not been demonstrated over the long-term under the environmental conditions within the Lahontan Region, it is important for wetland proponents to consult with Regional Board staff during the planning phase.

### ***NPDES Permits***

The 1987 amendments to the federal Clean Water Act mandated the issuance of NPDES permits for stormwater discharges from certain types of municipalities, industries, and construction sites. The State and Regional Boards are administering the stormwater NPDES program in California. The State Board interprets federal stormwater control regulations to "include the use of BMPs to control and eliminate sources of pollutants and limitations which prohibit the discharge of non-storm water." A set of statewide BMP handbooks has been prepared to provide guidance for dischargers on compliance with the NPDES permits (APWA Task Force 1993).

BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce pollution. For industrial stormwater discharges, BMPs also include treatment devices, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste removal, or drainage from raw material storage (APWA Task Force 1993).

The statewide permits prohibit most non-stormwater discharges. Certain non-stormwater discharges, such as discharges from firefighting, fire hydrant flushing, and uncontaminated ground water resulting from dewatering activities, may be permitted if they do not cause significant pollution problems. However, all direct waste discharges to surface waters are prohibited in many parts of the Lahontan Region; these prohibitions would supersede the exceptions in the general permits.

### ***Municipal NPDES Stormwater Permits***

Municipal stormwater NPDES permits are required for municipalities with populations over 100,000, for drainage systems interconnected with the drainage systems of such municipalities, and for municipalities which are determined to be significant contributors of pollutants. The collective populations of the portions of Los Angeles and San Bernardino Counties within the Lahontan Region may warrant the issuance of municipal stormwater NPDES permits (the coastal portions of these Counties already have such permits). Because of the extraordinary resource values of Lake Tahoe, and the threat to its water

quality posed by stormwater discharges containing sediment and nutrients, the State Board determined in 1980 that municipal stormwater was a significant source of pollutants and directed that stormwater NPDES permits should be issued to local governments. Municipal stormwater NPDES permits have been issued to the portions of Placer and El Dorado Counties within the Lake Tahoe Basin, and to the City of South Lake Tahoe, even though their populations are less than 100,000.

Municipal stormwater NPDES permits require the development of a management program for construction activities within the permittee's jurisdiction. The program must: (1) address appropriate planning and construction procedures, (2) ensure BMP implementation at, and inspection and monitoring of, construction sites which discharge into municipal storm sewers, and (3) provide for education or training for construction site operators. The factors that should be addressed in a municipal stormwater management program are as follows:

#### **For Residential/Commercial Activities:**

- Roadway and drainage facility operations and maintenance programs
- BMP planning for new development and redevelopment projects
- Retrofitting existing or proposed flood control projects with BMPs
- Municipal waste handling and disposal operations
- Pesticide, herbicide, and fertilizer use controls

#### **For Improper Discharge Activities:**

- Prevention, detection, and removal program for illegal connections to storm drains
- Spill prevention, containment, and response program
- Program to promote proper use and disposal of toxic materials
- Reduction of stormwater contamination by leaking/overflowing separate sanitary sewers

#### **For Industrial Activities:**

- Inspection and control prioritization and procedures
- Monitoring of significant industrial discharges

#### **For Construction and Land Development**

### 4.3, Stormwater Runoff, Erosion and Sedimentation

#### Activities:

- Water quality and BMP assessments during site planning
- Site inspection and enforcement procedures
- Training for developers and contractors

*Source:* APWA Task Force (1993)

The municipal and statewide NPDES construction permit programs interact. The municipality sets construction policies and standards, and is expected to enforce all local stormwater ordinances, floodplain management regulations, and local standards for grading and erosion control. Post-construction control measures required under the statewide construction permit (such as final site grading, and maintenance of erosion and drainage control measures) will be subject to municipal review and approval through existing procedures.

Because municipal stormwater permits have been in place in California for only a short time, the details of financing and implementation of control programs are still being worked out. In other states, areawide "stormwater utilities" have taken responsibility for construction, operation and maintenance of facilities.

#### **Construction NPDES Stormwater Permit**

The USEPA's guidance for the issuance of stormwater NPDES permits (USEPA 1993), treats construction projects as a subset of industrial discharges. The State Board treats industrial and construction discharges separately, and has issued a statewide construction NPDES permit. The permit applies to construction projects resulting in land disturbance of five acres or greater; the area requirement affects both one-time disturbances and phased projects which cumulatively disturb more than five acres. (A court decision may result in application of the NPDES program to smaller projects, but guidance is not yet available.) The permit does not apply to routine or emergency maintenance work sponsored by public agencies, to dredging and/or filling permitted by the U.S. Army Corps of Engineers, or to projects on Indian lands or within the Lake Tahoe Basin.

Project proponents are required to: (1) prepare a Stormwater Pollution Prevention Plan (SWPPP) before construction begins, (2) file a Notice of Intent (NOI) with the State Board before construction begins, and (3) file a Notice of Termination with the State Board once construction is complete. These requirements are summarized as follows:

- The NOI certifies that the applicant will comply with conditions in the statewide general NPDES permit. It is not a permit application and does not require approval, although an annual fee must be submitted with it.
- The SWPPP is directed toward construction staff; it describes erosion and runoff control measures to be used during and after construction, and a plan to inspect and maintain these control measures. The SWPPP may be revised during construction in response to changed conditions, or if the properly installed BMPs are ineffective in preventing sediment transport off the site. Revisions to the SWPPP are also required if there are changes in activities which could result in a significant amount of pollutants discharged in stormwater.
- The State Board must be notified (via a Notice of Termination form) once construction is complete. It must also be notified if a change of ownership occurs during construction. In this case, a revised NOI must be submitted, and the SWPPP must be revised by the new owner to reflect any changes in construction conditions. The general construction permit requires that the project owner arrange for maintenance of drainage/stormwater control facilities after project completion; maintenance may be done by private parties or by a public agency such as a community service district. Municipalities may require maintenance agreements.

Construction project proponents may request to be placed under individual NPDES permits rather than the general permit. The Regional Board may issue individual stormwater NPDES permits to construction projects when more stringent controls are necessary to protect water quality. As noted above, individual construction projects may also be regulated under a municipality's NPDES management program.

#### **Industrial NPDES Stormwater Permits**

The State Board has adopted a statewide general industrial NPDES permit which applies to facilities which discharge stormwater to surface waters either directly or through a storm drain system. The general permit does not apply to facilities which discharge stormwater to a municipal sanitary sewer system, or to facilities which discharge to evaporation ponds, percolation ponds, or dry wells (ground water injection wells) where there is no discharge to surface waters under any circumstances. The general industrial permit applies to the following types of facilities:

## Ch. 4, IMPLEMENTATION

- “heavy” manufacturing facilities
- certain other types of manufacturing facilities if materials are exposed to stormwater
- active and inactive mining and oil and gas facilities
- recycling facilities
- transportation facilities (including marinas)
- facilities subject to the requirements of 40 CFR Subchapter N (facilities subject to USEPA-promulgated stormwater effluent limitation guidelines, new source performance standards, or toxic pollutant effluent standards)
- hazardous waste treatment, storage, or disposal facilities
- landfills, land application sites, and open dumps
- steam electric generating facilities
- wastewater treatment plants with design flows greater than 1 million gallons per day.

The list above is a general summary from the draft statewide BMP handbook for industrial permits (APWA Task Force 1993). Some specific facilities within the categories above may not necessarily require NPDES permits. More detailed lists of specific industries requiring permits are contained in the statewide industrial NPDES permit, which is included as an appendix to the handbook.

For facilities such as wastewater treatment plants which discharge both stormwater and a primary industrial effluent to surface waters, both the general industrial stormwater NPDES permit and an individual NPDES permit for the primary effluent discharge would apply.

In addition to the stormwater industrial general permit, Regional Boards may, at their discretion, issue an industry-specific general permit. Industries may request individual NPDES permits instead of the general permit. Because the process is expensive and time-consuming, Regional Boards may choose **not** to issue an individual permit. Regional Boards are only expected to consider individual permits where individual facilities have unique characteristics or pose significant threats to water quality.

There is relatively little manufacturing industry in the Lahontan Region. Industrial facilities of concern include mines and mineral processing operations, energy production plants, automobile junkyards and

repair shops, lumberyards, corporation yards, concrete batch plants, metal plating shops, carpet and steam cleaners, airports, and marinas.

Industrial stormwater discharges must meet the requirements of Clean Water Act Sections 301 and 402, which mandate the use of best available technology economically available (BAT) and best conventional pollution control technology (BCT) to reduce pollutants, and any more stringent controls necessary to meet water quality standards. Compliance with the requirements of a variety of other laws and regulations for the control of hazardous materials and hazardous wastes may help to reduce potential stormwater pollutants. Such programs include state and local laws to control toxic air pollutants, hazardous material storage and emergency response planning, the workers' right-to-know program, and hazardous waste source reduction and management review.

The industrial general permit process involves submittal of a Notice of Intent to the State Board, and preparation of a Storm Water Pollution Prevention Plan (SWPPP) and monitoring program. Requirements for NOIs and SWPPPs are similar to those discussed above for construction permits; they are discussed in detail in the BMP handbook (APWA Task Force 1993). The stormwater management programs developed by municipalities under NPDES permits (above) may include regulation of stormwater discharges from industries to municipal storm drain systems. Industries should check with local stormwater management authorities to identify applicable requirements. Other considerations in industrial stormwater control include possible needs for stormwater control facilities to comply with state and local air quality regulations, fire code requirements, and local sewer district requirements for discharges to a sanitary sewer.

### ***Waste Discharge Requirements***

The Regional Board issues waste discharge requirements (WDRs) addressing both stormwater and erosion control, rather than NPDES permits, to smaller construction projects in sensitive areas such as the Lake Tahoe, Truckee River, and Eagle Lake Basins, and the Mammoth Lakes area. As noted in Chapter 5, a set of general WDRs has been adopted for small construction projects in the Lake Tahoe Basin. For smaller projects in less sensitive areas, waivers of WDRs may be appropriate. Waivers are best used to regulate small, short-term projects which do not present a threat to water quality. Specific types of projects for which waivers of stormwater WDRs may be considered are identified in the Regional Board's current waiver policy (see Chapter 6).

### **4.3, Stormwater Runoff, Erosion and Sedimentation**

When reviewing environmental documents for projects which may be placed under WDRs, Regional Board staff should give special attention to stormwater control needs in relation to receiving water objectives, particularly the non-degradation and toxics objectives contained in this Basin Plan and the USEPA's National Toxics Rule.

WDRs should address inspection, operation, and maintenance of stormwater control facilities, as well as their installation.

Requirements for use of stormwater BMPs in connection with new construction should be distinguished from requirements for "retrofit" of BMPs to existing development. The most active retrofit program in the Lahontan Region is being implemented in the Lake Tahoe Basin (see Chapter 5). Retrofit is being addressed in WDRs for some dischargers elsewhere, such as ski resorts in the Truckee River HU. However, the Regional Board may issue WDRs, including requirements for stormwater control, for any discharge which causes or threatens to cause water quality problems.

Regional Board staff should continue to evaluate the need for municipal stormwater permits for communities outside of the Lake Tahoe Basin, particularly in sensitive watersheds such as the Truckee River, June Lakes, and Mammoth/Hot Creek areas. As part of this evaluation, staff should investigate needs for retrofit of stormwater BMPs. As an alternative to a municipal permit, WDRs could be issued to facilities with large areas of impervious surface (e.g., existing shopping centers, convention centers, sports stadiums, etc.) which do not fall under one of the other NPDES categories. If local governments independently adopt requirements for the application of BMPs and for treatment of stormwater to ensure attainment of standards, municipal permits may not be necessary for communities with fewer than 100,000 residents.

There are a large number of inactive mines in the Lahontan Region (see "Mining, Industry, and Energy Development" section of this Chapter). Limited biological and ambient water quality monitoring to date indicates that erosion and stormwater from these mines may be contributing to impairment of beneficial uses of surface waters, particularly in the Owens HU. Under the State Board's Toxic Substances Monitoring Program (see Chapter 7) elevated levels of metals have been detected in the tissues of fish from a number of water bodies with inactive mines in their watersheds. Regional Board staff should continue to review Industrial NPDES permit NOIs for these mines and should determine the need for individual permits. Monitoring programs

should be adopted where appropriate to document impacts of mine stormwater on water and sediment quality and on aquatic biota. (The USEPA is proposing to develop and issue a general stormwater permit for inactive mines on federal lands.)

Through the Section 319 outreach program, Regional Board staff should continue to provide information to other agencies, dischargers, and the public about stormwater problems, permitting requirements, and voluntary BMP implementation.

Very little information is available on the quality of stormwater in most parts of the Lahontan Region, or on its impacts on beneficial uses. The Regional Board should encourage Caltrans, local governments, road maintenance entities, and university researchers to conduct additional studies of stormwater quality and impacts.

#### ***Stormwater Control Measures Implemented by Other Agencies***

The U.S. Forest Service and Bureau of Land Management jurisdictions in California, and the California Department of Transportation, have adopted statewide plans under Section 208 of the Clean Water Act which include commitments to implement BMPs for erosion and surface runoff control in connection with their activities. The Regional Board reviews the activities of these agencies under Memoranda of Understanding and Management Agency Agreements. (See the summaries of these plans in Chapter 6, and the discussions of impacts in the "Resources Management," "Land Development," and "Recreation" sections of this Chapter.) Stormwater controls are being implemented (usually together with erosion controls) in watershed restoration activities under a number of Coordinated Resource Management Plans (CRMPs; see "Range Management" in Section 4.9 of this Chapter). These plans often involve cooperation among federal and state agencies, and private landowners.

The Regional Board may issue waste discharge requirements to Caltrans and to local governments to control the impacts of stormwater from road construction and maintenance activities (see "Land Development" section of this Chapter). Caltrans developed a statewide Section 208 plan which was approved by the State Board in 1979; it contains a commitment to implement BMPs but does not include great detail on the BMPs themselves. The State Board should encourage Caltrans to update its 208 plan to provide such detail, with particular attention to:

## Ch. 4, IMPLEMENTATION

- stormwater and erosion control along existing highways
- erosion control during highway construction and maintenance
- reduction of direct discharges (e.g., through culverts)
- reduction of runoff velocity
- infiltration, detention and retention practices
- management of deicing compounds, fertilizer, and herbicide use
- spill cleanup measures
- treatment of toxic stormwater pollutants

Since Caltrans' contractors are responsible for most BMP implementation on highways, the selection of qualified contractors and the ongoing education of construction and maintenance personnel are particularly important.

Caltrans is required to obtain a municipal NPDES stormwater permit for discharges of stormwater from state-owned roads located in geographic areas for which municipal stormwater NPDES permits have been issued. Caltrans may be issued an individual stormwater permit which is separate from the permit issued to the municipality, or the Regional Board may require Caltrans to join as a co-permittee with the local agency which has jurisdiction over disposal of stormwater.

Local governments, whether or not they are under municipal stormwater NPDES permits, have authority to control stormwater discharges. A number of State laws and regulations affecting local governments have important implications for stormwater control. These include the General Plan Act, the California Environmental Quality Act, and the Subdivision Map Act. Local Governments may adopt zoning ordinances, flood control and drainage ordinances, and sewer use ordinances. As a result of the "non-designated" Section 208 planning process in the 1970s, some local governments in the Lahontan Region evaluated stormwater-related problems and strengthened their grading ordinances to prevent erosion and sedimentation. A BMP handbook was developed for the high elevation portions of Placer and Nevada Counties, although the BMPs were never formally certified.

All local governments within the Lahontan Region should consider the prevention and control of

stormwater problems as high priorities in zoning for, and design of, new development and redevelopment. Needs for retrofit of stormwater controls to existing development should be considered on an areawide basis through periodic general plan updates. Local governments are strongly encouraged to apply for federal grant funds under Sections 205(j), 314, and 319 of the Clean Water Act for studies of stormwater problems and implementation of control measures.

Flood control agencies should consider the water quality impacts of flood management programs as well as flood control objectives. Flood control facilities should be designed, operated and maintained to reduce pollutant concentrations in stormwater discharges.

The Tahoe Regional Planning Agency implements land use controls and sets conditions in its permits for construction projects which serve to control stormwater discharges in the Lake Tahoe Basin (see Chapter 5 of this Basin Plan).

Voluntary implementation of stormwater control BMPs by private parties (including retrofit to existing development) will be an important factor in achieving complete control of this pollution source. Public education programs, including newsletters distributed to homeowners, extension and "master gardener" programs, BMP demonstration sites, school curricula, videos, electronic bulletin boards, etc., are being developed and implemented by a variety of public agencies, schools and colleges, and environmental and citizens groups. Better coordination of these programs is desirable to make information widely available and to avoid duplication of effort.

## Erosion and Sedimentation

Erosion has been defined as: "The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep," and sedimentation as: "The process by which mineral or organic matter is removed from its site of origin, transported, and deposited by wind, water or gravity" (California Resources Agency 1978).

Erosion is a natural process, which generally proceeds at a slow rate unless large-scale vegetation disturbance occurs (e.g., as a result of wildfire or intentional land clearing activities). Human activities in a watershed can greatly accelerate the rate and amount of erosion.

The potential for erosion is determined by soil characteristics (such as particle size and gradation, organic content, soil structure, and soil permeability),

### **4.3, Stormwater Runoff, Erosion and Sedimentation**

vegetative cover, topography (slope length and steepness), and the frequency, intensity, and duration of precipitation. Many parts of the Lahontan Region are characterized by highly erodible soils, steep slopes, and harsh climates which limit the reestablishment of vegetation after disturbance.

Wind erosion, transport and deposition of sediment and toxic trace elements (such as arsenic) into downwind surface waters are problems in some desert areas of the Lahontan Region. Although wind erosion from desert playa lakebeds is a natural process, water diversions from tributaries of other desert lakes have partly or completely dried them up, increasing the likelihood of wind erosion. In some cases, human activities such as agriculture, mining, and illegal dumping, have increased the levels of pollutants subject to wind erosion. Owens Lake has been estimated to contribute five percent of all the particulate air pollution in North America (Polakovic 1993). Windblown arsenic concentrations from Mono Lake pose a human cancer risk of 1:10,000, which is one hundred times more dangerous than toxic factory emissions (Polakovic 1993). During drought years, windblown dust from the bed of Honey Lake in Lassen County can be carried about 40 miles to the Reno, Nevada area.

Sedimentation of surface waters affects beneficial uses by increasing turbidity, and physically altering streambed and lakebed habitat. Sediment affects prey capture by sight-feeding predators, clogs gills and filters of fish and aquatic invertebrates, covers and impairs fish spawning substrates, reduces survival of juvenile fish, reduces angling success, and smothers bottom dwelling plants and animals. Nutrients (such as phosphorus) and trace metals are often associated with sediment. Suspended sediment particles can act as substrates for the growth of bacteria which can concentrate dissolved nutrients from the water column. Toxic pollutants in stormwater have been found to concentrate in sediments. Sediment-bound pollutants can be remobilized under suitable environmental conditions.

Sediment can reduce the hydraulic capacity of stream channels, causing an increase in flood crests and flood damage. It can fill drainage channels, especially along roads, plug culverts and storm drainage systems, and increase the frequency and cost of maintenance.

Sedimentation can decrease the useful lifetime of a reservoir by reducing storage capacity for municipal supplies and increasing treatment costs to remove turbidity. Sedimentation of harbors and drainage systems results in higher maintenance costs and potential problems associated with disposal of

removed material. The accumulation of sediment in recreational lakes affects boating activity in the shorezone, and can lead to demands for dredging to deepen marinas and channels.

Farmers are generally aware that soil loss is an economic as well as an environmental problem. Homeowners may not be aware of this unless their homes and neighborhood streets are damaged by mudslides or streambank or lakeshore erosion.

Understanding the cumulative impacts of all past, present, and proposed human activities in a watershed is important in predicting the impacts of erosion on surface waters. Various sediment loading models have been developed. The U.S. Forest Service, Pacific Southwest Region has developed a "Cumulative Watershed Effects" methodology to predict sediment loading from timber harvests. This method has been adapted in the Lake Tahoe Basin for the evaluation of the impacts of new ski resort construction and the effectiveness of offsetting watershed restoration projects (see "Recreation" section of this Chapter).

#### ***Erosion and Sedimentation Control Measures***

Erosion and sedimentation control measures are discussed in detail later in this Chapter in connection with a variety of problem types. They may be summarized as follows:

- Avoidance or limitation of disturbance of soils and vegetation, especially during the wet season.
- Use of structural and/or vegetative Best Management Practices (BMPs) to stabilize soils during and after activities which involve soil disturbance. Erosion control BMPs may require maintenance and possibly eventual replacement.
- Retrofit of BMPs, implementation of remedial erosion control projects, and watershed restoration projects to correct problems from past soil-disturbing activities.

#### ***Erosion and Sedimentation Control Measures Implemented by the Regional Board***

Eroded sediment and other earthen materials which reach surface waters as a result of human activities are considered waste discharges under the Porter-Cologne Water Quality Control Act. Such discharges are subject to the prohibitions discussed elsewhere in this Chapter.

## Ch. 4, IMPLEMENTATION

Under the State Board's 1988 Nonpoint Source Management Plan, the general approach to erosion control is to rely on voluntary implementation of BMPs, and to use regulatory controls if necessary. Because of the sensitivity of the Lahontan Region's waters and the high erodibility of its soils, the Regional Board takes a regulatory approach to erosion control for many types of new development in the mountainous parts of the Region (see the sections on "Land Development" and "Recreation" in this Chapter).

Statewide municipal, industrial, and construction NPDES permits can involve the implementation of erosion control measures. The Regional Board can issue waste discharge requirements or conditional waivers for construction projects and activities which do not fall under these statewide permits, or to projects which pose special threats to water quality, in order to prevent or mitigate the impacts of erosion and sedimentation.

As described elsewhere in this Chapter, the Regional Board works with other agencies and private landowners, often under Management Agency Agreements, to ensure that BMPs for erosion control are implemented in connection with timber harvesting and other silvicultural activities, mining, agriculture, range management, and recreational activities on public and private lands. In cooperation with the Tahoe Regional Planning Agency, the Regional Board implements a comprehensive erosion control program in the Lake Tahoe Basin (see Chapter 5). Specific erosion control guidelines have also been adopted for the Mammoth area; they are included in the "Land Development" section of this Chapter.

### ***Erosion and Sedimentation Control Measures Implemented by Other Agencies***

Some of the most erosion-sensitive lands in the Lahontan Region are protected from major watershed disturbance because they are under public ownership and are being managed for wilderness or low intensity, undeveloped recreation uses. Acquisition of other sensitive lands by public agencies such as the Wildlife Conservation Board and by private land trust and conservancy agencies can further reduce the risk of erosion and sedimentation problems. Public land acquisition programs are an important factor in reducing sedimentation to Lake Tahoe.

The U.S. Forest Service, U.S. Bureau of Land Management, and California Department of Transportation adopted statewide "208 plans" in the 1970s which include commitments to implement BMPs for erosion control. The USFS has developed a detailed BMP handbook (USFS 1979). The California Department of Forestry and Fire Protection's Forest Practice Rules also address erosion control, and its "Urban Forestry Program" provides advice and assistance to owners of smaller private forest parcels.

The U.S. Soil Conservation Service, in cooperation with Resource Conservation Districts, provides advice on agricultural erosion control. In some areas, such as the Tahoe Basin, the Resource Conservation Districts can assist homeowners in design of BMPs. University Extension offices also provide assistance on erosion control.

Local governments, through their planning and zoning authority, have the ability to direct new development to areas where it will cause the fewest erosion problems. Grading ordinances can limit the extent of grading without a permit, require erosion and sediment control plans which meet specific standards, and require posting of performance bonds to ensure proper implementation of erosion control measures. The State has developed a model grading ordinance (California Resources Agency 1978). Many of the local governments within the Lahontan Region strengthened their grading ordinances as a result of the "208 planning" process in the 1970s. These ordinances should be updated from time to time as the "state-of-the-art" in erosion control evolves. Local governments with municipal NPDES stormwater control permits are now required to address erosion control as part of their stormwater management planning process.

The Tahoe Regional Planning Agency has recognized the importance of airborne fine sediment



### **4.3, Stormwater Runoff, Erosion and Sedimentation**

particulates in nutrient loading to Lake Tahoe, and has called for increases in the rate of BMP retrofit, and additional controls on off-road vehicle use, to reduce wind erosion and aerial deposition from disturbed areas. The Great Basin Air Pollution Control District is leading an interagency effort to reduce wind erosion from the Owens Lake bed through means such as vegetative stabilization. The need for and feasibility of similar controls for other ephemeral lakes in the Lahontan Region (such as Honey Lake, Mono Lake, and the Alkali Lakes in Modoc County) should be investigated.

Remedial erosion control projects to correct problems associated with past land disturbance activities are being implemented throughout the Lahontan Region by public agencies such as the U.S. Forest Service and Caltrans, and by public/private cooperative efforts such as Coordinated Resource Management Plans (CRMPs). Such efforts should be continued and expanded wherever feasible. See the discussion of watershed restoration programs in "Resources Management and Restoration" section of this Chapter.

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