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CALIFORNIA COASTKEEPER ALLIANCE

November 4, 2014

Chair Felicia Marcus and Board Members
c/o Jeanine Townsend, Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor
Sacramento, CA 95814

Sent via electronic mail to: commentletters@waterboards.ca.gov

RE: Comment Letter – Once-Through Cooling Policy Special Studies

Dear Chair Marcus and Board Members:

On behalf of California Coastkeeper Alliance, which represents 12 California Waterkeeper groups spanning the coast from the Oregon border to San Diego, the Natural Resources Defense Council, Heal the Bay, and Surfrider Foundation, we appreciate the opportunity to provide comments on the special studies (Bechtel Report) conducted by Bechtel Corporation for Pacific Gas & Electric (PG&E) that investigate alternatives for the nuclear-fueled power plants to meet the requirements of the Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (OTC Policy). Our organizations have been actively involved in the OTC Policy over the last nine years, and have actively participated in the development, adoption, and implementation of the Policy to ensure the timely phase-out of OTC in California.

OTC is responsible for "reducing important fisheries" and has contributed to the "overall degradation of the State's marine and estuarine environments" for decades.[1] The State Board acknowledges that OTC kills an estimated 79 billion fish and other marine life annually. The 12 Southern California OTC facilities alone kill up to 30 percent of the number of fish recreationally caught in the Southern California Bight each year. The impingement and entrainment impacts on marine mammals, sea turtles, and fish from the two nuclear plants in California are particularly significant, as they withdraw more water than all of the other OTC plants combined.[2] California's efforts to protect and restore its fisheries and coastal habitats through dam removal, Delta restoration, and the Marine Life Protection Act are being undermined by OTC.

Congress wrote Clean Water Act Section 316(b) almost 40 years ago to compel the development and use of technology to replace and minimize the adverse impacts of OTC. We commend the State Board for taking action and adopting the OTC Policy after decades of inaction by the U.S. Environmental Protection Agency. However, it is imperative that the State Board insures the Policy achieves its goal to protect marine resources from the "ongoing, critical impact" caused by OTC, by requiring the Diablo Canyon Nuclear Power Plant (Diablo Canyon) to comply with the Policy through retrofitting the facility with close-cycle cooling towers.

[1] Cal. State Water Res. Control Bd., Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling, Final Substitute Environmental Document 1 (2010).
[2] *Id* at 33.

A. DIABLO CANYON IS A SERIOUS THREAT TO THE MARINE ENVIRONMENT AND SHOULD BE REQUIRED TO COMPLY WITH THE OTC POLICY.

Retrofitting a nuclear power plant with closed-cycle cooling towers is not a new exercise. One nuclear plant and several coal plants have already been cost-effectively and efficiently retrofit to closed-cooling cooling in the United States.[3] Many U.S. nuclear plants were built with closed-cycle cooling towers[4], and half-a-dozen U.S. power plants, both nuclear and coal-fired, have been retrofit to cooling towers, and more retrofits of large nuclear and coal power plants are planned.[5] Moreover, California has already determined that retrofitting Diablo will not affect grid reliability. The April 2008 ICF Jones & Stokes reliability report prepared for the Ocean Protection Council states that properly scheduled conversion shutdowns, including those for nuclear plant conversions, should have no effect on overall grid reliability in the state.[6]

The Diablo Canyon Nuclear power plant (Diablo) withdraws more than 2.5 billion gallons of water per day, or 2.8 million acre-feet per year. To put this into context, the State Water Project delivers "1.4 million acre-feet in dry years to almost 4.0 million acre-feet in wet years."[7] More water is pumped through Diablo each year than through the entire State Water Project on an average year.[8] Furthermore, Diablo is responsible for nearly one third of the combined average withdrawals of all OTC power plants.[9]

This significant withdrawal of seawater is undermining California's efforts to protect and restore its fisheries and ocean ecosystems. The large and continuous intake of seawater at Diablo results in marine life impacts including entrainment of an estimated 1.5 billion larvae.[10] The consequences of these impacts are of particular concern as they relate to the state's new network of marine protected areas (MPAs).

In 2012, California finalized the nation's first science-based network of MPAs. Stretching from Oregon to the US/Mexico border, this network of 124 protected areas was created to safeguard the productivity and diversity of marine life and habitats for future generations. The Point Buchon State Marine Reserve (SMR) – which lies less than one mile from Diablo's open-ocean intake – and the adjacent Point Buchon State Marine Conservation Areas (SMCA), provide protection for an ecologically diverse and productive seascape that is home to more than 700 species of invertebrates, as well as 120 fish species, marine plants, seabirds, and marine mammals (See Attachment 1).[11]

These MPAs are an essential component of the Central Coast portion of the statewide MPA network and were designed using specific guidelines to maximize ecological benefits. The guidelines, which were provided by the Marine Life Protection Act Science Advisory Team (SAT), included a recommendation to avoid locating MPAs within areas of poor or threatened water quality, such as power plant intakes. The water quality siting guidance was developed in recognition that OTC has the potential to threaten marine life and impede the recovery of ecosystems in areas set aside for protection.

While Diablo's intake is not located directly within the Point Buchon MPAs, the area of source water

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[3] EPA 316(b) Phase II Technical Development Document, Chapter 4.
[4] EPA 316(b) Phase II Technical Development Document, Chapter 4.
[5] *Id*.
[6] ICF Jones & Stokes, *Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California*, prepared for California Ocean Protection Council, April 2008, p. 34.
[7] Department of Water Resources, "California State Water Project Water Contractors," available at http://www.water.ca.gov/swp/contractor_intro.cfm.
[8] Considering the $25 billion California is proposing to pay for the Delta tunnel project, the $6 billion estimate for seawater cooling towers at Diablo seems relatively small.
[9] Nuclear Review Committee's Subcommittee, Proposed Subcommittee Comments on Bechtel's Assessment of Alternatives to Once-Through-Cooling for Diablo Canyon Power Plant, pg. 4.
[10] *Id*.
[11] Pacific Gas & Electric Company, Point Buchon MPA Brochure, *available at*: http://www.californiampas.org/pubs/MPABrochures/Point_Buchon_final.pdf.

being pulled into the power plant likely overlaps with some portion of their boundaries and has the potential to withdraw marine life out of the protected areas and prevent them from reaching their full ecological potential. Furthermore, since the state's MPAs were designed to function as a network, entrainment and impingement impacts from continued operation of Diablo's open-ocean intake may reduce larval connectivity *between* the Point Buchon MPAs and other protected areas to the north and south, thereby compromising the effectiveness of the broader network. Significant social and financial investment went into creating California's MPA network; this investment should not be undermined by the retention of antiquated, harmful cooling technology at Diablo.

Throughout the debates over the cost to retrofit Diablo, the State Board should not lose sight of the dramatic impacts the power plant has on the marine environment. Diablo constitutes one-third of all OTC withdrawals, it withdrawals more water than the State Water Project, and its proximity to the Point Buchon MPAs makes it imperative that Diablo retrofit its facility to phase-out OTC.

B. CLOSE-CYCLE COOLING IS FEASIBLE AT DIABLO AND SHOULD BE REQUIRED.

Close-cycle cooling is feasible at Diablo and should be required by the State Board. The OTC Policy states that the State Board will consider the special nuclear studies and determine whether the Policy should be modified based on the "the following factors:

> (a) Costs of compliance in terms of total dollars and dollars per megawatt hour of electrical energy produced over an amortization period of 20 years;
> (b) Ability to achieve compliance with Track 1 considering factors including, but not limited to, engineering constraints, space constraints, permitting constraints, and public safety considerations;
> (c) Potential environmental impacts of compliance with Track 1, including, but not limited to, air emissions."[12]

The Policy goes on to state that if the State Water Board finds that for a specific nuclear-fueled power plant to implement Track 1, either (1) the costs are wholly out of proportion, or (2) that compliance is wholly unreasonable based on the factors in (b) and (c) above, then the State Water Board shall establish alternate requirements for that nuclear-fueled power plant.[13] The burden is on the person requesting the alternative requirement to demonstrate that alternative requirements should be authorized.[14]

PG&E has not met its burden of demonstrating that close-cycle cooling towers are not feasible. We agree with the Subcommittee's[15] finding that "there is no basis for an exemption from the once-through-cooling (OTC) Policy for Diablo Canyon Power Plant (Diablo Canyon)."

1. *The costs of retrofitting to close-cycle cooling is not wholly out of proportion with the costs considered when the OTC Policy was adopted.*

The Bechtel Report's cost estimates are highly speculative and prove that the actual project costs are uncertain. The Report concluded that close-cycle cooling could range anywhere from $6.2 to $14.1 billion. PG&E itself only estimates the cost at about half the Bechtel estimate, while the TetraTech estimates are about one-sixth the estimates prepared by Bechtel. The Subcommittee determined that "at a minimum, the disparity in the different cost estimates is a good indicator of the high level of uncertainty about project costs." The Subcommittee also found that due to the wide range of cost estimates, "the only definitive way to determine the costs of retrofitting Diablo Canyon is for the utility to competitively bid

[12] State Water Resources Control Board, Once-Through Cooling Policy, pg. 11 (May 2010).
[13] *Id* at 11-12.
[14] *Id* at 11-12.
[15] The "Subcommittee" was a sub-part of the Nuclear Review Committee, and consisted of representatives from the California Energy Commission, California Public Utilities Commission, the Center for Energy Efficiency and Renewable Technologies and the Alliance for Nuclear Responsibility.

the project with appropriate risk management and performance terms."[16] We agree, and believe competitive bids will result in substantial reductions in cost as compared to the Bechtel Report.

The Bechtel Report's cost estimates are inflated because Bechtel considered the "perfect scenario" rather than considering real world cost savings. In developing cost estimates, Bechtel did not consider achieving cost savings in design alternatives. The Subcommittee determined that Bechtel's use of the perfect scenario "may explain to some degree the much larger Bechtel cost estimates when compared with previous studies."[17] Bechtel stated they used accepted guidelines and criteria during the study "to identify the *best technical location without regard to cost* to site cooling towers for the closed cycle cooling options."[18] Another of Bechtel's criteria for the placement of towers was "proper spacing to obtain *best performance*."[19] These criteria represent the most ideal conditions, but in reality, a company bidding on the actual retrofit would include real-world cost savings. The Subcommittee concluded that it "seems reasonable to assume that *some level of cost reduction* could be achieved for the different options without risking the safety and reliability of the plant."[20]

Bechtel's determination that there was insufficient area for seawater cooling towers led to a flawed cost analysis. One of the more costly aspects identified in the evaluation of the closed-cycle cooling systems was Bechtel's determination that there was insufficient area within the existing power plants footprint to accommodate cooling towers. As a result, they determined that the mountain north of the plant power would need to be leveled to accommodate the cooling towers, a new pump house, and a desalination plant. The excavation quantities for the two-tower option would be 190 million cubic yards, and the four-tower option would be 317 million cubic feet – these estimates are roughly the size of the Panama Canal excavation.[21]

Bechtel's cost estimates for the close-cycle cooling towers are inflated because they added $3 billion for the excavation of a mountainside the size of the Panama Canal excavation. Bechtel determined that the excavation of the mountainside was necessary because the "southern area is not the *optimal* location for the tower."[22] The "optimal situation" should not be the driving consideration when it comes with a $3 billion price tag; the State Board should only be concerned with feasibility as defined by the OTC Policy.

2. Close-cycle cooling is a viable technology that has been determined feasible for Diablo.

Bechtel concluded that close-cycle cooling is a feasible technology for Diablo; and seawater cooling towers have <u>not</u> been proven to be infeasible. The OTC Policy requires the State Board to consider the "[a]bility to achieve compliance with Track 1 considering factors including, but not limited to, engineering constraints, space constraints, permitting constraints, and public safety considerations."[23] After considering these constraints and considerations, Bechtel concluded that closed-cycle cooling systems are technically feasible at Diablo. Moreover, the Subcommittee also concluded that "closed cycle cooling is a viable technology that could ensure Diablo Canyon's compliance with the state's OTC Policy."[24]

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[16] Supra note 9, at 1.
[17] *Id* at 11.
[18] Handout from December 18, 2013 Review Committee Meeting entitled *Bechtel – Cooling Tower Location*. See http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/rcnfpp
[19] *Id*.
[20] Supra note 9, at 11.
[21] *Id*.
[22] Handout from December 18, 2013 Review Committee Meeting entitled *Bechtel – Cooling Tower Location*. See http://www.swrcb.ca.gov/water_issues/programs/ocean/cwa316/rcnfpp
[23] Supra note 12, at 11.
[24] Supra note 9, at 1.

Regarding seawater cooling towers – the most cost-effective option – Bechtel concluded that they are not feasible due to a lack of sufficient PM-10 emission offsets.[25] We agree that particulate emission offsets would likely be required for seawater towers at Diablo. However, relatively low-cost particulate emission offsets can be generated through such actions as road paving.[26] The Nuclear Review Committee questioned Bechtel's conclusions for the availability of PM-10 offsets[27], and requested Bechtel do a quick cost projection for seawater cooling towers. The Review Committee also requested that the Water Board staff contact the San Luis Obispo Air Quality Management District regarding the availability of PM-10 offset credits. After Bechtel provided further evaluation regarding seawater cooling towers, the Subcommittee found "no basis for excluding the salt water cooling from further consideration."[28]

The State Board should determine that close-cycle cooling towers are feasible at Diablo and require PG&E to retrofit its facility to come into compliance with the OTC Policy. Close-cycle cooling towers are not wholly out of proportion with previous estimates; and Bechtel and the Subcommittee both determined close-cycle cooling towers to be feasible at Diablo. The State Board should require PG&E to come into compliance with the OTC Policy by retrofitting Diablo with close-cycle cooling towers.

C. OPEN-OCEAN SCREENS ARE NOT AN EFFECTIVE METHOD TO REDUCE MARINE LIFE MORTALITY.

State Board Members should be made aware of the Tenera Study that led to the Nuclear Committee's determination that open-ocean screens are not a viable technology for reducing impingement and entrainment. The Nuclear Review Committee requested Tenera Environmental to conduct an assessment of the impingement and entrainment impacts of screens to approximate potential reductions for relevant species. The analysis revealed that the "screen technologies would be ***much less effective*** in reducing impingement and entrainment than initially identified in Phase I assessment."[29] The Tenera Study, which was based on the results of head capture analysis, indicated that mesh or slot openings larger than about 3mm would result in very little reduction in population-level mortality.[30] Bechtel concluded that there is very little reduction in entrainment for any mesh or slot openings larger than about 1mm due to the generally smaller size of the larvae entrained there. Given the "serious questions regarding the effectiveness of screens" Bechtel viewed the small reduction in entrainment "as a significant shortcoming for the screen alternatives."[31]

While we understand the Tenera Study was site specific to Diablo Canyon, the study provides the State Board, to-date, with the most detailed analysis of open-ocean screen effectiveness. As Attachment 2 details, the Tenera Study shows minimal, if any, reductions in marine life mortality. As the State Board considers whether screens are an appropriate technology for minimizing the mortality of marine life from desalination facilities, it is prudent to remember Attachment 2. The State Board is currently considering screen sizes of .75mm and 1.0mm to be used in-lieu of the best available technology under the draft Desalination Amendment. With an 18.4 percent reduction in marine life mortality for a .75mm screen, and only a 5.2 percent reduction for a 1.0mm screen, open-ocean screens do not rise to the level of the best available technology – they do not even come close.

If the State Board does not consider the Tenera Study during the development of the Desalination Amendment, it is likely that the Amendment will significantly undermine the OTC Policy and all of the facilities' retrofits – including Diablo.

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[25] *See* Bechtel Power Corporation, Final Technologies Assessment for Existing Once-Through Cooling System: Report No. 25762-000-30H-G01G-00001 (September 2014).
[26] B. Powers telephone conversation with L. Erickson, Monterey Bay Unified APCD, January 22, 2009.
[27] Supra note 9, at 9.
[28] *Id*.
[29] Length-Specific Probabilities of Screen Entrainment of Larval Fishes Based on Head Capsule Measurements, In support of California State Water Resources Control Board Once-Through Cooling Policy for Nuclear Fueled Power Plant Special Studies, Tenera Environmental, Revised July 31, 2013.
[30] Supra note 9, at 6.
[31] *Id*.

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Our organizations believe Diablo is a serious threat to California's marine environment and it is critical that Diablo retrofit its facility with close-cycle cooling in a timely manner. We look forward to working with you to ensure the OTC Policy is upheld and continues to phase-out the destructive practice of OTC in California.

Sincerely,

Sean Bothwell
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Karen Garrison
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Heal the Bay

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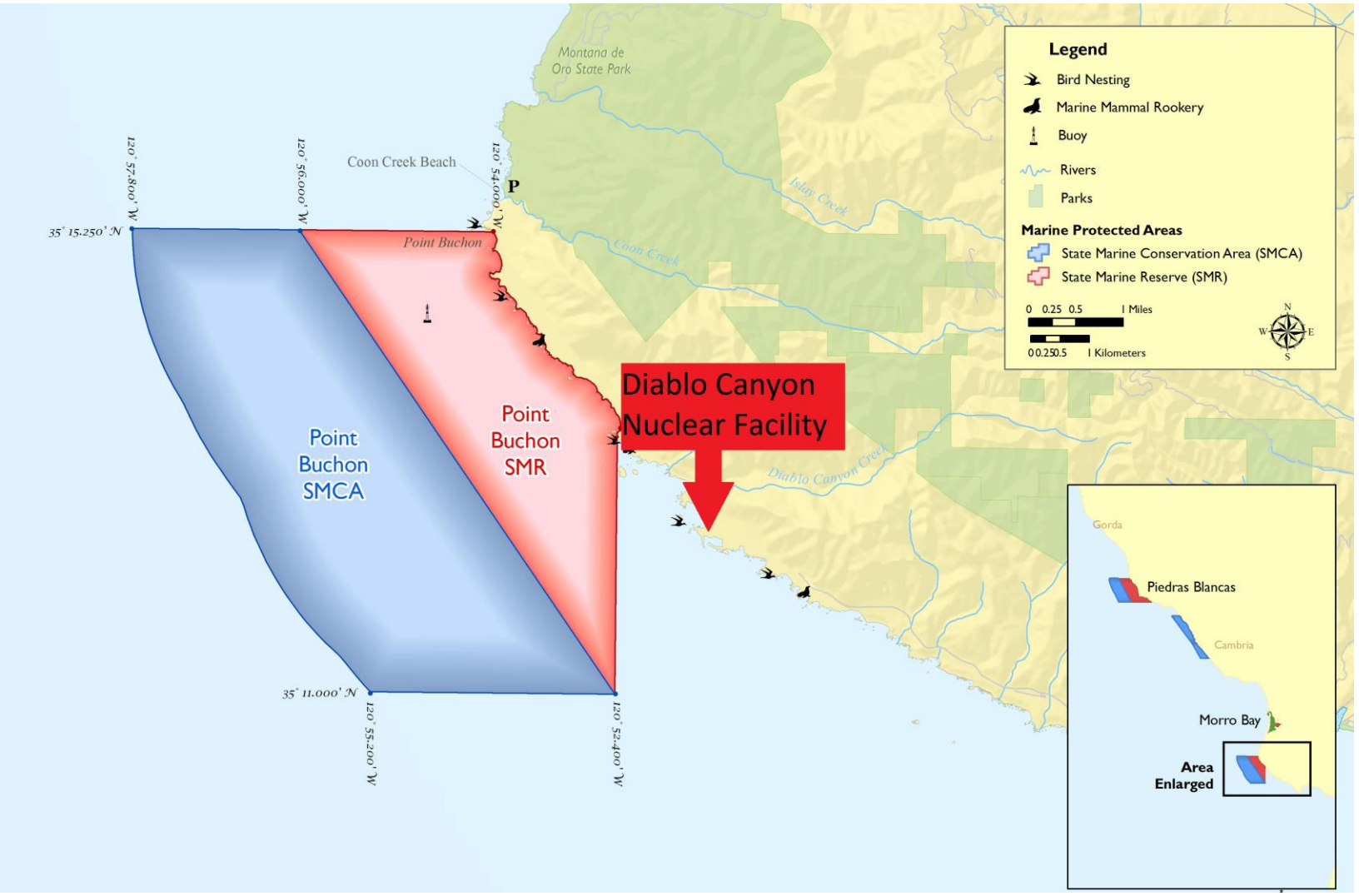
ATTACHMENT ONE



ATTACHMENT TWO

Table 8. Estimated total entrainment for seven taxonomic categories of fishes at DCPP for two year-long time periods: **July 1997–June 1998** and **July 1998–June 1999,** and estimated entrainment and percentage reductions in entrainment for six WWS slot widths.

Taxon	Year	Annual Entrainment Estimate	Entrainment with 0.75 mm Slot	Entrainment with 1.0 mm Slot	Entrainment with 2.0 mm Slot	Entrainment with 3.0 mm Slot	Entrainment with 4.0 mm Slot	Entrainment with 6.0 mm Slot
sculpins	97-98	281,090,063	250,963,525	272,928,200	280,905,488	281,077,740	281,088,820	281,090,063
	98-99	276,345,912	246,727,840	268,321,802	276,164,452	276,333,797	276,344,690	276,345,912
	Percent Reduction		**10.7**	**2.9**	**0.1**	**<0.1**	**<0.1**	**0.0**
rockfishes	97-98	216,878,458	184,049,464	207,640,578	216,852,906	216,877,448	216,878,392	216,878,458
	98-99	374,596,029	317,893,252	358,640,210	374,551,895	374,594,285	374,595,915	374,596,029
	Percent Reduction		**15.1**	**4.3**	**<0.1**	**<0.1**	**<0.1**	**0.1**
kelpfishes	97-98	121,977,076	99,498,869	116,388,842	121,704,903	121,972,683	121,977,076	121,977,076
	98-99	90,774,143	74,046,082	86,615,434	90,571,594	90,770,874	90,774,143	90,774,143
	Percent Reduction		**18.4**	**4.6**	**0.2**	**<0.1**	**0.0**	**0.0**
monkeyface prickleback	97-98	118,960,221	75,512,079	112,810,990	118,940,270	118,959,255	118,960,201	118,960,221
	98-99	127,721,405	81,073,394	121,119,296	127,699,985	127,720,367	127,721,383	127,721,405
	Percent Reduction		**36.5**	**5.2**	**<0.1**	**<0.1**	**<0.1**	**0.0**
anchovies	97-98	106,375,289	92,329,457	96,839,651	105,639,334	106,375,289	106,375,289	106,375,289
	98-99	3,209,133	2,785,398	2,921,462	3,186,931	3,209,133	3,209,133	3,209,133
	Percent Reduction		**13.2**	**9.0**	**0.7**	**0.0**	**0.0**	**0.0**
cabezon	97-98	14,707,340	10,576,147	13,674,113	14,705,082	14,707,330	14,707,340	14,707,340
	98-99	9,189,686	6,608,365	8,544,088	9,188,275	9,189,680	9,189,686	9,189,686
	Percent Reduction		**28.1**	**7.0**	**<0.1**	**<0.1**	**0.0**	**0.0**
flatfishes	97-98	45,128,059	42,009,412	43,464,849	45,114,887	45,128,059	45,128,059	45,128,059
	98-99	19,245,735	17,915,728	18,536,427	19,240,118	19,245,735	19,245,735	19,245,735
	Percent Reduction		**6.9**	**3.7**	**<0.1**	**0.0**	**0.0**	**0.0**
Average Percent Reduction in Entrainment			**18.4**	**5.2**	**0.2**	**<0.1**	**<0.1**	**0.0**