

San Diego
Regional Water Quality
Control Board



Executive Officer's
Report

December 14, 2005

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SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD

EXECUTIVE OFFICER'S REPORT

December 14, 2005

PART A

SAN DIEGO REGION STAFF ACTIVITIES *(Staff Contact)*

1. Personnel Report *(David Barker)*

As of December 2005 the California Regional Water Quality Control Board (San Diego Water Board) has an existing authorized staff size of 70 employee positions. Sixty of these positions are comprised of technical staff in the engineering, engineering geology, and biologist job classifications. Ten of these positions are comprised of staff in administrative office services and information technology job classifications.

The San Diego Water Board is currently involved in a major recruitment effort to fill vacancies resulting from recent staff departures as well as the establishment of new vacant positions resulting from budget augmentation with additional federal and state program funds. Three new employees reported to work in December and one new employee will report to work in January. Our current recruitment emphasis is to fill a total of 6 vacancies as follows:

- 1 administrative staff vacancy in information technology support services.
- 1 technical staff vacancy in the Department of Defense site cleanup program.
- 1 technical staff vacancy in Total Maximum Daily Load (TMDL) development program.
- 3 technical staff vacancies in the NPDES storm water program.

The recruitment and interview of candidates to fill these vacancies is underway. We are close to completing job offer negotiations with 1 candidate and anticipate they will report to work in the December – January time frame. We will continue the emphasis on recruitment to fill the remaining 5 vacant positions until all are filled.

2. Public Outreach Water Day Event *(Jody Ebsen and Jimmy Smith)*

On November 10, 2005 Regional Board staff attended "Water Day" held at "The School of Science, Connections and Technology" at the Kearny Educational Complex. The event was organized to offer 10th grade high school students a chance to interact with science professionals and obtain information about water issues. Approximately 123 students attended the Water Day event. The students began work on water quality related science projects to be completed in June 2006. The Regional Board staff provided informational handouts and met with students and teachers to discuss their interests.

3. Technical Presentation on Las Pulgas Landfill *(Amy Grove)*

On November 7, 2005, the Regional Board staff (Ms. Amy Grove) and State Water Board staff (Mr. Rich Boylan) gave a technical presentation to the statewide Land Disposal Roundtable. Representatives attended the Roundtable meeting from each of the Regional Boards and the State Water Board Land Disposal Program staff. The subject of the presentation was the investigation into failures of the landfill liner system at the Las Pulgas Sanitary Landfill located at U.S. Marine Corps (USMC) Base Camp Pendleton. From information available to the Regional Board, a number of defects in construction of the existing liner/ subgrade system, and/or operation of the leachate control/collection systems have resulted in violations of the waste containment requirements of Order 2000-054 (waste discharge requirements). Since April 2003, the Regional Board has issued the USMC eight enforcement actions related to the failure of the waste containment systems at the Las Pulgas Landfill. The presentation included a discussion of results from field investigations and laboratory testing conducted by environmental consultants to the USMC, and field observations made by the Regional Board staff.

4. Database Training for CIWQS *(Brian Kelley and John Odermatt)*

The California Integrated Water Quality System (CIWQS) is a new computer database system for the State and Regional Water Boards designed to track information about places of environmental interest, manage Orders and Resolutions, track compliance inspections, and manage enforcement activities. Implementation of the CIWQS database will require training for Dischargers and Regional/State Water Board staff. A key component of CIWQS is the electronic Self Monitoring Report (eSMR) module that will allow Dischargers to report their required monitoring data electronically via the CIWQS web site. Initially, the eSMR module will be available only for National Pollutant Discharge Elimination System (NPDES) individual permit holders. The CIWQS database replaced the SWIM database in June 2005.

On December 1, 2005, the Regional Board hosted a technical session designed to train selected staff on editing the CIWQS database. The technical session was designed to train staff on editing the violations and inspections modules of the CIWQS database. Staff attended the CIWQS training from Regions 4 and 9 (Brian Kelley and John Odermatt). The trainers included Messrs. James Maughan and Don Swiden, and Ms. Jarma Bennett of the State Water Board CIWQS Project Team. Additional training for entering regulatory measures into the system is scheduled for December 19 in Sacramento. A module for tracking paper reports is scheduled for release in January 2006. More information on the CIWQS database is available on-line at: <http://waternet/oit/ciwqs/>.

5. Meeting with USEPA Region IX: Office of Underground Storage Tanks *(John Anderson and John Odermatt)*

On December 6, 2005, the Regional Board staff from the Department of Defense – DoD (John Anderson) and UST (John Odermatt) programs met with representatives of the USEPA Region IX Office of Underground Storage Tanks. The USEPA is attempting to meet a federal requirement to close 50% of the existing open UST cases within the next 5

years. To achieve this goal, the USEPA is providing technical contractors to assist State and local agencies in expediting review and closure of low-risk UST cases. As part of that effort, the USEPA is providing a contractor to assist the Regional Board with processing of low-risk UST cases in the San Diego Region. The USEPA contractor is expected to be available between December 2005 and March 2006. Initially, the focus of this effort will be to process low-risk UST cases at Marine Corps Base Camp Pendleton but additional efforts may also include other low risk UST cases under the oversight of the Regional Board.

6. Trash Issue Focus Group Meeting for Chollas and Paleta Creeks *(Ben Neill)*

On Thursday, November 17, 2005, Mr. Eric Bowlby, the Canyons & Creeks Preservation Organizer for the San Diego Chapter of the Sierra Club, hosted a kickoff meeting to "identify and reduce sources of renegade trash into our environment". The group initially plans to focus on inner city urban canyons in the Chollas and Paleta Creek watersheds. Mr. Ben Neill of the Southern Watershed Protection Unit attended the focus group meeting. Several City of San Diego departments were represented as well as Caltrans and the Port District. San Diego City Council member Tony Young, whose district includes portions of the affected watersheds, addressed the group on the importance of a trash free environment to him and his constituents. The group discussed sources of trash, followed by current efforts to reduce trash and litter. The City of San Diego discussed a few of their many efforts to reduce trash; most notably their "Think Blue" education program, volunteer cleanups, and their code enforcement program. Caltrans presented their education program titled "Don't Trash California". Also discussed were current obstacles to reducing trash in the Chollas watershed such as differences in language and culture, and a lack of funding for local government programs. Kim Herbstritt of the Institute for Public Strategies gave the final presentation on her experience garnering local community involvement with the Chollas Canyon Coalition. The focus group will invite local community representatives to attend future meetings and to help collaborate on solutions to the litter problem. In the future, successful efforts in reducing trash within the Chollas and Paleta watersheds will be expanded to include other watersheds in the San Diego region. The Regional Board will continue to participate in these efforts.

7. Nonpoint Source Conference *(Ben Neill)*

On November 7-9, Dave Gibson, Ben Neill, Jimmy Smith, and Debbie Woodward attended the Third Biennial Non-Point Source Pollution Conference in Sacramento. The conference was sponsored by the State Water Resources Control Board (SWRCB), the Regional Water Quality Control Boards, the California Coastal Commission (CCC) and the United States Environmental Protection Agency, Region 9 (USEPA). Celeste Cantu, the SWRCB's Executive Director; Peter Douglas, the CCC's Executive Director; and Alexis Strauss, USEPA Water Division's Director, gave the opening remarks. Approximately 350 people attended the conference. Presentations about projects and practices implemented to improve water quality in California focused on monitoring of non-point source pollution related to agriculture, forestry, marinas, urban runoff, hydromodification, wetlands, and vegetated treatment systems. Notable conference

presentations included: Norris Brandt of the Irvine Ranch Water District describing natural treatment systems implemented in San Diego Creek; Pete Ode of the Department of Fish and Game presenting GIS techniques to investigate non-point source stressors and the condition of stream invertebrates; and Dr. Khaled Bali, University of California Desert Research and Extension Center, describing how in the Imperial Valley, changes in irrigation practices and application of polyacrylamide successfully reduces sediment and phosphorous loads in receiving waters.

PART B **SIGNIFICANT REGIONAL WATER QUALITY ISSUES**

1. Sanitary Sewer Overflows (SSO) (*Charles Cheng, Cade Johnson, Joann Lim, Melissa Valdovinos, Victor Vasquez*) (*Attachment B-1*)

From November 1 to November 30, 2005, there were 14 sanitary sewer overflows (SSOs) from publicly-owned collection systems reported to the Regional Board office; eight of these spills reached surface waters or storm drains, none resulted in closure of recreational waters. Of the total number of overflows from public systems, four were 1,000 gallons or more. The combined total volume of reported sewage spilled from all publicly owned collection systems for the month of October 2005 was 9,487 gallons.

There were also 10 sewage overflows from private property reported in November 2005. One of these spills reached surface waters or storm drains, but none resulted in closure of recreational waters. None of the overflows from private property were 1,000 gallons or more.

The total rainfall amount for November 2005 recorded at San Diego's Lindbergh Field was 0.12 inch. For comparison, in October 2005, 0.46 inch of rainfall was recorded at Lindbergh Field, and 15 public SSOs were reported. Also for comparison, in November 2004, 0.33 inch of rainfall was recorded at Lindbergh Field, and 24 public SSOs were reported.

Attached is a table entitled "Sanitary Sewer Overflow Statistics," updated through November 30, 2005, which contains a summary of all sanitary sewer overflows (by FY) from each agency since FY 2001-2002.

It should be noted that the data for spill volume per volume conveyed (GAL/MG) could be easily misinterpreted. For a sewer agency that has a small system size, but experienced a spill of a few hundred gallons or more, the value may show high. Also, for a sewer agency that has a large system size, a high volume spill event may not result in a high value for this statistic. Hence, these numbers by themselves are not sufficiently representative of the measures being taken by a sewer agency to prevent SSOs, nor can the numbers be compared directly between agencies. The data does represent a different way to review and analyze SSO volume data as it relates to system size.

Additional information about the Regional Board's SSO regulatory program is available at the Regional Board's website at <http://www.waterboards.ca.gov/sandiego/programs/sso.html>.

One Notice of Violation (NOV) was issued in November for a significant overflow as follows:

City of San Diego

The City of San Diego (City) notified this office of a 12,300-gallon sanitary sewer overflow, none of which was recovered, that occurred on October 19, 2005 at 3819 Estrella Avenue. Sewage reportedly flowed into Chollas Creek, which was dry at the time, and soaked into the ground. The cause of the overflow was reported as a blockage in a 4-inch sewer lateral and the associated 8-inch sewer main as a result of vandalism.

2. Clean Water Act Section 401 Water Quality Certification Actions Taken in November 2005 (Bob Morris) (Attachment B-2)

Section 401 of the Clean Water Act requires that any person applying for a federal permit or license which may result in a discharge of pollutants into waters of the United States, must obtain a state water quality certification that the activity complies with all applicable water quality standards, limitations, and restrictions. The majority of project applications are submitted because the applicant is also applying for a Section 404 permit from the Army Corps of Engineers, for filling or armoring of creeks and streams. See attached table (B-2).

Public notification of pending 401 Water Quality Certification applications can be found on our web site at: <http://www.waterboards.ca.gov/sandiego/programs/401cert.html>.

3. Grants Update (Dave Gibson)

Status of State Bond Act and federal 319(h) Grant Program Projects

The Regional Board staff is currently managing 37 grant-funded contracts worth approximately \$53 million and is processing the extension requests for eight Proposition 13 Phase II grants. There are approximately 11 projects that are behind schedule. The extension amendments will provide the additional time for some grantees to complete their projects. For projects that are behind schedule and cannot be extended, the Regional Board staff will try to work with the grantees to return the projects to schedule. In particular, the Los Penasquitos Lagoon Foundation (Foundation) grants for constructing sediment detention basins and implementing source control measures are significantly behind schedule. The Regional Board is working closely with the Foundation staff to develop and submit amendment requests to enable the Foundation to complete a basin and implement source control BMPs under the two grants. The amendment and deviation requests are under review by the State Water Resources Control Board (SWRCB) staff.

The Regional Board met with the Lakeside Conservancy on December 1, 2005 to discuss amendments to one of their contracts that would permit them to work with Caltrans on sediment-fill removal along the San Diego River in conjunction with the extension of

Highway 52 in Santee. The Lakeside Conservancy will restore wetland habitats along the San Diego River through the removal of fill material and restoration of floodplain and wetlands in the project area adjacent to Highway 67. Caltrans will require fill material in 2008 for the Highway 52 extension to Highway 67 and can use virtually the entire volume of fill material the Conservancy plans to remove from the San Diego River floodplain. Use of this fill material close by the Highway 52 project area will save Caltrans approximately \$3 million in purchase and trucking costs over the alternative project plan to bring the needed fill material in from Ramona. If accepted by the SWRCB, the amendment would realize a net savings to the State of \$3 million while ensuring the success of the grant-funded projects in Lakeside.

Proposition 50 Integrated Regional Water Management (IRWM) Grant Program

The Director of the Department of Water Resources (DWR) is considering final approval of the IRWM planning grant-funding list. Management level reviews of the Step 1 Implementation Grant Proposals are being completed at SWRCB and DWR. Applicants for the Step 1 Implementation Grant proposals will be notified of the status of their applications in early January 2006.

Proposition 40 and Proposition 50 Consolidated Grants Program

Approximately \$144 million is available in the six funds included in the Consolidated Grants program. All remaining funds (approximately \$10 million) in the Proposition 13 accounts will also be made available in the Consolidated Grants program.

The draft Consolidated Grants Program Guidelines were released for public comment on November 3, 2005. Comments were due to SWRCB on December 5, 2005. Three public workshops, including one in San Diego, were also held to provide the public with an opportunity to review and comment on the draft Guidelines. Approximately 70 people attended the San Diego workshop on November 30, 2005. SWRCB staff are currently reviewing the comments and revising the draft Guidelines. The final Guidelines will be considered for adoption by the SWRCB on January 4, 2006. If the Guidelines are adopted on January 4, 2006, Concept Proposal applications may be accepted on the Financial Assistance Application Submittal Tool (FAAST) website beginning January 9, 2006 with all proposals due no later than February 9, 2006. Applicants that submit competitive Concept Proposals will be invited to submit Full Proposals in March 2006. All grants funded under Prop. 40 must be encumbered no later than December 2006 and all grant funded work completed by September 2008. For Prop. 50, all grants must be encumbered by June 2008 and all work completed by June 2010.

Funding Fair

The SWRCB hosted a one-day Funding Fair on November 4, 2005 in Sacramento. The purpose of the Funding Fair was to provide an overview of current and upcoming funding opportunities and tips for completing applications, negotiating grant agreements, and managing grants. The SWRCB received many positive comments from the approximately 200 attendees. The Funding Fair website has been updated with event

handouts, presentations, and a list of the attending organizations. The Funding Fair website is at: <http://www.waterboards.ca.gov/funding/fundingfair.html>

Dairy Water Quality Grant Program

Statewide, 19 proposals were submitted by the October 3, 2005 due date requesting \$17.5 million in grant funds. There is \$5 million available. No proposals were submitted for projects in the San Diego region. Project proposal reviews are underway. The final Selection Panel meeting has been set for December 16, 2005. The recommended project list may be considered for adoption by the SWRCB in January 2006.

Small Community Groundwater Grants

The proposal submittal period closed on August 19, 2005. Forty-eight proposals, totaling approximately \$48.2 million, were submitted. The total available funding is \$9.5 million. Neither of the two proposals submitted in the San Diego region were competitively ranked on the Competitive Project List (CPL), which was adopted by the SWRCB on November 16, 2005. The CPL includes 11 projects totaling \$14.9 million in Rank 1. Applicants with projects in Rank 1 have been invited to submit complete applications. The SWRCB will process complete applications until the funds are exhausted.

Clean Beaches Initiative Grant Program

The Clean Beaches Task Force will meet on December 13, 2005 to review the new project proposals and discuss the Proposition 50 guidelines. Ten projects worth approximately \$10 million have been recommended for Proposition 40 funding, leaving a balance of approximately \$12.2 million. The SWRCB will consider amending the Competitive Location List (CLL) for eligible projects at its January 2006 meeting. The SWRCB is continuing to accept applications for Proposition 40 funds for projects on the CLL.

4. Shelter Island Yacht Basin TMDL for Dissolved Copper (Lesley Dobalian)

The Office of Administrative Law (OAL) approved the Shelter Island Yacht Basin TMDL for Dissolved Copper on December 2, 2005. The TMDL was forwarded to the U.S. Environmental Protection Agency for final approval, expected to occur in February 2006. OAL approval marks the beginning of the 17-year compliance schedule in the TMDL for meeting copper load reductions.

5. Status Report on Rainbow Creek Total Nitrogen and Total Phosphorus TMDLs (Lisa Honma)

The Regional Board adopted the Rainbow Creek Total Nitrogen and Total Phosphorus TMDLs on February 9, 2005. The State Board approved the Total Nitrogen and Total Phosphorus TMDLs for Rainbow Creek on November 16, 2005. The TMDL will be forwarded to the Office of Administrative Law (OAL) for review and will subsequently be forwarded to the U. S. Environmental Protection Agency for final approval.

6. Recent Newspaper Articles regarding Environmental Issues at MCB Camp Pendleton
(Beatrice Griffey & John Anderson) (Attachment B-6)

In September 2005, the North County Times and the San Diego Union Tribune published several articles reporting on the presence of lead and copper in the potable water supply of the U.S. Marine Corps Base, Camp Pendleton (Base). It is the Marine Corps' position that the elevated lead and copper concentrations are related to corrosion of the potable water supply system and not related to the ground water aquifer. At this time, Base representatives are investigating the matter, and providing bottled water, and blood testing to interested individuals living/working on Base. This matter is under the statutory authority of the Department of Health Services.

Whereas there are several contaminated sites involving metals within Base boundaries, to date, significant lead contamination in ground water has not been identified (out of a total of 383 quarterly samples collected since January 1998 for the southern distribution system, all registered "non-detect" for lead except for six samples). Of the six detections of lead, only one sample was above the 15 ppb action level for lead (Well No. 330925 had 27 ppb in 1998). Since 1998 this well has had two other detections both below the 15 ppb action level (0.8 ppb in 1999 and 6 ppb in 2004). The Base currently has plans to include metals analyses in future environmental restoration studies in the Santa Margarita River basin, which provides water for a major part of the southern distribution system. The Site Mitigation and Cleanup Unit staff will be receiving period updates. The Camp Pendleton point of contact regarding this matter is Major Andrew Entingh, who may be reached via phone at (760) 725-4557 or via electronic mail at andrew.entingh@nmci.usmc.mil.

On November 22, 2005, the San Diego Union Tribune published an extensive article reporting on various environmental issues at the Base. A portion of the article addressed contaminated sites involving numerous pollutants that were released to the environment by accidental spills and the improper containment, use, and disposal of waste, wastewater, and chemicals. A Regional Board geologist within the Site Mitigation and Cleanup Unit, Beatrice Griffey, is overseeing the investigation and cleanup of these sites. Additionally, the article included an overview of waste containment and storm water issues at the Las Pulgas Landfill. The issues are of environmental significance and include the erosion and runoff control, leachate discharge, and possible liner failure in a 17-acre section of the 39-acre Landfill. A Regional Board geologist within the Land Discharge Unit, Amy Grove, is overseeing environmental activities at the Landfill. The subject articles contains several quotations obtained from several Regional Board representatives and is attached for review.

7. Discharge of Concrete Slurry to De Luz Creek near Temecula, Riverside County (Eric Becker)

Approximately 170,000 gallons of concrete slurry waste was discharged to De Luz Creek, a tributary of the Santa Margarita River, after an illicit, unregulated surface impoundment failed some time between November 22nd and November 29th. The impoundment is located in Riverside County, but the discharge to De Luz Creek has also impacted areas within San Diego County. On December 7, 2005, a Cleanup and Abatement Order

(CAO) was issued requiring the responsible parties to take immediate and effective action to remove the slurry from the creek and to mitigate for the impacts of the discharge.

The responsible parties named in the CAO are Multiple Concrete Enterprises Inc., Micheal & Milan Lubanko, LUBCO Inc., and Tabatha and Keri Lubanko. Multiple Concrete Enterprises Inc. is the contractor that generated the concrete slurry waste as part of its concrete grinding operation for a Caltrans Interstate-5 construction project and that transported the waste to the surface impoundment. LUBCO Inc. was contracted by Multiple Concrete Enterprises Inc. to dispose of the slurry waste.

8. Mission Valley Terminal (*Kelly Dorsey*)

On November 22, 2005, the Regional Board staff met with our technical consultants (Drs. Margaret Eggers and Paul Johnson) and representatives from Kinder Morgan (the Discharger) to discuss technical comments regarding: 1.) a revised Corrective Action Plan for off-property cleanup and 2.) a Corrective Action Plan containing proposed method(s) and a schedule for cleanup of on-property pollution from the Mission Valley Terminal. The Discharger submitted both reports in compliance with Addendum No. 5 to Cleanup and Abatement Order (CAO) 92-01. The Discharger plans to address most of the Regional Board staff concerns as revisions to these reports. The Regional Board staff and the Discharger are likely to schedule future meetings to discuss strategies for the long-term monitoring and remediation of the on-property area as these efforts may be complicated by the continuation of on-site terminal operations and the treatment capacity of the proposed remediation system.

On November 14, 2005, the Regional Board staff received a request to provide an overview of site remediation to the San Diego River Conservancy. On November 18, 2005, the Regional Board staff provided a written summary of regulatory actions and other factors affecting cleanup and abatement of pollution from historical operations at the Mission Valley Terminal. The written summary will be included as an Executive Officer Report item during the San Diego River Conservancy meeting on December 2, 2005 (see SDRC agenda online at <http://sdrc.ca.gov/meetings.html>).

The next milestones required by CAO 92-01 include completion of the Discharger's evaluation of their remediation system to determine compliance with the performance criteria required in the Monitoring and Reporting Program and their next quarterly groundwater monitoring report (due by April 30, 2006).

9. Mission Bay Landfill (*Brian McDaniel*)

On November 18, 2005, the California Regional Water Quality Control Board, San Diego Region (Regional Board) staff attended the monthly Mission Bay Landfill Technical Advisory Committee (TAC) meeting. The Regional Board currently regulates the Mission Bay Landfill pursuant to Waste Discharge Requirements (WDRs) Order 97-11 (and addenda thereto). Regional Board staff continue to review the facility's semi-annual groundwater monitoring reports. Current groundwater monitoring reports indicate the detection of low levels of volatile organic compounds (VOCs) in several wells at the site

The current focus of the TAC is to provide the City's environmental consultant, SCS Engineers, with comments on the draft Site Investigation Report. The draft report addresses the current conditions. The staff anticipates that the TAC members will request additional information regarding the report's conclusion and addressing current and future land uses for the site. The City of San Diego has created a web site (at <http://www.sandiego.gov/citycouncil/cd6/crtk/mblandfill.shtml>) allowing the public, and other interested parties, to follow the work of the Mission Bay TAC.

10. Cyanobacteria (Blue-Green Algae) in California (Peter Michael) (Attachment B-10)

The San Diego Region has many impoundments. Green algae and blue-green cyanobacteria are normally found in these reservoirs. The information in this executive officer report is presented to inform the Regional Board of the growing concern about cyanobacteria in northern California where blue-green toxin levels are high; however, no board action is recommended at this time in the San Diego Region.

The U.S. Environmental Protection Agency (USEPA) on September 30, 2005 issued a news release, "*Federal, Tribal, and State Authorities Advise Caution on Dangerous Klamath River Algae*" (www.epa.gov, search for "blue green"). The North Coast Regional Water Quality Board and the Karuk Tribe joined USEPA and local agencies to advise the public to avoid ingesting water or coming into contact with water undergoing blue-green cyanobacteria blooms in reservoirs. The USEPA September 30, 2005 news release is attached (B-10).

Lakes, streams, and coastal lagoons in southern California often contain algae. Algae can appear as floating mats and can be distributed in the water as plankton. The usual algae species present are green algae; however, species of bacteria called cyanobacteria, which produce pond scum, are often found in the same water bodies. Cyanobacteria are often referred to as "blue-green algae" because of their appearance.

During warm weather in the summer and fall months and if the nutrients nitrogen and phosphorous in water are high, both the true algae and the cyanobacteria can "bloom," causing discoloration. During blue-green blooms especially, bacteria populations can multiply to very high levels in just a few days. As cells die, some blue-green species can release toxic chemicals, called "toxins," into the water. The presence of a major blue-green bloom in a water body is usually a cause for concern.

One of the blue-green species, *Mycrocystis aeruginosa*, can produce a powerful and persistent toxin. Some toxins are known to cause skin irritation in humans, and if ingested, can damage the liver. *Mycrocystis* toxin concentrations have been measured in a Klamath River reservoir up to 217 times the World Health Organization standard for tolerable daily intake, and have been detected up to 125 miles downstream. Cell counts of up to 468 times the World Health Organization *Microcystis* standard for recreational water use, and among the highest recorded in the United States, were recorded during a blue-green bloom in a Klamath reservoir.

On November 8, 2005 USEPA and the State Water Board held a well-attended workshop in Sacramento that was telecast over the Internet. For speaker handouts, please download them from <http://www.waterboards.ca.gov/>. Dr. Ken Hudnell of USEPA summarized his cyanobacteria research and discussed growing worldwide interest in further research. As a follow-up in the San Diego Region, Mr. Bruce Posthumus of the San Diego Regional Board in mid-November provided a list of possible research projects to the Southern California Coastal Water Research Project (SCCWRP) at its Commissioners' Technical Advisory Committee meeting. He recommended SCCWRP undertake "... studies to investigate [the] relationship, if any, between cyanobacteria and reported symptoms of water contact users of bays and nearshore ocean waters (e.g., surfers and bathers)."

11. Status of City of Escondido's Compliance with MS4 Permit Requirements (Eric Becker)

On November 2, 2005, the Regional Board Watershed Protection Unit (WPNU) met with representatives of the City of Escondido to discuss the City's ongoing failure to take appropriate and timely enforcement action against developers of construction sites within their city. As prescribed by Order No. R9-2001-001, *Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, and the San Diego Unified Port District*, the City must enforce its ordinances requiring Best Management Practices (BMPs) at construction sites for the purpose of reducing pollutants in storm water runoff to the maximum extent practicable. In March 2005, an Administrative Civil Liability complaint was issued in part for the City's noncompliance with this requirement. In October 2005, the WPNU found the City had failed to take necessary enforcement action at two construction sites lacking the BMPs required under the City's ordinances.

During the November 2, 2005 meeting, the City acknowledged that it has the authority and necessary requirements to ensure that adequate BMPs are implemented at construction sites. As a follow up to the meeting, the WPNU conducted joint inspections of the two construction sites with City field personnel and learned that the City has improved its construction inspection/enforcement process to better document, cite, and utilize effective enforcement tools, such as "stop work" orders. On November 21, 2005, the City also submitted a corrective action plan to address deficiencies in the construction program. The WPNU will continue to review the City's oversight of construction sites to ensure compliance with Municipal Storm Water Permit No. R9-2001-01.

12. Status Report: City of San Diego Convention Center Groundwater Dewatering (Vicente Rodriguez)

The City of San Diego discharges to San Diego Bay from 300,000 to 400,000 gallons per day of groundwater extracted from beneath the convention center parking structure in accordance with effluent limitations contained in Waste Discharge Requirements Order No. R9-2003-0050.

Since January 1, 2000, the City of San Diego has reported approximately 80 violations of effluent limitations, including violations for toxicity and heavy metals. The Regional Board has assessed the City of San Diego \$72,000 in Mandatory Minimum Penalties (MMP) for 24 of the violations. About half of the remaining violations are subject to MMP and the remainder to discretionary liability. The potential maximum liability for these violations could reach \$500,000, based on criteria established in California Water Code Section 13385. In March and December 2003, the Regional Board adopted Cease and Desist Order No. R9-2003-0086 (CDO), which required the City of San Diego to submit a plan to achieve compliance with discharge requirements by either adding a treatment system or finding other disposal options. The CDO requires the City of San Diego to perform accelerated monitoring when violations are first detected and to implement their plan when violations of a similar type persist over a specified time.

In November 2005, the City of San Diego notified the Executive Officer that the results of the accelerated monitoring required the implementation of the Remedial Action Workplan to provide necessary treatment to achieve compliance. The City of San Diego, however, requested a delay in implementing the plan to January 2006 to allow a new type of charcoal filter to be installed and tested and additional, accelerated monitoring to confirm the earlier submitted data on violations.

13. Rescission of Notices of Violation for Alleged Noncompliance--Watershed Urban Runoff Management Plan Requirement (Michael McCann) (Attachment B-13)

In accordance with the Regional Board's direction at the November 9, 2005 Board Meeting, letters were sent on November 14th to the 21 San Diego County MS4 stormwater copermittees rescinding the Notices of Violations issued to them on June 17, 2005. Attached is a copy of one of the letters.

The November 14 letters also referred to a meeting of the copermittees and the Regional Board Executive Officer to discuss future compliance with the MS4 stormwater permit requirements. This meeting occurred on December 1, 2005 as part of the monthly meeting of the City/County Management Association. John Robertus, Michael McCann, and Phil Hammer participated in a discussion with the management staff of a number of copermittees. The discussion focused on effective ways for the Regional Board to work with the copermittees in complying with the MS4 permit requirements. The copermittees requested greater cooperation by the Regional Board in helping them meet the MS4 permit requirements and expressed appreciation to John Robertus for being open to their suggestions for improving understanding of the permit requirements. John Robertus invited the copermittees to provide their perspective on funding of their stormwater programs and also to provide input on the new requirements proposed in the next MS4 permit that will be considered by the Board as early as May 2006.

14. Shipyard Sediment Cleanup Report (David Barker)

Elevated levels of pollutants above San Diego Bay background conditions exist in the San Diego Bay bottom marine sediment within and adjacent to the National Steel and Shipbuilding Company and BAE Systems San Diego Ship Repair facility leaseholds

(referred to as the "Shipyard Sediment Site"). The Regional Board is considering development and issuance of a cleanup and abatement order for discharges of metals and other pollutant wastes to San Diego Bay marine sediment and waters at this site. On April 29, 2005 the Regional Board circulated for public review and comment a tentative version of the cleanup and abatement order (see tentative Cleanup and Abatement Order No. R9-2005-0126). A copy of this document is posted on the Regional Board website at <http://www.waterboards.ca.gov/sandiego>.

Regional Board staff is close to finalizing a draft Technical Report providing the rationale and factual information supporting the proposed findings and directives of tentative Cleanup and Abatement Order No. R9-2005-0126. We currently plan to release it for public review on the Regional Board website by the end of December 2005. The report is a complex lengthy document and comprises over 400 pages of text and appendices addressing multiple parties that should be held accountable for the cleanup, the volume, physical, chemical and toxicity characteristics of the contaminated marine sediment, the potential for health risks to humans and damage to aquatic life and aquatic dependent wildlife caused by exposure to pollutants in the sediment, the technological and economic feasibility of various cleanup or remedial alternatives and recommended marine sediment cleanup levels for a suite of chemical constituents.

PART C

STATEWIDE ISSUES OF IMPORTANCE TO THE SAN DIEGO REGION

1. *Caulerpa taxifolia* Eradication and Prevention Activities (Lesley Dobalian & Bruce Posthumus) (Attachment C-1)

SDRWQCB continues to participate in efforts to eradicate the two known infestations of the highly invasive non-native seaweed *Caulerpa taxifolia* in southern California, to find any other infestations, and to prevent new infestations. This alga is a "living pollutant" which is capable of growing, spreading, and causing ongoing and increasing damage to ecosystems of coastal waters. It has infested large areas of the Mediterranean Sea, with serious adverse effects on natural ecosystems. In 2000, infestations were found in two coastal embayments in southern California: Agua Hedionda Lagoon in the San Diego region and Huntington Harbour in the Santa Ana region. These are the only known infestations in the western hemisphere. The Mediterranean infestation and both southern California infestations are believed to have resulted from aquarium releases.

Efforts to eradicate the southern California infestations were initiated shortly after they were discovered. Periodic surveys of the infestation sites have been conducted as part of the eradication efforts. No *Caulerpa* has been found in Agua Hedionda Lagoon since September 2002 or in Huntington Harbour since November 2002. If none is found at these sites during the fall 2005 surveys, the Southern California *Caulerpa* Action Team (SCCAT), which has overseen eradication efforts and in which SDRWQCB actively participates, plans to consider recommending that the Department of Fish and Game determine that the infestations have been eradicated.

Even if the two known infestations are considered eradicated, surveys of other southern California coastal waters will continue in order to determine if there are other, currently unknown, infestations. Outreach and education efforts directed towards preventing new infestations and encouraging reporting of possible infestations will also continue. A project to develop methods for eradication in high-energy open coastal waters is also planned, in anticipation of the possibility that an infestation could occur in such waters.

Much of the funding for eradication and prevention work has been provided by grants from the State Water Resources Control Board.

The attached paper published in the journal *Biological Invasions* discusses lessons learned from the first several years of efforts to eradicate the southern California infestations.

For more information, see the National Invasive Species Council website at <http://www.invasivespeciesinfo.gov/ismonth/archives/caulerpa/speciesofmonth.html>.

2. Forging Partnerships on Emerging Contaminants (John Anderson)

The Environmental Council of the States (ECOS) - Department of Defense (DoD) Sustainability Work Group held a conference in San Diego November 2-3, 2005 on Forging Partnerships on Emerging Contaminants, A Forum for State and Federal Stakeholders. The purpose of the Forum was "to foster dialogue between environmental regulators and the regulated community on the issues and challenges associated with emerging contaminant and how they can be better addressed in the future." The ECOS-DoD Sustainability Work Group was created in Spring 2004 and is co-chaired by Jon Sandoval of Idaho Department of Environmental Quality and Alex Beehler of the Department of Defense. The Work Group serves as a focal point within ECOS where ECOS and DoD can discuss and address issues related to sustainability of remedial work and the military mission at DoD installations.

The specific objective of the Forum was to identify issues that the Forum participants believe are the greatest roadblocks in addressing emerging contaminant issues. Emerging contaminants are either newly identified contaminants (i.e. perchlorate, 1,4-Dioxane) or contaminants that have new or conflicting toxicology or exposure information not used before (i.e. trichloroethylene). In attendance were 150 state, federal, and non-governmental representatives that included representatives from 30 states. Through four breakout sessions, the Forum participants identified twenty-two issues. As an example, the top two issues include: 1) *The ECOS and DoD Sustainability Workgroup should develop a resolution and champion a broad policy of pollution prevention regarding emerging contaminants;* 2) *Develop a framework with consideration of the risk assessment process and risk management perspectives for what to do with Emerging Contaminants after identification but prior to agreement on protective levels.* The ECOS-DoD Sustainability Work Group will now use this information to develop an issue

paper(s) to help focus development of a cooperative process to address emerging contaminants.

3. Brownfields - New Orphan Site Cleanup Account (OSCA) Program Created (*John Anderson*)

A new grant program, the Orphan Site Cleanup Account (OSCA) was added to the Chapter 6.75 of the California Health and Safety Code effective January 1, 2005 (AB 1906 Lowenthal). The OSCA was created to encourage the cleanup of Brownfield sites contaminated by petroleum underground storage tanks where there is no financially responsible party. This program will provide financial assistance to eligible applicants for cleanup at these sites. The OSCA Program will receive a \$10,000,000 per year appropriation for fiscal years 2005, 2006, and 2007. An application process will be used to determine eligible projects. OSCA grants will be issued to eligible applicants based on the availability of funds and their placement on the OSCA Priority List.

The main application requirements include: 1) Site does not qualify for the UST Cleanup Fund; applicant did not cause or contribute to the release; and applicant has no affiliation to a responsible party, 2) Must be a Brownfield site and principal source of contamination is from a petroleum UST, and 3) no financially responsible party has been identified to pay for the cleanup costs.

OSCA Application Packages will be available on line and mailed to interested parties in December 2005. State Water Resources Control Board will adopt the OSCA Priority List in March 2006 and funding the applications is proposed by April 2006. As OSCA Program information becomes available, the Special Accounts Unit of the Division of Financial Assistance will post information at the following website:

www.waterboards.ca.gov/cwphome/ustcf/osca.html. Interested parties' can also sign up and subscribe to the OSCA electronic mailing list for future OSCA Program updates at the following website: http://www.waterboards.ca.gov/lyrisforms/swrcb_subscribe.html

4. AB 885 Regulations – Onsite Wastewater Treatment Systems (*Bob Morris*)

As enacted by Assembly Bill 885 and prescribed by California Water Code section 13291, the State Water Resources Control Board is currently drafting new statewide regulations for the permitting and operation of onsite wastewater treatment systems (OWTS). An OWTS is any individual or community onsite wastewater treatment, pretreatment, and dispersal system. The most common OWTS in the San Diego Region is the "conventional" septic tank/leach field system. There are also a few systems referred to as "alternative systems" such as mounds and evaporation/transpiration systems. In addition, the SDRWQCB recently has received several proposals for onsite systems referred to as "experimental systems". These systems, which are designed to reduce pathogen and nitrate levels in the discharge, consist of small treatment plants with shallow subsurface drip irrigation systems on individual home sites and commercial lots.

On December 9th, the State Board will have conducted a public workshop to discuss the comments that were provided at their recent OWTS scoping meetings held in Riverside,

Santa Rosa, Malibu, Sacramento, and Redding in preparation of an Environmental Impact Report, as well as options and a timeline for adopting the new regulations. The State Board has received more than 300 letters and heard from more than 80 people during the public comment period. The commenters ranged from representatives of public agencies and organizations to business owners and private individuals. Even with the broad range of commenters, a few common themes were identified among the comments received.

Some stakeholders generally support the proposed new regulations, see the need for OWTS-related water quality issues to be resolved, are glad to see the State is doing something to help resolve these issues, and feel more comprehensive and coordinated regulation of OWTS is long overdue. Many supporters of the proposed project offered specific comments involving proposed modifications to the draft regulations with the intention of improving the proposed regulations. Other stakeholders, however, contend that the current OWTS regulatory environment works fine, that the state's soil and hydrogeologic conditions already do a good job of treating OWTS effluent, that more government regulations and associated costs for homeowners and business owners are not warranted, and that "if it ain't broke, don't fix it."

The proposed regulations may result in significant changes in the way the Regional Board and local environmental health agencies regulate OWTS. As currently proposed, the regulations would require either the Regional Board or the local agency, pursuant to a Memorandum of Understanding with the Regional Board, to issue renewable operating permits to the owners of new OWTS. Consequently, the Regional Board and the local agencies have significant interest in the outcome of the State Board action and will continue to coordinate our tracking and review of these new regulations.

5. SWRCB Report on the Role of Science for Water Boards (*John Robertus*)

The SWRCB has released the report, Role of Science and Engineering in Decision-Making Within the State and Regional Water Boards. It was published in September 2005 and culminated months of effort by retired annuitant, William A. Vance, Ph.D., who served as a scientist for the SWRCB for many years. The 72-page report discusses the role of science, engineering and technology in decision-making at the Water Boards in implementing federal and state laws along with their implementing regulations, and Water Board plans and policies. It has been provided to the San Diego Regional Board Members and is available for review at the SDRWQCB Website at:

http://www.waterboards.ca.gov/sandiego/programs/reference%20pubs/reference_pubs.html.

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION**

**SIGNIFICANT NPDES PERMITS, WDRs,
AND REGIONAL BOARD ACTIONS**

December 14, 2005

APPENDED TO EXECUTIVE OFFICER REPORT

SIGNIFICANT NPDES PERMITS, WDRS, AND RB ACTIONS

DATE OF REPORT	NAME OF PERMIT/WDR/RB ACTION	Action Type	Initial Document Application Complete	Dish./RWQ Limits and Monitoring Plan Known	Draft Complete	Public Rev. & Comment	BOARD HEARING & ADOPTION	Consent Item	COMMENTS	Staff
December 14, 2005	FEBRUARY 8, 2006 RB MEETING San Diego Regional Board Office									
	REGIONWIDE BACTERIA TOTAL MAXIMUM DAILY LOAD	Hearing: TMDL	NA	NA	50%	0%	February 8, 2006	No	TMDL Workplan FY 2005-06	Arias
	CITY OF SAN DIEGO SOUTH BAY WATER RECLAMATION FACILITY	NPDES Permit Reissuance	100%	90%	50%	0%	February 8, 2006	No	NPDES Workplan FY 2005-06	Kelley
	FALLBROOK PUBLIC UTILITY DISTRICT OCEAN OUTFALL DISCHARGE	NPDES Permit Reissuance	100%	90%	90%	50%	February 8, 2006	No	NPDES Workplan FY 2004-05	Vasquez
	OCEANSIDE MARINE CTR. OCEANSIDE HARBOR	NPDES Permit Reissuance	100%	90%	0%	0%	February 8, 2006	No	NPDES Workplan FY 2005-06	Felix
	DRISCOLL MISSION BAY BOATYARD	NPDES Permit Reissuance	100%	90%	0%	0%	February 8, 2006	No	NPDES Workplan FY 2005-06	Felix
	DANA POINT BOATYARD DANA POINT HARBOR	NPDES Permit Reissuance	100%	90%	0%	0%	February 8, 2006	No	NPDES Workplan FY 2005-06	Felix
	GENENTEC OCEANSIDE FACILITY BRINE DISCHARGE TO OCEANSIDE OCEAN OUTFALL	NPDES Permit Revision	100%	100%	0%	0%	February 8, 2006	Yes	Ownership change (formerly Biogen Idec)	Kelley
	RESCISSION ORDER--PRE MIX CONCRETE CO. CARLSBAD AND SLOAN CYN SAND CO. DEHESA	WDRs Rescission	NA	NA	100%	10%	February 8, 2005	Yes		Ghoram
	MARCH 8, 2006 RB MEETING San Diego Regional Board Office									
	CABRILLO LLC ENCINA POWER PLANT CARLSBAD	NPDES Permit Reissuance	100%	100%	75%	0%	March 8, 2006	No	NPDES Workplan FY 2004-05	Kelley
	SOUTH ORANGE COUNTY WASTEWATER AUTHORITY--ALISO CREEK OCEAN OUTFALL	NPDES Permit Reissuance	0%	90%	0%	0%	March 8, 2006	No	NPDES Workplan FY 2005-06	Kelley
	SOUTH ORANGE COUNTY WASTEWATER AUTHORITY--SAN JUAN CREEK OCEAN OUTFALL	NPDES Permit Reissuance	0%	90%	0%	0%	March 8, 2006	No	NPDES Workplan FY 2005-06	Kelley
	APRIL 12, 2006 RB MEETING San Diego Regional Board Office									
	REGIONWIDE BACTERIA TOTAL MAXIMUM DAILY LOAD	Adoption TMDL	NA	NA	50%	0%	April 12, 2006	No	TMDL Workplan FY 2005-06	Arias
	POSEIDON RESOURCES DESALINATION PROJECT CARLSBAD	New NPDES Permit	0%	80%	0%	0%	April 12, 2006	No	NPDES Workplan FY 2005-06	Kelley
	JACK AND MARK STIEFFEL DAIRY RIVERSIDE COUNTY	NPDES Permit Reissuance	80%	90%	90%	0%	April 12, 2006	No	NPDES Workplan FY 2004-05	Kelley

SIGNIFICANT NPDES PERMITS, WDRS, AND RB ACTIONS

DATE OF REPORT December 14, 2005	NAME OF PERMIT/WDR/RB ACTION	Action Type	Initial Document Application Complete	Dish./RWQ Limits and Monitoring Plan Known	Draft Complete	Public Rev. & Comment	BOARD HEARING & ADOPTION	Consent Item	COMMENTS	Staff
	FRANK J. KONYN DAIRY SAN PASQUAL VALLEY	NPDES Permit Reissuance	0%	90%	0%	0%	April 12, 2006	No	NPDES Workplan FY 2005-06	Ghoram
	KAMPEN BROS. (fmr. DeJAGER/BOERSMA) DAIRY RIVERSIDE COUNTY	NPDES Permit Reissuance	0%	90%	0%	0%	April 12, 2006	No	NPDES Workplan FY 2005-06	Ghoram
	T.D. DAIRY (VAN TOL DAIRY) RAMONA	NPDES Permit Reissuance	0%	90%	0%	0%	April 12, 2006	No	NPDES Workplan FY 2005-06	Ghoram
	FALLBROOK PUBLIC UTILITY DISTRICT FALLBROOK RECLAMATION PROJECT	WDRs Update Mast. Reclamation	NA	100%	80%	0%	April 12, 2006	Yes	Master Reclamation Req'ts	Vasquez
	OAK TREE RANCH MOBILE HOME PARK FACILITY EXPANSION SAN DIEGO COUNTY	WDR Revision	100%	100%	0%	0%	April 12, 2006	Yes		Quach
	MAY 10, 2006 RB MEETING City of Laguna Beach									
	SAN DIEGO COUNTY MUNICIPAL STORMWATER PERMIT	NPDES Permit Reissuance	100%	90%	0%	0%	May 10, 2006	No	NPDES Workplan FY 2005-06	Hammer
	GROUNDWATER EXTRACTION GENERAL PERMIT FOR SAN DIEGO BAY	NPDES Permit Reissuance	NA	50%	0%	0%	May 10, 2006	No	NPDES Workplan FY 2004-05	Kelley
	JUNE 14, 2006 RB MEETING San Diego Regional Board Office									
	OCEAN DISCHARGER RECEIVING WATER MONITORING PROGRAM UPDATES	NPDES Permits	NA	50%	0%	0%	June 14, 2006	No	NPDES Workplan FY 2004-05	Kelley
	PENDING / UNSCHEDULED ACTIONS									
	PROPOSED GREGORY CANYON LANDFILL NORTH SAN DIEGO COUNTY	New WDRs	100%	20%	30%	10%			Public Workshop scheduled for May 19, 2005	Tamaki

SANITARY SEWER OVERFLOW STATISTICS (Updated through November 30, 2005)

SEWAGE COLLECTION AGENCY	SYSTEM SIZE ^B		NO. OF SEWAGE SPILLS [LISTED BY FISCAL YEAR (FY) - JULY 1 THROUGH JUNE 30]					SPILLS PER 100 MILES (LISTED BY FY)					SPILL VOLUME 2005-06 ^A	
	Miles	MGD	01-02	02-03	03-04	04-05 ^A	05-06 ^A	01-02	02-03	03-04	04-05	05-06 ^A	GAL	GAL/MG ^C
ORANGE COUNTY:														
EL TORO WD	55	2.2	3	1	3	3	2	2	5.5	1.8	5.5	5.5	13,506	39.6
EMERALD BAY SERVICE DISTRICT	6	0.09	0	0	0	1	0	0.0	0.0	0.0	16.7	0.0	0	0.0
IRVINE RANCH WD	36	2.0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0	0.0
LAGUNA BEACH, CITY OF	95	2.4	10	27	8	11	2	10.5	28.4	8.4	12.6	2.1	300	0.8
MOULTON NIGUEL WD	530	13.0	2	1	2	5	0	0.4	0.2	0.4	0.9	0.0	0	0.0
SAN CLEMENTE, CITY OF	179	4.5	6	7	2	5	1	3.3	3.9	1.1	2.8	0.6	125	0.2
SAN JUAN CAPISTRANO, CITY OF	100	3.4	0	0	1	2	0	0.0	0.0	1.0	2.0	0.0	0	0.0
SANTA MARGARITA WD	546	10.7	12	4	5	6	0	2.2	0.7	0.9	1.1	0.0	0	0.0
SOUTH COAST CWD	132	4.0	5	8	7	4	1	3.8	6.1	5.3	3.0	0.8	120	0.2
TRABUCO CANYON WD	43	0.72	0	0	1	3	0	0.0	0.0	2.3	7.0	0.0	0	0.0
RIVERSIDE COUNTY:														
EASTERN MWD	421	9.5	1	3	7	0	0	0.2	0.7	1.7	0.0	0.0	0	0.0
ELSINORE VALLEY MWD	80	2.0	0	0	1	3	0	0.0	0.0	1.3	3.8	0.0	0	0.0
MURRIETA MWD	25	0.5	0	0	1	0	0	0	0	4.0	0.0	0.0	0	0.0
RANCHO CA WD	71	2.9	2	0	1	2	1	2.8	0.0	1.4	2.8	1.4	1,125	2.6
SAN DIEGO COUNTY:														
BUENA SANITARY DISTRICT	84	1.9	0	2	1	2	0	0.0	2.4	1.2	2.4	0.0	0	0.0
CARLSBAD MWD	214	7.2	15	6	6	12	4	7.0	2.8	2.8	4.7	1.9	144	0.1
CHULA VISTA, CITY OF	400	16.0	6	3	1	7	2	1.5	0.8	0.3	1.3	0.5	215	0.1
CORONADO, CITY OF	53	3.8	5	2	5	0	0	9.4	3.8	9.4	0.0	0.0	0	0.0
DEL MAR, CITY OF	30	1.1	2	7	1	0	1	6.7	23.4	3.3	0.0	3.3	3,500	20.2
EL CAJON, CITY OF	198	9.1	2	3	0	3	0	1.0	1.5	0.0	1.5	0.0	0	0.0
ENCINITAS, CITY OF	118	4.1	2	6	1	5	0	1.7	5.1	0.8	4.2	0.0	0	0.0
ESCONDIDO, CITY OF	350	10.8	14	3	2	4	2	4.0	0.9	0.6	1.1	0.6	268	0.2
FAIRBANKS RANCH COMM SERV DIST	15	0.21	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0	0.0
FALLBROOK PUBLIC UTILITY DIST	72	2.0	17	22	9	10	5	23.6	30.6	12.5	13.9	6.9	6,600	21.6
IMPERIAL BEACH, CITY OF	84	2.2	1	14	2	8	2	1.2	16.7	2.4	9.5	2.4	425	1.3
LA MESA, CITY OF	155	5.8	12	3	4	3	0	7.7	1.9	2.6	1.9	0.0	0	0.0
LEMON GROVE, CITY OF	69	2.4	9	4	4	3	0	13.0	5.8	5.8	4.3	0.0	0	0.0

SANITARY SEWER OVERFLOW STATISTICS (Updated through November 30, 2005)

SEWAGE COLLECTION AGENCY	SYSTEM SIZE ^B		NO. OF SEWAGE SPILLS (LISTED BY FISCAL YEAR (FY) - JULY 1 THROUGH JUNE 30)					SPILLS PER 100 MILES (LISTED BY FY)					SPILL VOLUME 2005-06 ^A	
	Miles	MGD	01-02	02-03	03-04	04-05 ^A	05-06 ^A	01-02	02-03	03-04	04-05	05-06 ^A	GAL	GAL/MG ^C
SAN DIEGO COUNTY (continued):														
LEUCADIA CWD	185	4.2	5	6	1	6	1	2.7	3.2	0.5	2.7	0.5	1,350	2.1
NATIONAL CITY, CITY OF	97	5.1	0	1	2	1	3	0.0	1.0	2.1	1.0	3.1	3,100	4.0
OCEANSIDE,CITY OF,WTR UTIL DEP	446	13.0	17	23	22	13	5	3.8	5.2	4.9	3.1	1.1	2,755	1.4
OLIVENHAIN MWD	16	0.39	1	2	0	3	0	6.3	12.5	0.0	18.8	0.0	0	0.0
OTAY MWD	86	1.4	0	3	1	0	0	0.0	3.5	1.2	0.0	0.0	0	0.0
PADRE DAM MWD	150	5.1	4	3	3	1	0	2.7	2.0	2.0	0.7	0.0	0	0.0
PAUMA VALLEY COMM SERVICE DIS	8	0.07	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0	0.0
POWAY, CITY OF	170	4.0	1	5	3	0	1	0.6	2.9	1.8	0.0	0.6	50	0.1
RAINBOW MWD	54	0.74	2	2	6	2	0	3.7	3.7	11.1	3.7	0.0	0	0.0
RAMONA MWD	83	1.3	5	2	2	4	0	6.0	2.4	2.4	3.6	0.0	0	0.0
RANCHO SANTA FE COMM SERV DIST	52	0.44	1	1	0	2	0	1.9	1.9	0.0	3.9	0.0	0	0.0
SAN DIEGO CO, PUBLIC WORKS	380	11.0	4	11	2	2	2	1.1	2.9	0.5	0.5	0.5	33,000	19.6
SAN DIEGO, CITY OF, MWWD	2,894	170	226	193	115	122	37	7.8	6.7	4.0	3.3	1.3	49,598	1.9
SOLANA BEACH, CITY OF	52	1.2	2	1	6	1	0	3.8	1.9	11.5	0.0	0.0	0	0.0
USMC BASE, CAMP PENDLETON	194	3.1	18	23	14	12	7	9.3	11.9	7.2	5.2	3.6	47,020	100.8
US NAVY	123	4.0	24	12	11	13	6	19.5	9.8	9.0	10.6	4.9	4,020	6.6
VALLECITOS WD	202	6.1	4	5	4	6	2	2.0	2.5	2.0	2.5	1.0	576	0.6
VALLEY CENTER MWD	48	0.32	0	3	1	1	0	0.0	6.3	2.1	2.1	0.0	0	0.0
VISTA, CITY OF	198	6.5	4	4	7	9	0	2.0	2.0	3.5	4.6	0.0	0	0.0
WHISPERING PALMS COMM SERV DIS	17	0.26	1	1	0	0	0	5.8	5.8	0.0	0.0	0.0	0	0.0
REGION 9 TOTAL	9615	363	445	427	275	266	87						167,797	
AVERAGE ¹								4.6	4.4	2.9	2.8	0.9		5
STANDARD DEVIATION ²								5.0	7.0	3.4	4.4	1.5		16
MEDIAN ³								2.4	2.4	2.0	2.5	0.0		0

^A Includes available preliminary data for July 1, 2004 through November 30, 2005, and may not include all spills less than 1,000 gallons that did not enter surface waters or storm drains

^B As of June 2003.

^C Volume of spills for the period in gallons divided by the amount conveyed for the period in million gallons

^D Included with Eastern Municipal Water District

¹ The average is the sum of all values divided by the number of values.

² In a normally distributed set of values, 68% of the values are within one standard deviation either above or below the average value.

³ The median is the middle value in a set; half the values are above the median, and half are below the median.

DATE	APPLICANT	PROJECT TITLE	PROJECT DESCRIPTION	WATERBODY	IMPACT (Acres)	MITIGATION	CERTIFICATION ACTION ²
10/18/05	Otay Water District	Otay Water District Recycled Water Pipeline, Reservoir, and Pump Station	Installation of a 4 mile recycled water pipeline, pump station, and steel reservoir.	A tributary to the Otay River, Otay hydrologic unit (910.20)	Ephemeral Stream (T) 0.005	Restore 0.005 acre of the impacted water body and preserve 0.005 acre with Otay Water District San Miguel Habitat Management Area	Low Impact Certification.
10/19/05	Caltrans, District 11—David Pound	Pala Creek Bridge Interim Project	Project is a temporary repair measure to protect the SR-76 bridge over Pala Creek from additional scouring and potential failure until a replacement bridge is designed and implemented	Pala Creek HSA 903.21	Riparian (T) 0.02	Restoration of temporary impacts. Wetland 0.02 acres	Low Impact Certification
10/20/05	John Cumming & Lee Johnson	371-403 Pacific Avenue Shoreline Stabilization Project	Involves the Construction of an approx. 138 ft.-long, 35 ft.-high, and 2ft.-wide colored and textured concrete tieback seawall on the public beach below two residential structures on Pacific Ave.	Pacific Ocean	Shoreline of the Pacific Ocean (P) 0.008	The fee of \$57,670.00 been placed in a mitigation fund in lieu of placing sand on the beach to mitigate for the impacts of seawalls on natural shoreline.	Technically-conditioned Certification

10/21/05	Jim Yates	Talega Business Park Basin No. 5 Maintenance Project	Maintenance would occur when surface sediment accumulation is greater than 18 inches or 10% of the basin volume. The purpose is to maintain functionality of the basin as sediment deposits at inlet structures.	Segunda Deshecha (HSA 901.32)	Streambed (T) 0.14	All impacts are temporary and not expected to result in a significant loss of beneficial uses	Technically-conditioned Certification
10/25/05	North County Transit District, Karen King	O'Neil to Flores Second Track	Construction of 1.8 miles of new mainline rail track and rehabilitate 0.9 miles of existing siding track.	Aliso Creek, French Creek and unnamed tributaries to the Pacific Ocean	Wetland (T) 0.44 Streambed (T) 0.14 Wetland (P) 0.65 Streambed (P) 0.03	For permanent impacts: 1.88 acres of wetland restoration and or bank purchase	Technically-conditioned Certification
10/31/05	San Diego Unified School District	Scripps Ranch Middle School	Construction of a 1800 student middle school, infrastructure, and bridge widening within a 34-acre site.	Carroll Canyon Creek and tributary, Penasquitos HU, Miramar Hydrologic area (906.10)	Vegetated Waters (P) 0.08 (T) 0.02 unvegetated Waters (T) 0.03	Create 0.10 acre freshwater marsh, restore 0.03 acre unvegetated swale, enhance 1.8 acres of riparian scrub onsite.	Technically-conditioned Certification
11/3/05	Vineyards View Estates, LLC Marwan Younis	Vineyards View Estates	Consists of 37 single-family residential lots and associated infrastructure on 18.3 acres. (3 acres will be retained as Open Space)	Unnamed tributary to Murrieta Creek, Gertrudis HSA	Ephemeral Tributary to Murrieta Creek (P) 0.02	Purchase of 0.1 acre of credit from the Barry Jones Wetland Mitigation Bank and 0.04 acre credit from the Santa Margarita Arundo Removal Program	Technically-conditioned certification

1. Wetland refers to vegetated waters of the U.S. and streambed refers to unvegetated waters of the U.S. (P) = permanent impacts. (T) = temporary impacts.
2. Low impact certification is issued to projects that have minimal potential to adversely impact water quality. Conditional certification is issued to projects that have the potential to adversely impact water quality, but by complying with technical conditions, will have minimal impacts. Denials are issued when the project will adversely impact water quality and suitable mitigation measures are not proposed or possible. Time expired refers to projects that may proceed due to the lack of an action by the Regional Board within specified regulatory timelines. Withdrawn refers to projects that the applicant or Regional Board have withdrawn due to procedural problems that have not been corrected within one year.

Toxic woes fester at Camp Pendleton

Cleanup efforts praised; years of more work ahead

By Rick Rogers
UNION-TRIBUNE STAFF WRITER

November 22, 2005

Contaminated drinking water is the latest environmental problem plaguing Camp Pendleton, which has so many toxic waste sites that it was declared a public health threat more than a decade ago.

The 125,000-acre base – the last large chunk of mostly undeveloped land between Los Angeles and the U.S.-Mexico border – is an environmental contradiction. Bald eagles soar over the site and steelhead trout swim in its waters. But the area is also home to plumes of solvents, pockets of pesticides and trenches of petrochemicals.

Some of the trouble is decades old, to times before anyone realized the dangers of burying, burning or dumping hazardous materials. Others are more recent, such as Camp Pendleton's difficulties with dangerously high levels of lead and copper in its tap water.

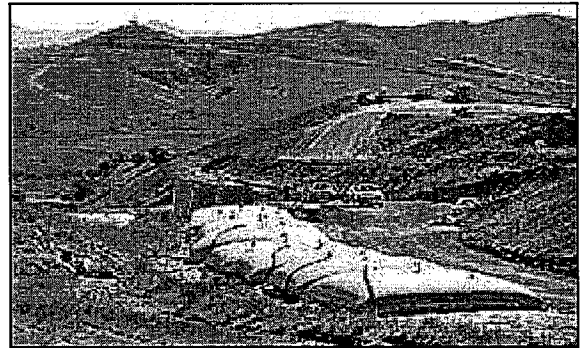
Even a well-intentioned project has now become an environmental headache. A liner for a base landfill that opened in 1999 has leaked radioactive runoff, according to documents from the San Diego Regional Water Quality Control Board. The liner threatens to leak again during the rainy season.

It will cost more than \$250 million and take a decade to fully assess all of Camp Pendleton's pollution concerns, the Environmental Protection Agency estimates. The dollar figure does not include expenses for actual cleanup and bills related to at least one lawsuit alleging that toxin-laced dust made a Marine's daughter sick.

"If you look at Camp Pendleton in terms of risks to people, it is one of the more seriously contaminated military sites in the country," said Lenny Siegel, executive director of the Center for Public Environmental Oversight, a watchdog group based in San Francisco.

Even so, Siegel and state and federal pollution experts largely give high marks to Camp Pendleton's environmental program.

For example, they praise base officials' prompt efforts to provide free bottled water and medical screening for people concerned about exposure to tap water containing high levels of lead or copper. The Marines began offering the assistance in September, when they announced the contamination



LAURA EMBRY / Union-Tribune
Bladders and metal tanks at the Las Pulgas Landfill on Camp Pendleton hold 300,000 gallons of contaminated water, just one of several environmental concerns on the base.

problem.

"They're not dragging their feet," said Martin Hausladen, an EPA project manager who monitors Camp Pendleton.

A national priority

In 1989, Camp Pendleton was the first location in San Diego County named to the federal Superfund list.

Congress created the Superfund in 1980 to pay for cleaning up hazardous-waste sites that threaten public health. While the Defense Department pays for environmental restoration on military bases, being selected for the national priority list still brings with it the moniker "Superfund site."

By 1989, the Marines had detected Silvex, a cancer-causing herbicide now banned in the United States, in two drinking-water wells and discovered hazardous waste in seven locations at Camp Pendleton, the EPA said.

Since then, the number of toxic sites on the base has surged to at least 208, according to an EPA report issued in 2004. That's not counting the more than 250 underground fuel tanks that were found to be leaking and removed in the 1980s and 1990s.

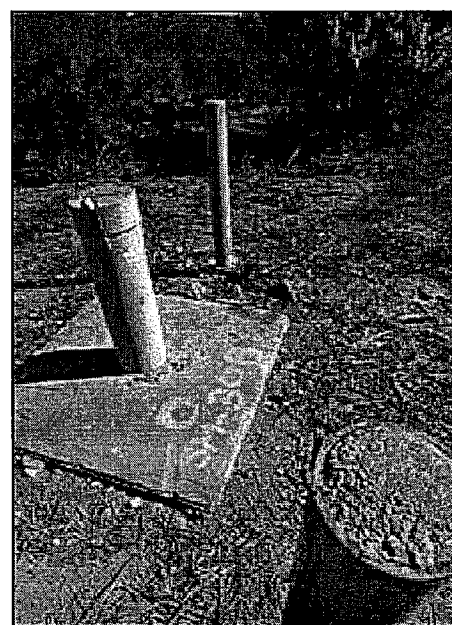
Today, more than 500 monitoring wells throughout Camp Pendleton track the movement of contaminants and serve as the front lines for state, federal and Marine Corps agencies working to protect the 60,000 people who live and work on the base.

Officials from the EPA, state Department of Toxic Substances Control and regional water board are working with Camp Pendleton officials to fix the problems.

Since 1989, the Pentagon has spent \$148 million on Camp Pendleton trouble spots the EPA has described as "low-hanging fruit." Remaining are "some very difficult sites," said Beatrice Griffey, a geologist supervising cleanup of Camp Pendleton's underground storage tanks for the San Diego Regional Water Quality Control Board.

Nationally, there are about 1,300 Superfund sites. Fifty, including Camp Pendleton, fall under the Navy's jurisdiction. The other Marine installations on the national priority list are:

- Camp Lejeune, N.C.
- The logistics base in Albany, Ga.
- The logistics base in Barstow.
- The Cherry Point air station in North Carolina.
- The Parris Island recruit depot in South Carolina.



LAURA EMBRY / Union-Tribune
More than 500 monitoring wells are set up throughout Camp Pendleton to give state, federal and military officials a way to track the movement of contaminants on the base.

- Quantico Marine Corps Base in Virginia.
- The Yuma air station.
- The former El Toro air station in Orange County.

Complete details on the scope and progress of Camp Pendleton's environmental restoration work are difficult to obtain. But documents that base officials submitted to the secretary of defense in 1997 and 1998 describe some of the challenges.

For instance, the paperwork described leaking underground tanks that "contaminated millions of gallons of groundwater – the only source of drinking water for over 30,000 Marines, sailors" and their families on the base.

More than 100 tons of contaminants from the base's aquifers were removed, the documents showed.

Threats old and new

In recent months, the Navy unveiled a \$16 million plan to clean two additional polluted sites at Camp Pendleton – a former burn pit and a flood-prone, small-arms range that contains copper, arsenic, lead and dioxins.

Camp Pendleton is vulnerable to groundwater contamination because its aquifers are relatively close to the surface. So far, with the apparent exceptions of the Silvex and now the lead and copper, its drinking water has been largely spared.

But more environmental threats loom.

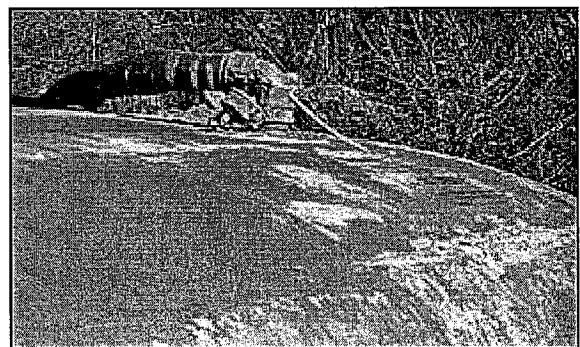
Hausladen said a plume of chlorinated solvents from the Camp Pendleton air station has crept 100 feet to 150 feet toward drinking-water wells in the past four years.

Concentrations of the solvents are four to eight times higher than federal guidelines. Officials with the San Diego Regional Water Quality Control Board believe it is just a matter of time before the plume reaches the wells.

Camp Pendleton officials can use existing technology to remove chlorinated solvents and other contaminants on the base. Such work can be extremely expensive, said John Anderson, a senior geologist for the water board. As a backup strategy, he said, the Marines are considering importing some of their water.

Not all of Camp Pendleton's problems are linked to past practices.

The Las Pulgas Landfill is located slightly west of the base's central area. In the late 1990s, the Marines wanted to add a 17-acre section to the 39-acre site. They hired contractors to expand the landfill and brought in another contractor to monitor the work.



LAURA EMBRY / Union-Tribune
Large bladders on the base are filled with water contaminated with tritium, a radioactive form of hydrogen.

On May 24, 1999, the contractors finished installing a liner to keep contaminants from seeping into the ground, according to records from the water board.

The first whiff of potential trouble with the liner came when the Marine Corps failed to submit an inspection report that summer. When base officials turned in a report in December, it was incomplete, the water board said.

Then in April 2003, Camp Pendleton was cited for failure to control erosion and runoff from the landfill. That December, a study suggested the liner was damaged. Water board officials described a "number of technical discrepancies between the as-built construction and the design specifications."

During a December 2004 meeting, water officials discussed "referral to a federal/state agency for investigation of criminal/negligence issues" concerning the liner.

At the very least, the sides of the liner have failed and it is possible that the bottom has split as well, said John Odermatt, a senior engineering geologist for the regional water quality board. The board is drafting an order to force Camp Pendleton to fix the landfill.

Marine officials said they are investigating whether the liner has leakage problems.

Since February, Camp Pendleton has been cited four times for its leaking landfill. At least 1,000 gallons of leachate – water that filters through garbage – has seeped into the ground, according to the water board.

At least 300,000 additional gallons of leachate are being stored at the Las Pulgas Landfill in large bladders and metal tanks. The liquid is contaminated with tritium, a radioactive form of hydrogen, at levels up to 2.5 times the federal limit for drinking water.

The Marine Corps said it is close to finalizing an agreement with the Nuclear Regulatory Commission that will allow it to dump the tritium into its sewage treatment system. The idea is to dilute the tritium to federal Clean Water Act standards and then discharge the treated waste into the ocean.

As Camp Pendleton officials work with various regulatory agencies to address pollution problems, they also face the prospect of a courtroom battle.

A July 2002 lawsuit filed in San Diego federal court alleges that a young girl living with her family at the base's Wire Mountain housing complex suffered severe brain damage from landfill waste.

The suit claims that in late 1999 and early 2000, Lacie Myers was exposed to thallium that blew off dirt being disposed in a landfill near her home and school. Thallium, a toxic metal, is now banned but was once used in rat poison.

Lacie, now 9, continues to suffer from ailments such as mental impairment and hypersensitivity to heat and cold, the lawsuit says. Her family seeks \$15 million in damages, and the case could go to trial early next year.

Neither Scott Allen, the San Francisco lawyer representing the Myers family, nor Camp Pendleton officials would comment on the litigation.

In the immediate future, Camp Pendleton residents should not fear an environmental catastrophe, said Anderson, the water board geologist. He's less sure about the long-term situation.

"There always seems to be a contaminant du jour that (Camp Pendleton officials) have to deal with," Anderson said.

Find this article at:

<http://www.signonsandiego.com/news/military/20051122-9999-1n22pollute.html>

Check the box to include the list of links referenced in the article.



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Federal, state and tribal authorities advise caution on dangerous Klamath River algae

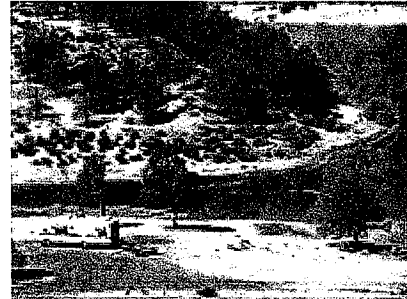
For Immediate Release: September 30, 2005

Contact: Mark Merchant, U.S. EPA, (415) 947-4297; or William L. Rukeyser, California State Water Resources Control Board, (916) 341-7365

Press Office Main Line: (415) 947-8700

SAN FRANCISCO – In response to the emergence of dangerous algal blooms in the Klamath River in California, the Karuk Tribe, the North Coast Regional Water Board and the U.S. Environmental Protection Agency are joining other local, state and federal agencies in warning residents and recreational users of the river to use caution when near such blooms.

“This algae produces toxins that pose a significant potential public health concern. We advise people to avoid all direct contact with Klamath River water while the bloom is occurring.” said Alexis Strauss, Water Division director of the EPA’s regional office in San Francisco.



The Klamath River is a popular recreation area on the California-Oregon border. (Photo credit: State Water Resources Control Board)

Water samples taken over the past two months from Copco and Iron Gate Reservoirs – located on the Klamath near the Oregon border – have revealed high levels of the toxic blue-green alga *Microcystis aeruginosa*. Blooms of *Microcystis aeruginosa*, which often occur between June and September, can look like green, blue-green, white or brown foam, scum or mats floating on the water. They have been found as far as 125 miles downstream of the reservoirs.

The Klamath River is rich in nutrients that support the growth of the blue-green algae. Warm and calm surface water created by Iron Gate and Copco Reservoirs provide an ideal environment for the growth of large algal blooms. The extent of the blooms, and their toxicity, were not known until studies were conducted this year by the Karuk Tribe.



Water samples collected in Copco and Iron Gate reservoirs on the Klamath River have shown high levels of toxic blue-green algae.

“In August, we found levels of *Microcystis aeruginosa* as high as 46.8 million cells/ml along the shoreline and 8.9 millions cells/ml on the open water. These levels exceed the World Health Organization (WHO) standard for recreational use by 468 and 89 times, respectively,” explained Susan Corum, the Water Resources Coordinator for the Karuk Tribe’s Department of Natural Resources. “Microcystin toxin produced by the blooms in these locations was 1571.7 and 436.9 µg/L; exceeding the

WHO Tolerable Daily Intake level by 217 and 60.3 times respectively. These levels are among the highest recorded in the United States."

According to California's Office of Environmental Health Hazard Assessment (OEHHA), the U.S. EPA, the Karuk Tribe and Water Board, the *Microcystis aeruginosa* and resulting microcystin toxin pose a significant potential health threat to humans and animals exposed through direct ingestion of contaminated water or incidental ingestion during recreational water activities and bathing.

"The public needs to take the microcystin toxin in this algae seriously," said Catherine Kuhlman, Executive Officer of the North Coast Water Board. "The levels of algae and associated toxins measured in parts of the river are high enough to pose health risks to anyone drinking or bathing in the water, particularly children and animals."

Studies of the possible health effects of exposure to *Microcystis aeruginosa* and its microcystin toxin in the Klamath's waters range from mild, non-life threatening skin conditions to permanent organ impairment and death depending upon exposure time and intensity.

Symptoms could include mild to severe eye irritation, allergic skin rash, mouth ulcers, fever, cold and flu-like symptoms, vomiting, diarrhea, kidney damage, liver damage or complete failure, and death.

Children and animals are at the greatest risk of adverse effects, due to their smaller body size and higher water ingestion rates.

As pets and other domestic animals could drink contaminated water, pets and livestock should be kept away from the water.

There are three main ways to be exposed to *Microcystis aeruginosa* and subsequent microcystin toxins in contaminated waters:

- direct contact to exposed skin or to the highly sensitive membranes of the ear, eye, nose and throat;
- accidental or intentional swallowing; and;
- inhalation of contaminated water aerosols.

A full-grown adult ingesting 3.4 ounces of contaminated water in a given day would be exposed to levels 28 times greater than the accepted World Health Organization's Tolerable Daily Intake value. This calculation is based on a single one-hour "swimming event" per day. More swimming events or activities of longer duration could result in greater exposure.



Algae blooms, such as this one at Mallard Cove on Copco Reservoir, produce toxins that could harm people and animals. (Photo credit: State Water Resources Control Board)

For an average-size child who is 3-years-old, ingesting slightly more than a measuring cup of contaminated water in any one "swimming event" would be the equivalent of 278 times the accepted WHO Tolerable Daily Intake value. As with adults, more swimming events or activities of longer duration could result in greater exposure.

Local, state, tribal and federal health and environmental agencies recommend that people not drink or cook with contaminated waters. You should avoid or minimize contact with contaminated waters. It is best of stay

out of the water near algal blooms and to keep pets away. If you do come in contact with the water, wash thoroughly with clean water. Avoid eating fish caught during an algal bloom. If you do, fishermen should clean the fish with fresh water and dispose of the innards away from the river or where animals could eat them; Avoid irrigation with contaminated water; Report dead or distressed wildlife along the shoreline to local, state or tribal authorities.

For more information, visit: The 1999 World Health Organization, Toxic Cyanobacteria in Water: A guide to their public health consequences, monitoring and management at:
[http://www.who.int/water_sanitation_health/resourcesquality/toxicyanbact/en/](http://www.who.int/water_sanitation_health/resourcesquality/toxiccyanbact/en/)
and,
World Health Organization Guidelines for Drinking Water Quality, 3rd Edition
at: http://www.who.int/water_sanitation_health/dwq/gdwq3/en/index.html

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California Regional Water Quality Control ATTACHMENT B-13

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Alan C. Lloyd, Ph.D.
Secretary for
Environmental
Protection

Arnold Schwarzenegger
Governor

November 14, 2005

In reply refer to:
WPS:10-10-5016.02

Mr. Walt Ekard
Chief Administrative Officer
County of San Diego
1600 Pacific Highway, Room 209
San Diego, CA 92101

Dear Mr. Ekard:

**SUBJECT: RESCISSION OF NOTICE OF VIOLATION FOR ALLEGED
NONCOMPLIANCE WITH MUNICIPAL STORM WATER PERMIT
ORDER NO. 2001-01**

This is to inform you that in accordance with the Regional Board's decision at the November 9, 2005 Board Meeting, the Notice of Violation issued to your agency for inadequate implementation of watershed activities is rescinded.

The Regional Board considered the adequacy of the Notice of Violation document and the record and concluded that it would be appropriate to rescind the Notice of Violation with the goal of moving forward with the development of the next municipal separate storm sewer system (MS4) permit and with the ongoing efforts by the Copermittees to achieve full compliance with MS4 permit Sections J.1 and J.2.

As a follow-up to this action, the Regional Board Executive Officer, John Robertus, is arranging a meeting of all the Copermittees to discuss how the Copermittees' storm water programs can comply fully with the MS4 permit requirements. This open discussion will benefit both the Regional Board and the Copermittees in understanding the current requirements and any impediments that exist in achieving compliance with the MS4 permit. Our hope is to convene this meeting in December at the Regional Board office.

The heading portion of this letter includes a Regional Board code number noted after "In reply refer to:" In order to assist us in the processing of your correspondence, please include this code number in the heading or subject line portion of all correspondence and reports to the Regional Board pertaining to this matter.

California Environmental Protection Agency

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If you have any questions regarding this letter, please contact me at (858) 467-2988 or email: mmccann@waterboards.ca.gov.

Respectfully,



MICHAEL P. McCANN
Supervising Water Resource Control Engineer

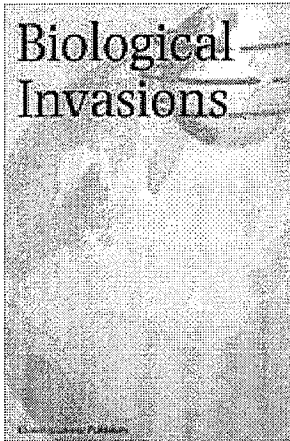
cc: John Richards
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Article

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California's Reaction to *Caulerpa taxifolia*: A Model for Invasive Species Rapid Response*

Lars W. J. Anderson¹ 

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Received: 15 August 2003 Accepted: 26 March 2004

Abstract The invasive marine alga *Caulerpa taxifolia* was discovered June 12, 2000, in California at Agua Hedionda Lagoon. Due to a 15-year history of spread in the Mediterranean Sea, *C. taxifolia* had already been placed on the US Federal Noxious Weed list in 1999. Awareness of this threat greatly facilitated consensus building and setting clear eradication goals among a large number of state, federal and local agencies as well as private groups and non-governmental organizations (NGOs) that became the 'Southern California Caulerpa Action Team' (SCCAT). Field containment and treatments began 17 days after the discovery due to: (1) timely identification and notification of the infestation; (2) the proactive staff of the San Diego Regional Water Quality Control Board who deemed this invasion tantamount to an 'oil spill', thus freeing up emergency funding; (3) the mobilization of diver crews already working at the site. Three well-integrated components of this rapid response have resulted in an effective eradication program: (a) expertise and knowledge on the biology of *C. taxifolia*; (b) knowledge on the uses, 'ownership' and characteristics of the infested site; (c) knowledge and experience in the implementation of aquatic plant eradication. Together, with the requisite resources (approximately \$US1.2 million per year), this approach has resulted in containment, treatment and excellent progress toward eradication of *C. taxifolia*. Successful rapid response to other aquatic invasive species will require similar readiness to act, and immediate access to adequate funding.

Keywords algae - aquatic weed - California - *Caulerpa* - eelgrass - eradication - invasive species - rapid response - SCCAT

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The references of this article are secured to subscribers.

California's reaction to *Caulerpa taxifolia*: a model for invasive species rapid response*

Lars W.J. Anderson

USDA-ARS Exotic and Invasive Weed Research, One Shields Ave, Davis, CA 95616, USA (e-mail: lwanderson@ucdavis.edu; fax: +1-530-752-4604)

Received 15 August 2003; accepted in revised form 26 March 2004

Key words: algae, aquatic weed, California, *Caulerpa*, eelgrass, eradication, invasive species, rapid response, SCCAT

Abstract

The invasive marine alga *Caulerpa taxifolia* was discovered June 12, 2000, in California at Agua Hedionda Lagoon. Due to a 15-year history of spread in the Mediterranean Sea, *C. taxifolia* had already been placed on the US Federal Noxious Weed list in 1999. Awareness of this threat greatly facilitated consensus building and setting clear eradication goals among a large number of state, federal and local agencies as well as private groups and non-governmental organizations (NGOs) that became the 'Southern California *Caulerpa* Action Team' (SCCAT). Field containment and treatments began 17 days after the discovery due to: (1) timely identification and notification of the infestation; (2) the proactive staff of the San Diego Regional Water Quality Control Board who deemed this invasion tantamount to an 'oil spill', thus freeing up emergency funding; (3) the mobilization of diver crews already working at the site. Three well-integrated components of this rapid response have resulted in an effective eradication program: (a) expertise and knowledge on the biology of *C. taxifolia*; (b) knowledge on the uses, 'ownership' and characteristics of the infested site; (c) knowledge and experience in the implementation of aquatic plant eradication. Together, with the requisite resources (approximately \$US1.2 million per year), this approach has resulted in containment, treatment and excellent progress toward eradication of *C. taxifolia*. Successful rapid response to other aquatic invasive species will require similar readiness to act, and immediate access to adequate funding.

Introduction

In order to consider the need for, and optimal components of, effective responses to newly discovered invasive species, it is instructive to view these incursions within the context of more generic environmental or health emergencies. The USA and indeed most of the developed countries have well-defined systems for responding to the most common types of catastrophes, such as fire,

flood, earthquakes or disease outbreaks. The systems are comprised of early warning devices or networks, and equally important, the physical and human resources needed to react quickly. Societies have generally recognized the huge social and economic costs of delays in response to these untoward, but inevitable occurrences. Unfortunately, there is neither an adequate awareness of the costs, nor are the systems in place to mount a similar action for the analogous disruptions caused by problematic invasive species, particularly in the marine and freshwater environments. The rampant spread of many

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invasive plants attests to the lack of response capacity (Mullin et al. 2000). A clear example is the reaction to the discovery of northern pike (*Esox lucius*) in Lake Davis, CA during the early 1990s (Lee 2001). The response by the California Department of Fish and Game (CDFG), which consisted of piscicide (rotenone) applications in 1997, resulted in rancorous public objections and litigation. It was not until 1999, nearly four years after the threat was clearly understood by CDFG scientists, that a stakeholder group was formed and a consensus-driven plan was developed (California Department of Fish and Game 2000). Northern pike are still present, but now there is far more unanimity of purpose and a more cooperative atmosphere that can facilitate steps needed to reduce the threat from Northern Pike. However, the costs of delays, in part resulting from inadequate approaches for rapid response, can be measured in years and more than \$9 million in settlement fees (Goedde 1998).

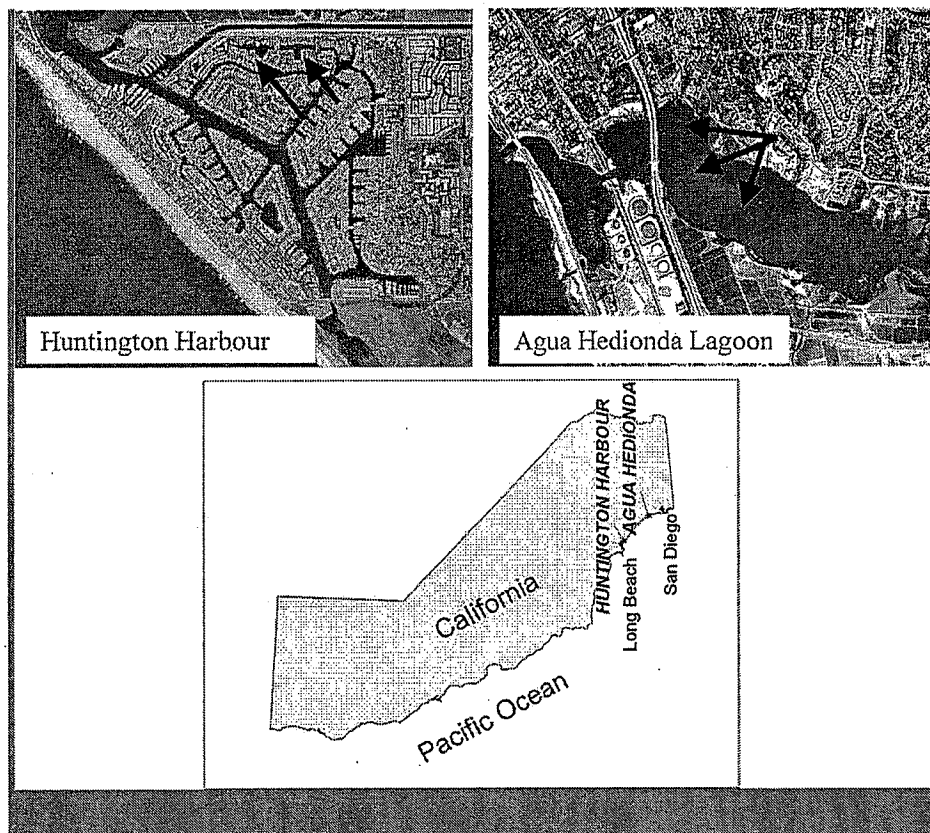
California's recent success in thwarting (at least for now) the introduction of *C. taxifolia*, a marine alga, has revealed both conceptual and practical approaches that are useful as a model for constructive and effective response to incursions of other invasive species. Over the past few years, there have been other published proposals in the US for rapid responses to invasive species (e.g., National Invasive Species Council 2003; FICMNEW 2003; Western Regional Panel 2003). There have also been several state plans developed during the past 5 years to address the threats to aquatic resources posed by a variety of invasive freshwater and marine organisms, including 13 plans approved at this time by the federal Aquatic Nuisance Species Task Force (ANSTF). These plans also contain rapid response strategies. Target species range from microscopic, ballast water-borne organisms to large vertebrates such as the northern pike and snakehead fish (*Channa argus*), as well as a variety of freshwater and marine plants and invertebrates. However, with very few exceptions, such as the 25 year-old Hydrilla Eradication Program in California (California Department of Food and Agriculture 2002), the plans at this time are analogous to having a conceptual design for a fire department, but with no fire station, no on-call fire fighters, no pool of effective fire-fighting

equipment, no mandate or authorization to fight fires, and no hands-on training for fire-fighters. As a result, reactions today to new introductions of invasive species are usually far too late, poorly coordinated and often provoke negative reactions from stakeholders who do not understand the threats, costs, risks, and benefits of immediate action as compared to the risks of not responding quickly, decisively and effectively. The public, in short, has a clear grasp of threats from fires and floods, but only the most vague understanding of how invasive species affect their lives. The state plans mentioned above all have public education/outreach components, but realistically, creating an awareness similar to that for fire prevention and fire-hazards will probably take a generation. What can be done now to counter the establishment of new invasive species? What can we learn from the limited examples of successful responses? The recent introduction of the marine alga *C. taxifolia* into a southern California lagoon, Agua Hedionda, and a small embayment called Huntington Harbour provides some answers. The following is a synopsis of the development of the eradication actions, and recommendations for applying lessons learned from the project to the broader concern of invasive species intervention. Other brief accounts of the early phases and various aspects of this project have been reported elsewhere (Anderson 2001, 2002; Anderson and Keppner 2001; Jousson et al. 2001; Williams and Grosholz 2002).

C. taxifolia invasion in the USA

Early detection – a fortuitous awareness

The history and almost 20-year spread of *C. taxifolia* in the Mediterranean Sea is well described (Ménész 1999, 2001). However, until the discovery in California in 2000, no other populations had been documented in the western hemisphere. Agua Hedionda Lagoon is a small (ca. 150 ha total) estuary located about 50 km north of San Diego, CA (Figure 1). It is comprised of three sections: the outer lagoon (adjacent to, and connected with, the Pacific Ocean), the middle lagoon and the inner lagoon; it was in the latter section that *C. taxifolia* was found. The overall lagoon is



used for a variety of public and private activities: recreation (fishing, paddling, water skiing, and wave boarding), power production (i.e., cooling water), aquaculture, and personal watercraft ('jet ski') rentals. Most recreational activities occur in the inner lagoon and therefore subsequent actions to eradicate this invasive species directly affected a variety of stakeholders, including many homeowners adjacent to the lagoon. The Huntington Harbour site occupies about 4 ha and consists primarily of two small, relatively isolated basins surrounded by houses. It is connected via large pipes to the outer harbor area, which is in turn connected to the ocean.

At the time *C. taxifolia* was discovered in June, 2000, a small team of scuba divers was documenting locations and status of native eelgrass beds (*Zostera marina*) as part of contract work for a power plant. Importantly, the dive-team leader recognized that the *C. taxifolia* colony was not part of the normal flora, and quickly notified the California Department of Food and Agriculture staff within the Pest Detection and Exclusion Branch, who then made contacts with those scientists and managers involved with aquatic invasive species control and eradication (Woodfield 2000, personal comm.) Specimens of the plant were sent imme-

diately to specialists who could confirm the identity of the species. These critically important steps were taken within 24–72 h after the discovery. Later, more detailed genomic analysis confirmed that this population was identical to the plants that had spread in the Mediterranean areas (Jousson et al. 2001).

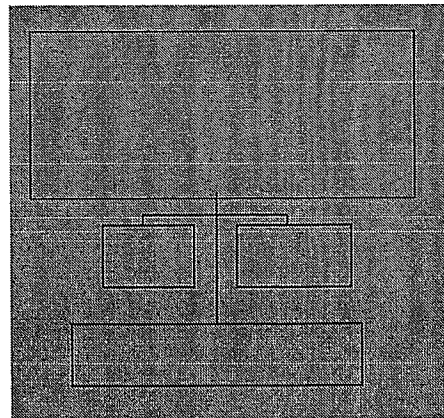
Agency and 'non-agency' responses

Within one week after the species was identified, representatives from several California state agencies, federal agencies, and a few key local stakeholders met to assess the threat. In subsequent meetings, representation expanded to include specialists in phyecology. At this juncture, formal options for various actions were discussed, and the group arrived at a consensus to eradicate *C. taxifolia*. During this period, several of the agency representatives inspected the site at Agua Hedionda Lagoon, a critically important step. Understanding the physical characteristics of the site, and its proximity to the open ocean and to recreational and other uses of this lagoon was essential in the overall successful development of an eradication plan. The fact that one concessionair e's activity was directly affected by proposed eradication operations (e.g., restriction of boat use), as well as the likelihood that the very activity of the customers (i.e., jet skiing and wave boarding) might spread the infestation, resulted in lengthy negotiations between these stakeholders and the Steering Committee of what has become known as the Southern California Caulerpa Action Team, or SCCAT. Discussions and negotiations on other 'passive' uses in the lagoon (e.g., fishing, non-motorized watercraft) were also begun, including informational public workshops that included the non-profit group Agua Hedionda Lagoon Foundation (AHLF) and other affected property owners.

This quick progression in the response first involved a few 'official agencies', but very soon included several public and private groups, which ultimately comprised SCCAT (see Appendix 1). Although without any formal jurisdiction, or direct funding, SCCAT has acted as an advisory lead consortium whose goal is to implement eradication plans, and to ensure the success of the eradication project through judicious, scien-

tifically based monitoring and evaluation. Initially, monthly meetings, and more recently bi-monthly meetings have been held for over 4 years. Currently, representatives from five agencies comprise the Steering Committee: California Department of Fish and Game, San Diego Regional Water Quality Control Board, Santa Ana Regional Water Quality Control board, NOAA-Fisheries, and US Department of Agriculture-Agricultural Research Service. Within SCCAT, there are separate committees that address public education, outreach, and technical issues. The Steering Committee has also worked directly with stakeholders to develop consensus-based use plans for Agua Hedionda Lagoon. Figure 2 shows the overall organization of SCCAT.

The success of SCCAT stems, in large part, from the personal commitment of the individuals who have brought their varied experience, expertise, and the support of their respective agencies, or private affiliations to bear on this problem. This eradication project was not, however, without early birthing pains. During initial evaluations of the threat from *C. taxifolia* and discussions of options for response, opinions differed at both the technical level as well as the sociological level. It is worth noting that the June 2000 infestation was the first known for *C. taxifolia* in the western hemisphere, and that there was no successful example of eradicating a marine alga in the US. Legitimate and important



questions were raised: Can this plant be eradicated? Should research be conducted for a while before eradication is attempted? What is the potential for dispersal beyond the lagoon? Is it already off the California coast, but simply undetected? Unfortunately, documented experiences in the Mediterranean invasion did not bode well for successful eradication. And yet, experience with much larger infestations of *Hydrilla verticillata* in California canals and lakes strongly suggested it could be done, but only if action were immediate, effective and unwavering (California Department of Food and Agriculture 2002).

Other critical questions were raised: What, if any, recreational activity should be allowed in or near the infested area? Who has legal authority to restrict boating and other recreational activities? For that matter, who owns the lagoon? Taken together, these were difficult problems. The solution has been to strike a balance between actions deemed essential for the project (containment, treatment and monitoring), and modifications in public access to, and uses within, the lagoon.

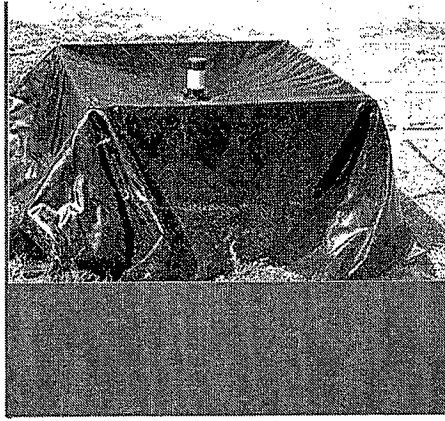
Operational realities – what to do and how to fund it

Once the consensus to eradicate was clear, the next obvious questions were: How? By what methods? Who will actually do it? What will it cost? Who will pay? Within two weeks after discovery, discussions centered on feasibility for containment, chemical control, various types of dredging, draining coupled with construction of temporary dams, and tarping. In fact, the probability of successful eradication was questioned periodically as various methods were evaluated from the standpoint of cost, potential non-target impacts, and projected efficacy. For example, there are no federally registered products for control of marine algae except boat bottom coatings (antifouling paints). Thus chemicals (algaecides) would require a special permit from the California Environmental Protection Agency, Department of Pesticide Registration (CalEPA/DPR). In tandem with these discussions, pilot efficacy testing was performed in small containers with several registered aquatic herbicides such as diquat, endothal, chelated copper, fluridone, and

sodium hypochlorite (household bleach). Only bleach (5% sodium hypochlorite) resulted in obvious toxicity symptoms (i.e., chlorosis and eventual disintegration of tissues) with short exposures of a few hours. Consideration of other options, such as dredging, quickly revealed the enormous operational costs, associated disposal and treatment issues, and concerns for non-target species. Localized, diver-assisted dredging was tested in uninfested areas, but the unconsolidated nature of the lagoon sediments rapidly reduced visibility and made this option impractical.

As the constraints of other methods became clear, as well as the need to take action, SCCAT concluded that the best approach for both containment and treatment of the *C. taxifolia* colonies was construction of small polyvinyl chloride (pvc) frames that were to be placed over the plants and then covered with black 20 mil PVC sheeting. The sizes of the tarps ranged from 500 m² areas for the few large colonies initially discovered, to about 1 m² for small plants found in later surveys. The sides of the tarps were anchored and sealed to the bottom with gravel-filled bags. An overhang was provided between the edge of the colony and edge of the bagged area to ensure that a margin of uninfested area was also covered and treated (Figure 3). Initially, liquid sodium hypochlorite (ca. 12% stock solution) was injected into the tarped areas via ports in the pvc tarps fitted with caps. Smaller colonies were later covered with the pvc tarps without a frame, beneath which several 2.5 cm dia. solid chlorine-releasing tablets ('pucks') were placed. The tablets were much easier for scuba divers to handle and required far less equipment than was required for injecting liquid sodium hypochlorite. Use of chlorine necessitated obtaining a Research Authorization from Cal EPA/ DPR.

Containment and treatments of the largest colonies in Agua Hedionda began 17 days after the discovery of *C. taxifolia*. The rapid deployment of equipment and the associated treatments resulted from the fortuitous presence of a scuba team that was already working in the lagoon, and their commitment toward the eradication goal. The subsequent discovery of *C. taxifolia* in the small embayments at Huntington Harbour, a few weeks after the find in Agua Hedionda, prompted similar containment, though only PVC



tarps (without frames) and solid chlorine-releasing tablets were used since the colonies were smaller at this site.

Thus, from an operational perspective, expedient decisions were made based upon the need to act quickly and the desire to use those methods having reasonable probability for success, and which would be least likely to cause off-target concerns. Treatments were therefore confined to the known target 'volume'. The consensus was also that the dissipation of chlorine (dilution, breakdown and inactivation via particulate and dissolved organic matter) would likely be rapid.

An examination of the funding sources for this rapid response, and for continuing eradication actions during the past 4 years, reveals another unique aspect of the SCCAT consortium: the importance of individual efforts and personal commitments. The 'startup' emergency funds (about US\$200,000) came from the San Diego Regional Water Quality Board and Cabrillo Power, LLC (a power plant located on the lagoon). Through the highly focused efforts of an Environmental Specialist on the San Diego Regional Water Quality Control Board, the invasion of *C. taxifolia* was treated like an oil spill, and thus qualified for emergency funding. As a result, US\$100,000 became available almost immediately from emergency spill funding sources normally earmarked for 'clean up and abatement'. This example of creative and flexible

thinking, coupled with personal dedication, represents the best qualities in regulatory scientists and managers.

The designation as a 'clean up and abatement action' also cleared potentially delaying legal constraints. The Board was able to issue required permits for the project, and CalEPA/DPR placed a high priority on issuance of authorization for use of chlorine. Similarly, when the Huntington Harbour infestation was found, the Santa Ana Regional Water Quality Control Board provided emergency funds for eradication there. The financial commitment from managers and staff at Cabrillo Power, LLC made the initial full treatments of the infestations possible and also served as a firm testament to the importance of achieving successful eradication.

Additional funding eventually followed from NOAA-Fisheries, California Department of Fish and Game (CDFG), and several subsequent grants that were tied to environmental coastal protection goals. Most recently, the California Coastal Conservancy has awarded US\$1.3 million for 2004-2005 eradication efforts and monitoring efforts. However, due to the 'virtual' status of SCCAT, funds are either channeled directly to the operations contractor, or through the Agua Hedionda Laguna Foundation. SCCAT has served in an advisory, coordinating and reviewing capacity in the eradication efforts. (Appendix 1 summarizes the sources of funds to 2003 that also support public education and outreach, as well as research targeted to specific needs for eradication and detection.)

Oversight and quality assurance

The very high profile nature of this project has attracted national and international interest (Dalton 2000, 2001). In fact, shortly after the eradication treatments began, a BBC film crew flew to San Diego expressly to include this work in a special documentary on the spread of *C. taxifolia* in the Mediterranean area. At the same time, the aggressive, eradication-only stance taken by SCCAT, coupled with high anticipated costs (ca. \$1.2 million per year), provided plenty of fodder early on for second-guessing, and for continuing debates about what type of studies could have or should have been performed in the field short of

containment and kill actions. The sources of these concerns derived from: (a) the reality and exigency of responding to a new invasive species with a clear history of detrimental, rapid spread (i.e., the Mediterranean coasts), and (b) divergent perspectives and priorities of scientists experienced with on-the-ground control and eradication approaches compared to the perspectives of their phycologist colleagues who, understandably, wanted the opportunity to investigate this 'new species' in situ. Finally, the lack of any recognizable track record of successfully eradicating *C. taxifolia* led some scientist to believe that it could not be done. This prompted discussion of the merits of first studying how it would grow here. Given these circumstances, together with the fact the *Caulerpa* genus, including *C. taxifolia*, comprise some of the most widely sold and shared tropical seawater plants for aquarium enthusiasts, it is no surprise that controversy developed. In addition, highly selective reporting in some media focused on controversial issues, rather than on the significant progress being made by SCCAT (e.g., Dalton 2000, 2001).

Efficacy of treatments

To develop quality assurance information and to evaluate the efficacy of the tarping and chlorine treatments, a series of sediment samples were taken from beneath the treated/tarped areas in December 2001, and August 2002. The hiatus between initial treatment and assessment was quite purposeful: The Technical Committee within SCCAT reasoned that risks associated with removing tarps and disturbing sediments too soon overrode the desirability of examining the treated plants, especially since the colonies were still well contained under the tarps. By December, 2001, SCCAT felt that adequate time had passed; therefore, following careful removal of sediments using PVC coring tubes, replicated 10 cm dia. by 20 cm deep samples were removed and transported to the USDA-ARS research facility on the UC Davis campus and placed in conditions that would promote growth of viable fronds or stolons. As a control for this procedure, other cores from similar sediments in uninfested and untreated areas were removed and inoculated with fronds of *C. taxifolia*: these cores

supported continued growth from the fronds. However, in core samples taken inside treated areas from both sampling periods, December and August, no *C. taxifolia* emerged, nor were any intact pieces found 76 and 108 days after planting, respectively. Surprisingly, seedling eelgrass (*Zostera marina*) emerged from several cores from areas that had been previously covered and treated, and some living invertebrates were also present (Anderson 2002, 2003). These assays, therefore, indicated that treatments were successful in killing *C. taxifolia* and that, at least within the samples taken, other organisms survived the treatments, including seed of native eelgrass. Some of these cores were from sites that had been tarped and treated 2 years previously. Further examination of chlorine effects (e.g., dose/response) on *C. taxifolia* is underway (Williams and Schroeder 2003; Williams and Schroeder 2004). Additional field assessments are also on going, including removal of small, replicated sections of tarps and monitoring of organisms that re-occupy these areas.

Program review

In order to assess the eradication progress, and to provide a forum for information exchange, the University of California Cooperative Extension hosted an International Conference on *C. taxifolia* at the end of January 2001 in San Diego, 50 km south of the original infestation (California Sea Grant 2002). Experts in *Caulerpa* taxonomy and ecology participated, including scientists from France, Italy, Croatia, and some Australian managers who were just beginning to react to a new *C. taxifolia* infestation. SCCAT was able to report that the first assessments of chlorine-treated areas indicated no potential for re-growth based on bioassay grow-out of sediment cores removed from beneath the tarps (Anderson 2002). Immediately following the conference, a Scientific Review Panel, requested by CDFG, reviewed the SCCAT actions and provided recommendations. Within the 17 recommendations, were several reasonable suggestions, such as: maintaining rapid response capacity (within 30 days after new discovery), defining a lead agency, expanding surveillance in California, conducting risk assessment (for other potential

infestation sites), conducting a review of project action protocols, and further investigation of methods to eradicate *C. taxifolia* and other invasive marine algae. However, the panel was divided on whether eradication was possible. For example, when polled as to the likelihood of successful eradication, 6 of the 11 panel members felt there was less than a 50% probability; whereas five members ranked the chances around 80% (California Department of Fish and Game 2002).

Field monitoring for new growth

As the need for new containment and treatments declined by the end of the second season (fall 2002), the primary task shifted to monitoring for new growth within the Agua Hedionda Lagoon and Huntington Harbour sites. The usual criterion for eradication is quite simple: no living parts can remain to re-infest the site. This may seem trivial, yet searching under water for small, centimeter-sized pieces of fronds is very difficult due to poor visibility, tidal currents, epiphytic growth that can camouflage the plants, and the presence of other macrophytes such as eelgrass (*Z. marina*) that can occlude the divers' view. To accomplish the searches, teams of several divers follow prescribed transect lines laid with GPS units. The search grid provides approximately 1-meter spacing between lines so that some overlap occurs to minimize the chances of missing plants. Survey of the inner lagoon site at Agua Hedionda Lagoon takes approximately 5–7 days to complete, assuming favorable visibility. The search strategy has recently shifted to fewer surveys per year (now one spring and one fall search starting in fall 2003), and more defined search areas based upon historic 'discovery' patterns. Surveys of Huntington Harbour require less time due to the smaller area and generally higher frequency of conditions offering better visibility. Figure 4 shows that from an initial total infestation in Agua Hedionda Lagoon of about 1000 m² (June/July 2000), the area containing new plants declined dramatically during 2001–2002. A similar level of success has been achieved in Huntington Harbour. In fact, to date (November 2004) no new plants have been found in Agua Hedionda Lagoon since September 2002 or

in Huntington Harbour since November 2002. This pattern of reduction is typical for eradication efforts, wherein dramatic reductions may be expected initially, followed by a diminished rate of reduction due to the difficulty in detection of smaller plants or colonies.

Given the increasing challenge of finding small plants, how does one know with some certainty that a zero-detection survey is not simply 'missed' plants? There are really three components to this question: (1) What are the divers' efficiency and ability to locate *C. taxifolia*? (2) What is the minimum size a colony has to attain to assure it will be detected 100% of the time in a standard search effort, and (3) conservatively, how long does it take for the plant to reach a minimum threshold size for assured detection? Part of the 2002/2003 surveys and monitoring efforts have addressed these questions by using ersatz (plastic) caulerpa fronds fastened together to produce 'colonies' of various sizes. In fact, the general efficiency (quality assurance) is now routinely determined by placements of the ersatz targets in locations not known to the search team. The "percent find" for single passes on the transect lines and can range from 30 to 80% depending primarily upon turbidity (clarity) of the water. The minimum size for 100% detection is presently being confirmed using four size ranges of the plastic caulerpa. Once this is known with reasonable certainty, then SCCAT will propose a final eradication timetable. The full set of criteria for establishing this schedule will first be submitted for technical, scientific review by the oversight committee that met in San Diego in January 2001. After review and consideration of comments, an Eradication Schedule (i.e. projected time to declare complete eradication) will be submitted to all stakeholders.

The SCCAT model

A summary of the events leading to the present stage in the SCCAT response is provided in Figure 5. Importantly, 'pre-conditions' were in place at the time the discovery was made. Even though there was no contingency fund in place, nor any team in place, the level of awareness of the threat from *C. taxifolia* had been well established, at least

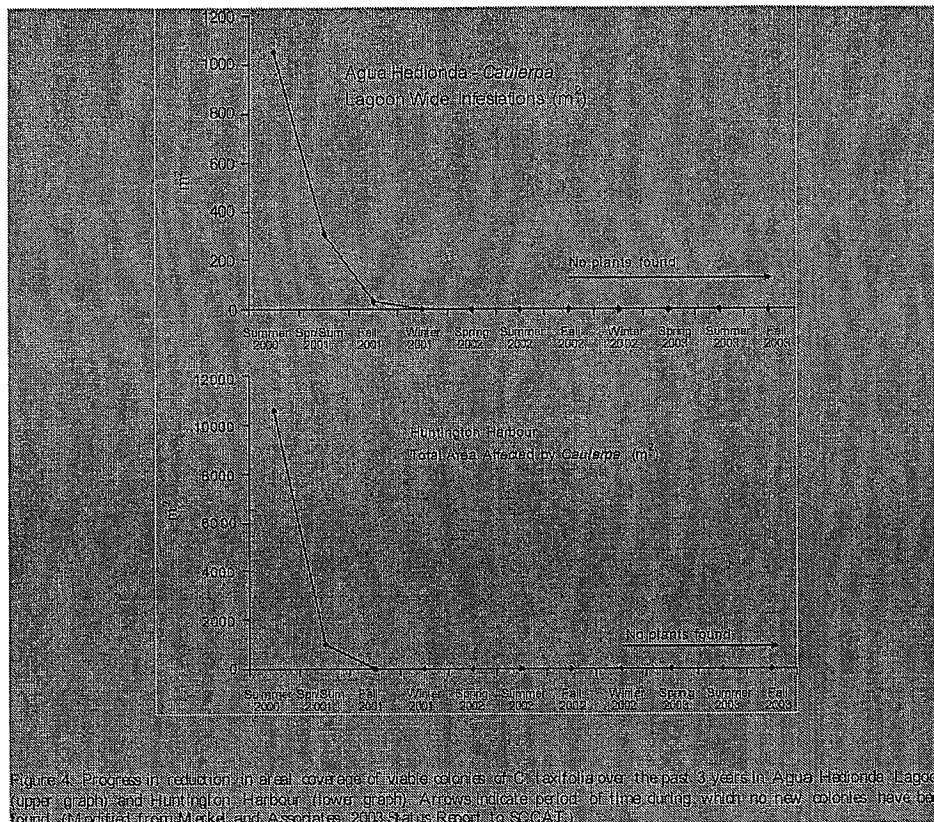
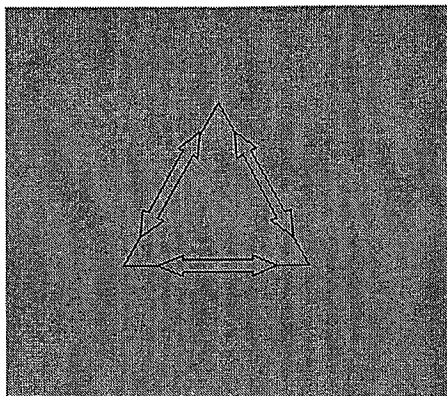


Figure 4. Progress in reduction in area covered by viable colonies of *C. taxifolia* over the past 3 years in Agua Hedionda Lagoon (upper graph) and Huntington Harbour (lower graph). Arrows indicate period of time during which no new colonies have been found. (quintiles from Mjelke and Associates, 2003 Status Report to SCCAT.)

within a small circle of aquatic invasive species scientists and managers (Keppner et al. 1998; Keppner and Caplen 1999). This heightened awareness probably shaved weeks to months from on-the-ground response time. With fortuitous timing, Alex Mänesz's (1999) warning tome describing the consequences of no action against this species in Europe, was published shortly before the California discovery, and underscored the need to act quickly.

Though the SCCAT approach to the *C. taxifolia* infestation is not fundamentally different from many schemes proposed for rapid response, there are some assumptions in these schemes that

probably should be modified based upon the SCCAT model. First, rather than a complex, nationally-centralized structure, I believe that the requirements for effective rapid responses can be distilled to three essential components that must be fully integrated at the local level: (1) biological and ecological knowledge of the invading species; (2) knowledge of the invaded site (physical, ecological, and sociological); (3) sufficient field expertise and resources for immediate action. By examining the functions of these components, one can understand how to prepare for the eventuality of a new introduction. Second, these components, taken separately, will not produce a



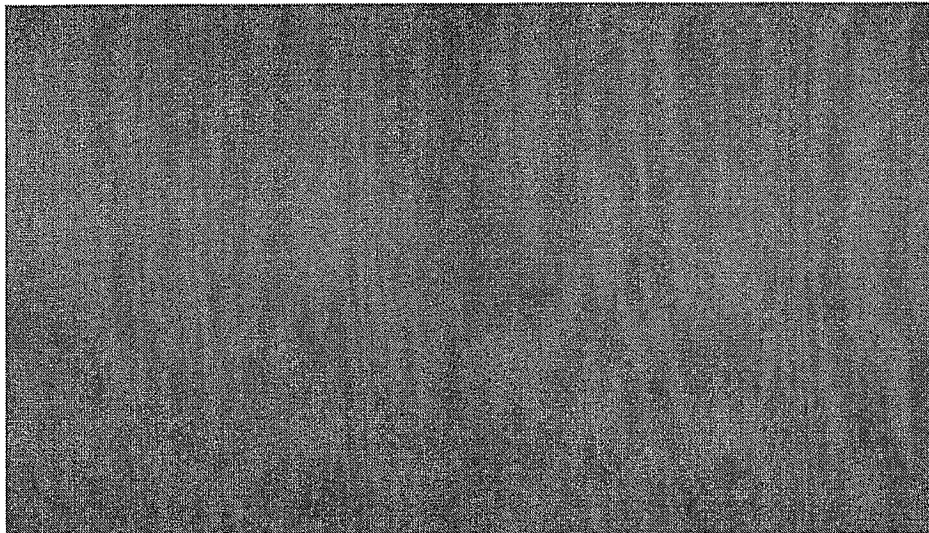
coordinated, credible or effective response for a simple reason: The expertise within each functional component will only be productive in the context of the input from the other two. For example, phycologists may be knowledgeable about a given algal species and can provide crucial life cycle, reproductive and ecological information. However, without expertise in implementing a 'best eradication' option, or the knowledge of the infested site and pertinent sociological constraints, this biological information alone is not sufficient to develop a feasible strategy for eradication. The converse is of course true as well: scientists and managers versed in approaches and methods for containment, control and eradication may be ill prepared for using those tools without the relevant biological, regulatory, and stakeholder information. The need for this multidisciplinary consortium also suggests that the most effective participants will be those who truly understand their limitations, and who respect the expertise comprising the other components. This is a 'culture' that must be guided by common goals and a willingness to listen carefully to opposing views in order to develop a credible consensus for action. I believe that problems arising from some past reactions to invasive species derive directly from a failure to fully engage each of the three components at the onset of the response. Undoubtedly, SCCAT too would have benefitted from earlier, public informational stakeholder

workshops. This is because the iterative, adaptive management approach that works best necessitates a series of meetings as new information is obtained and changes are proposed.

Third, whatever approach is taken in response to invasive species, adequate, accessible funding is absolutely essential. SCCAT was extremely fortunate in having a fully responsive agency, the San Diego Water Regional Water Control Board that had access to funds. This suggests that several state and federal agencies with resource management mandates must each be provided with a minimum of US\$500,000 for rapid response. In addition, Memoranda of Understanding (MOUs) between state agencies, and between the states and the federal agencies, must prescribe how these funds can be transferred and shared quickly. The MOU for resource-sharing is equivalent to the practice of facilitating multi-city fire station coordination for responses to large fires.

Lastly, and this is probably the most important difference from other proposed schemes, the successful experiences with the California *H. verticillata* eradication program (California Department of Food and Agriculture 2003), with SCCAT, and with the less well-known sabellid (polychaete) worm eradication in the California abalone industry (Culver et al. 1997; Kuris and Culver 1999; Culver and Kuris 2000) all demonstrate that early and effective responses are locally driven (i.e., either impaired or facilitated), require key local stakeholders, and almost always need to engage local resources. In essence, this is a "bottom-up" model, which recognizes that vital information on infested sites, as well as public buy-in, must be achieved locally, and in the context of all available expertise and knowledge of the target species. The concept is summarized in Figure 5.

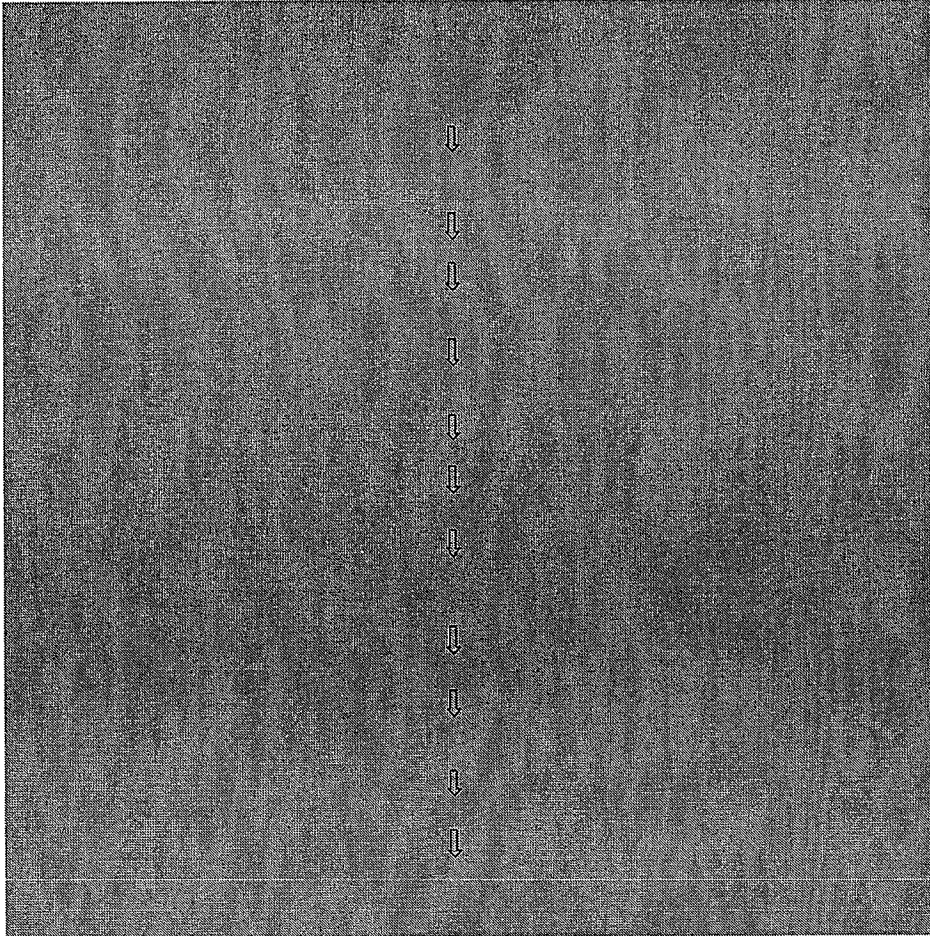
Assuming that the model can work, how could it be applied to other putative invasive species? The answer lies in part in the example of *C. taxifolia*'s status before it was discovered in the USA (Figure 6). Rather than waiting for the first 'find' in a new location, what is needed is a short list of likely invading species—either those yet to reach the USA, or those localized in certain regions or states, but with clear potential to spread and to damage aquatic resources. From



this list, a "pest-alarm" drill, or exercise is run for each species in order to identify who (professionally and by agency and stakeholder group) will best provide expertise in the three rapid response components that I have described earlier. This telling exercise will quickly ferret out gaps in operational abilities (e.g., training needed, resources available), as well as identify likely pathways and sites of introduction. It will also identify scientists who are knowledgeable about the species' biology and those who are willing to be placed on standby. This will clarify ownership of likely infestation sites and help identify and resolve regulatory issues so that these do not impede timely action. Ideally, a species-specific response team could be designated and ready to act on a new discovery within a few days. Even if the new species is not from the original target list, most of the pre-infestation work will have been done anyway. Figure 7 summarizes a 'pest alarm' approach and suggests that these teams might be called a 'NIPIT', for Non-native Invasive Pest Intervention Team. I suggest that this alarm exercise might cost around US\$5,000 per species, and that this up-front

investment would reap tremendous return in shortening response time, providing effective use of resources and in elevating the public's awareness for the need to prevent establishment of these organisms. The recent report of yet another algal invasion, this time by *Caulerpa racemosa* in the Mediterranean Sea and Canary Islands (Verlaque, personal communication), suggests that this type of exercise and preparedness is urgently needed.

In summary, SCCAT has been extremely successful in spite of, and perhaps because of, the fact that no single agency federal, state, or local had both the authority and resources to implement actual eradication fieldwork. This circumstance required fluidity, flexibility and pragmatic decision-making. A collaborative culture was developed, wherein creative, adaptive problem solving has been the hallmark, and where the contributions of a wide range of public and private entities were essential. SCCAT continues to perform an effective role in facilitating and optimizing the use of resources to achieve the consensus goal: Eradication of *C. taxifolia* for the protection of California's coastal ecosystems.



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Appendix 1. Sources of funding and approximate total amounts (US\$) provided for *C. taxifolia* eradication from 2000-2003. (Note: Use of some funding extends through 2005.)

Contributing organization	Funds and other in-kind support
San Diego Regional Water Quality Control Board (via State Water Resources Control Board)	Designated <i>C. taxifolia</i> as 'pollutant'. Approximately \$2.0 million provided for emergency 'cleanup' funding support; outreach and education; research on high-energy habitat detection; participation by staff on SCCAT (SCCAT Chair/Steering Committee)
Santa Ana Regional Water Quality Control Board (via State Water Resources Control Board)	Emergency cleanup/abatement funds for Huntington Harbour infestation; approximately \$700,000. Participation on SCCAT

Appendix 1. Continued.

Contributing organization	Funds and other in-kind support
California Department of Fish and Game	Directed funds of approximately \$945,000. (Eradication, surveillance, research via UCD & ARS, outreach/education) Participation by staff on SCCAT (Steering Committee)
California Coastal Conservancy	Grant of \$1.3 million for eradication/monitoring (via Agua Hedionda Lagoon Foundation)
California Department of Parks and Recreation UC Davis/Research UC Davis/Extension	\$15,000. Scientific Review process (via CDFG) Physiological expertise; scientific support for improved eradication methods; research on chlorine efficacy; scientists Participation on SCCAT
US Department of Agriculture-Agricultural Research Service- Exotic and Invasive Weed Research	Scientific expertise in control and eradication of aquatic plants and algae; in-kind support for early assessment of algaecides and assessment of treatment efficacy; scientist participation on SCCAT (Steering Committee)
National Marine Fisheries Service (NOAA-Fisheries)	Approximately \$300,000; Support to deal with Coastal Commission permits; staff scientist participation on SCCAT (Steering Committee)
US Fish and Wildlife Service (Coastal Program) and ANS Task Force Cabrillo Power, LLC	\$212,000 for eradication/surveillance (via NOAA-Fisheries); \$40,000 (Scientific Review Panel) Early, rapid funding of ca. \$123,000 to help support eradication; Participation on SCCAT
Merkel and Associates, Inc.	First detection and notification; contractor for operational, hands-on eradication field team; outreach/education; Participation on SCCAT
Agua Hedionda Lagoon Foundation	Public liaison and awareness; support for obtaining regulatory changes and funding; negotiations for adjusted Agua Hedionda Lagoon uses; obtained grants for eradication totaling approximately \$2 million (310(h) funds and Ca.Coast.Comm.)
City of Carlsbad, CA	Security at Agua Hedionda Lagoon site; enforcement of boating restrictions; community outreach; staff participation on SCCAT