From: Hillary Hauser [mailto:hillary@healtheocean.org]
Sent: Friday, March 18, 2005 2:30 PM
To: COPCpublic
Subject: Wastewater Discharge

Dear Council:

Please accept the attached news release and report from Heal the Ocean - "Ocean Wastewater Discharge Inventory for the State of California" - which describes one of California's biggest ocean pollution problems, the amount of sewage we are dumping into the sea, from Oregon to the San Diego/Tijuana border.

We will be presenting this to California Ocean Protection Council members in the future, hopefully so the panel will give the facts in this report seroius consideration as they begin to work out the very real problems regarding the health of California's beaches.

Thank you!

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HEAL THE OCEAN
OCEAN WASTEWATER DISCHARGE INVENTORY
FOR THE STATE OF CALIFORNIA

Heal the Ocean divers inspect outfall © Jim Knowlton

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ABOUT HEAL THE OCEAN:

Heal the Ocean is a highly successful non-profit citizen's action group in Santa Barbara, California, with nearly 3,000 members. Since its formation in 1998, the organization has been using sophisticated technology (DNA, virus testing, GIS mapping), to pinpoint sources of ocean pollution, for the purpose of initiating and facilitating a halt to pollution practices. Heal the Ocean has also hired engineers, scientists, hydrologists and researchers to assess problem areas, to conduct testing, and to perform cost feasibility studies for better technological methods of handling human waste.

Heal the Ocean is the first environmental organization to conduct DNA studies in the environment (the group collaborated with Santa Barbara County Environmental Health Services to perform a DNA study of Rincon Creek in 1999). HTO has also initiated septic-to-sewer conversions in areas of Santa Barbara County where improperly placed septic systems are suspected of polluting the environment. The group is one of the first environmental organizations in the nation to conduct virus studies in the ocean, and to commission cost feasibility engineering studies for upgrading wastewater treatment plants to full tertiary capability.

In addition, Heal the Ocean staff and volunteers actively gather environmental facts by going out in the field with video cameras, and HTO divers have made video documentaries of sewer outfalls. The group successfully campaigned to end one of California's last 301(h) sewage waivers not only by hiring excellent lawyers and researchers, but by making a dive on the sewer outfall to show the Regional Water Quality Control Board what the sea looked like in the area of sewage deposition. Visit us on our website, at www.healtheocean.org.

ACKNOWLEDGMENTS

Heal the Ocean wishes to acknowledge the help of our 3,000 supporters, and in particular we thank the following for the wonderful financial generosity that makes our work possible: Jack & Kim Johnson, Brian & Laurence Hodges of the WWW Foundation, The Ann Jackson Family Foundation, Mr. & Mrs. Tom Crawford of The John G. Braun Charitable Annuity Trust, Adam & Kara Rhodes of the WWW Foundation, Yvon Chouinard, Thomas & Cynthia Dabney of The Christopher Foundation, Julia Louis-Dreyfus & Brad Hall of The Hall Charitable Fund, Patagonia, our numerous anonymous donors – and last but not least, the Groundswell Society and the wonderful surfers of the Rincon Clean Water Classic, who have been surfing every year to raise funds to aid in our fight to clean up one of the world's greatest surf breaks.

Hillary Hauser, executive director
Heal the Ocean

Heal the Ocean
Ocean Wastewater Discharge Inventory for the State of California

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Background:

There are 37 direct-to-ocean sewage outfalls discharging into the Pacific Ocean off the California coast – from the Oregon border to San Diego/Tijuana – that could affect the health of swimmers, surfers, windsurfers and divers, who consider their use of the ocean to be part of the California lifestyle. The following statistics are extracted from a four-month survey conducted by Heal the Ocean into the records of the state of California's Regional Water Quality Control Boards, NPDES permits, National Oceanic and Atmospheric Administration (NOAA) nautical charts, or direct telephone contact with the discharger or public works departments of the coastal cities included in this survey.

Over 1.5 billion gallons of sewage per day (dry weather flow) is discharged directly into the Pacific Ocean, as follows:

	Millions of gallons per day
North Coast (Mendocino to Crescent City)	10
San Francisco Region	27
Central Coast (Santa Cruz to Carpinteria)	70
Los Angeles Region (Oxnard to Terminal Island (including Avalon & San Clemente islands)	796
Orange County	320
San Diego Region	286
Total	1,509

Almost 44 billion tons of mass solids (sewage sludge) per year is deposited into the Pacific Ocean, as follows:

	Millions of tons per year
North Coast (Mendocino to Crescent City)	214
San Francisco Region	406
Central Coast (Santa Cruz to Carpinteria)	1,073
Los Angeles Region (Oxnard to Terminal Island (including Avalon & San Clemente islands)	15,000
Orange County	14,000
San Diego Region	13,300
Total	43,993

Of the 37 wastewater treatment facilities, 17 or 44% are discharging into the "surf zone" of the ocean – into waters 50 feet or less. In these areas, the likelihood of contact of sewage to humans recreating in the ocean is not only high but probable.

In some areas the sewage is discharged directly into the ocean waves (1.9 million gallons per day (mgd) in Crescent City, 0.17 mgd in Shelter Cove).

In the Central Coast (Region 3), the Ragged Point Inn dumps .013 mgd of sewage over a cliff!

The following short outfalls deposit secondary-treated sewage into the inshore, recreational zone of the ocean off California:

		Distance from shore	Depth of Water
Crescent City	1.9 mgd	Into waves	0’
Arcata	1.7 mgd	Marsh channel (tide takes it out)	2’
Eureka	5.2 mgd	4,100 ft.	22’
Shelter Cove	.17 mgd	Into waves	0’
Fort Bragg	1.3 mgd	650 ft.	27’
Daly City	6.8 mgd	2,500 ft.	32’
Half Moon Bay	2.2 mgd	1,900 ft.	37’
Carmel/Pebble Beach	1.6 mgd	600 ft.	35’
Ragged Point Inn	.013 mgd	Cliff discharge	0’
San Simeon	.05-.1 mgd	600 ft.	20’
Avila/Port San Luis	.03 mgd	2,240 ft.	29’
Montecito	1.0 mgd	1,550 ft.	22’
Summerland	0.15 mgd	740 ft.	19’
Carpinteria	1.7 mgd	1,000 ft.	25’

Almost 24 million gallons per day of sewage goes into the ocean off California daily in 20 to 30 ft. of water or less, at a distance less than a mile from the shore.

Large sewage deposits are being made by sewage plants into waters only slightly deeper (40 to 50 ft. range), including:

		Distance from shore	Depth of Water
Cayucos/Morro Bay	1.4 mgd	2,900 ft.	50’
Pismo Beach	1.1 mgd	4,400 ft.	55’
Oxnard	21.0 mgd	5,280 ft.	48’

About 23 million gallons per day of sewage goes into the ocean daily in mid-waters only slightly deeper (40 to 50 ft. range).

The 37 ocean outfalls along the California coast are currently considered to be “meeting state standards,” because the current California Ocean Plan, which is the basis for the standards, is outdated, and inadequate to protect public health. The Ocean Plan needs revision to reflect the risks we now know wastewater discharges pose. Nor does the current Ocean Plan reflect any consideration for the increase in water sports throughout the state, which has occurred for many reasons – among which are a population increase, as well as technological equipment advances, such as wetsuits, that encourage more people into the water.

Current state standards by which the health of California's beaches is measured (namely, whether or not it is safe for people to recreate in the ocean) has been based on a bacteria standard, a measurement of the amount of total coliform, fecal coliform and enterococcus in seawater.

These "indicator bacteria" do not in themselves cause illness in humans, but as Heal the Bay (Santa Monica), points out in its explanation of the grading system it uses in its Beach Report Card program to guide ocean-users, a 1996 health effects study conducted by the University of Southern California under the direction of the Santa Monica Bay Restoration Project (SMBRP) established a direct connection between levels of these indicator bacteria and human illness).[1]

These illnesses include stomach flu, ear infection, upper respiratory infection and skin rash.

While measurements of these indicator bacteria may be helpful in determining healthfulness or non-healthfulness of swimming or surfing in the ocean on a given day, they are inadequate in two areas:

1) <u>They do not pinpoint pollution sources</u>. In particular, fecal coliform measurements cannot differentiate between birds, mammals, dogs, or humans. The measuring of pollution cannot take the place of eradicating that pollution.

2) <u>Indicator bacteria can be absent when hepatitis A and enteric (coxsackie and polio) viruses are present.</u> These viruses, which can only be present in human fecal matter, indicate a true health risk.

Heal the Ocean has conducted virus tests at a number of Santa Barbara County's most popular swimming beaches, on warm, sunny days when creeks are not running and when storm drains are not emptying, when indicator bacteria are absent and the beaches are earning an "A" grade – and the samples reveal the presence of both hepatitis A and enteric viruses. These samples were processed in the USC laboratory of Dr. Jed Fuhrman. (APPENDIX A)

The argument that these viruses were "not viable" (dead) is moot. Dead or alive (and the USC laboratory scientists say a dead virus cannot be measured), these viruses got into the ocean from human sources. Since the creeks were not running, the entry of these viruses into the ocean can, by logic, only be from 1) direct human deposition (homeless problem), 2) contaminated groundwater (perhaps from upstream septic systems or broken sewer pipes) flowing unseen into the sea, 3) illegal dumping of bilges from boats, or 4) sewage from sewage treatment plants.

In samples taken from the final settling ponds of two Santa Barbara-area sewage treatment plants, both hepatitis A and enteric viruses were detected, sometimes in very high concentrations, or "bands." These same viruses were detected in ocean water samples taken from nearby beaches. The tested sewage, about to be released into the ocean, had gone through full secondary treatment, meeting state standards for ocean disposal.

NOTE: Heal the Ocean makes it clear that its virus testing has not been systematic, nor has it ever been Heal the Ocean's intent to provide a regular virus testing service for the community. These tests were performed solely to determine if viruses are present in the ocean (indicating human pollution) on open, "Grade A" days, and more than once we found this to be the case.

Because many of California's sewer outfalls are depositing sewage in very shallow water – the recreational zone, where people swim – Heal the Ocean commissioned Dr. Howard Kator, an environmental microbiologist from Virginia, for a report on the human health aspects of coming into contact with secondary-treated sewage.

Information from Dr. Kator's report, "Concerns and risk factors associated with discharges of secondary treated sewage into very shallow coastal waters" (APPENDIX B), was included in the Natural Resources Defense Council (NRDC) "Swimming in Sewage" report presented to Congress in February 2004.[2]

"There is considerable evidence that exposure to polluted marine bathing waters results in an increased frequency of human disease symptoms (Henrickson et al. 2001)," Kator notes. "Most epidemiologic studies confirm that swimmers have an increased risk of disease compared with nonswimmers (Cabelli et al. 1983, Griffin et al. 2003). Disease symptoms include eye-ear, respiratory, gastrointestinal disorders and infrequently more serious conditions. Pathogens associated with outbreaks attributed to marine recreational waters have generally not been identified but are assumed to be viruses."[3]

The Beaches Environmental Assessment and Coastal Health (BEACH) Act has established an October 2005 deadline for states with coastal recreational waters to develop new water quality standards for bacteria. But as noted in the NRDC "Swimming in Sewage" report, two scientists (Rose and Katonik), state that "...viruses and protozoa have relatively long survival times and low infective doses (the smallest dose that can cause infection), whereas bacteria require a high infective dose."[4]

The NRDC report concludes that the long survival times and low infective dose of viruses and protozoa raise serious questions about reliance on bacterial standards as indicator of clean water. [5]

In its report, "Managing Wastewater in Urban Coastal Waters," the National Research Council reports, "The United States continues to have periodic outbreaks of hepatitis A from the consumption of shellfish from areas contaminated by sewage, even when bacterial standards are being met."[7]

The state of California cannot continue with the old standards when it is now known that the die-off, or inactivation, of human viral pathogens in seawater takes days, while the coliform bacteria used in testing for sewage contamination die-off is several hours. The bacteria standard may provide plant operators with a measure of plant performance, but is an inadequate indicator of contamination or risk to ocean users.

A recent World Health Organization (WHO) analysis (APPENDIX C) provides a simple qualitative chart of health risks related to different degrees of sewage treatment and types of discharges. This chart indicates that tertiary wastewater poses very low risks to humans, even with short outfalls (those discharging into body contact areas).

The WHO chart indicates that *very low health risks can also be obtained if sewer outfalls are extended beyond the shallow, inshore "recreational" zone – where people swim, surf or dive – to a minimum of a mile offshore, and/or a minimum depth of 60 feet of water.* In establishing safe depths and distance from shore, consideration must be given to local ocean conditions and the amount of sewage discharged.

Areas such as San Francisco, where there are combined storm drains (CSOs), large pulses of stormwater enter the sewerage system due to infiltration and inflow (I&I), and present human risks during rainy periods that are not present during dry periods due to wastewater systems being overwhelmed. The CSOs present a risk to both those actually using the water, as well as beach-goers and people on land downwind of the contaminated water, because studies have shown that infection is possible by breathing pathogens present in aerosols.

Building tertiary treatment plants, or adding capacity to existing plants to fully treat or store CSOs or I&I flows that are over plant capacity would involve an overlong process of individual site analysis, self-monitoring report review, hearings and perhaps cost feasibility studies on a case by

case basis. Any panel considering a new Ocean Plan for the state of California should put this problem on its agenda for study.

In the meantime, to solve an immediate health threat to ocean users without adding a cost to the state of California (the minimal financial burden would be on the users of the wastewater facilities), wastewater treatment plants discharging into the shallow zone of the Pacific Ocean off California should be required to install longer sewer outfalls. Regulations establishing minimum distance from shore as one mile, and minimum depth of water, 60 feet, would not only solve the I&I and CSO problems, they would reduce the risk of ocean users coming into contact with sewage. Considering the WHO information, it can be assumed that a sewage discharge occurring more than a mile from shore reduces the human health risk category by more than 90% (from what it would be with a short outfall or discharge at the shoreline).

These statistics, in relation to the WHO information, indicate that 10 California wastewater discharges pose a high public health risk, 22 a medium risk, 3 a low risk, and 2 a very low risk. By most standards – especially for those who assume they can use the ocean of California without getting sick – these results are unacceptable.

Heal the Ocean believes that California coastal communities do not own the Pacific Ocean as their private disposal field. The time has come to bring practical and technological advances to wastewater treatment. Heal the Ocean has conducted cost/feasibility studies for tertiary treatment for the five wastewater treatment plants discharging into the ocean off Santa Barbara County, and has received cost estimates for sewer outfall extension. Both are affordable – less than most people pay for cable television.

CALIFORNIA OCEAN WASTEWATER DISCHARGE INVENTORY

Discharger, Wastewater Treatment and Volume, Discharge Location

For
Heal the Ocean
Santa Barbara, California

Prepared By
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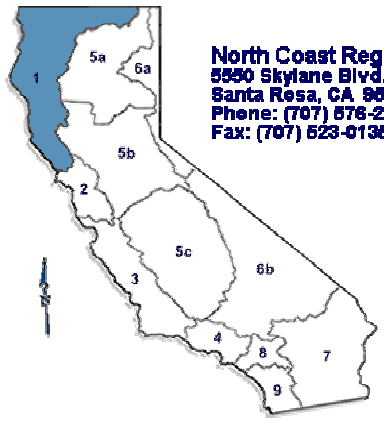
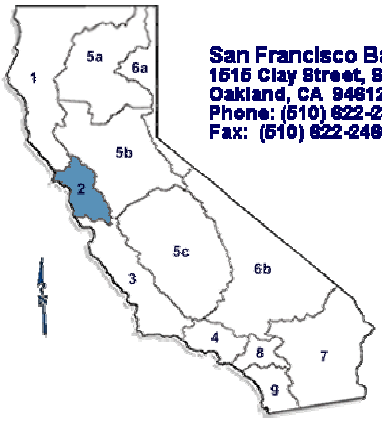
REGIONAL WATER QUALITY BOARD REGIONS WITH OCEAN DISCHARGES

Region 1



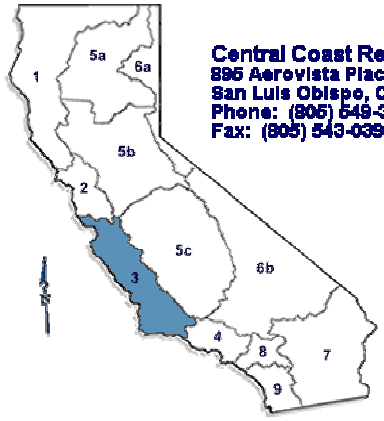
North Coast Region (1)
5550 Skylane Blvd., Suite A
Santa Rosa, CA 95403
Phone: (707) 576-2220
Fax: (707) 523-0135

Region 2



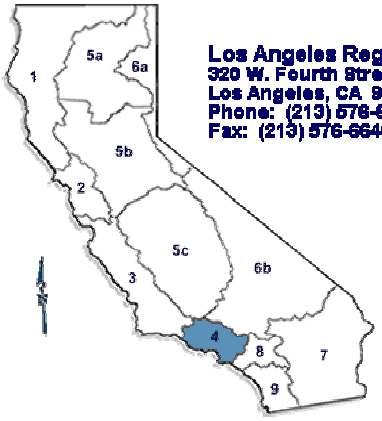
San Francisco Bay Region (2)
1515 Clay Street, Suite 1400
Oakland, CA 94612
Phone: (510) 622-2300
Fax: (510) 622-2460

Region 3



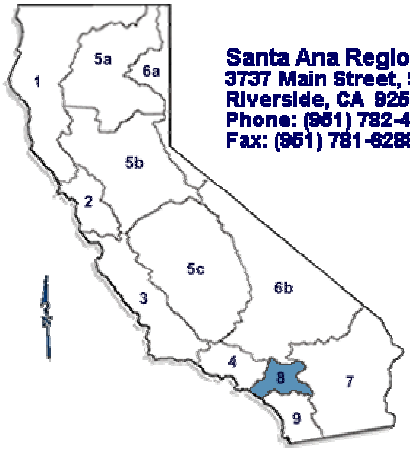
Central Coast Region (3)
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401
Phone: (805) 549-3147
Fax: (805) 543-0397

Region 4



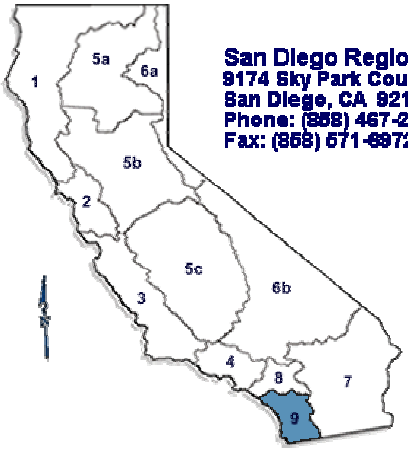
Los Angeles Region (4)
320 W. Fourth Street, Suite 200
Los Angeles, CA 90013
Phone: (213) 576-6600
Fax: (213) 576-6640

Region 8



Santa Ana Region (8)
3737 Main Street, Suite 500
Riverside, CA 92501-3339
Phone: (951) 782-4130
Fax: (951) 781-6288

Region 9



San Diego Region (9)
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340
Phone: (858) 467-2952
Fax: (858) 571-6972

NORTH COAST REGION (1) OCEAN DISCHARGER SUMMARY INFORMATION

DISCHARGER (NPDES NO.)	TREATMENT PROCESSES	WASTEWATER CHARACTERISTICS			DISCHARGE LOCATION		COMMENTS
		MASS SOLIDS LOAD (m tons/yr)	MAX DESIGN FLOW (MGD)	AVG DRY WEATHER FLOW (MGD)	DISTANCE FROM SHORE (Feet)	WATER DEPTH (Feet)	
Crescent City[1] (CA0022756)	Secondary with disinfection	39	1.9	1.9	"Short outfall"	0	Plant near hydraulic and organic capacity
Arcata[2] (CA002271)	Secondary and oxidation lagoons with disinfection	35	2.3	1.7	Humboldt Bay Discharge	2 Marsh Channel	Treatment includes artificial wetlands; tide takes wastewater into Humboldt Bay
Eureka[3] (CA0024449)	Blend of disinfected secondary with primary	108+	8.6	5.2	4100	22	Discharges without disinfection of primary effluent occur due to high inflow and infiltration.
Shelter Cove[4] (CA0023027)	Secondary with disinfection	4	0.77	0.17	Surf zone	0	
Fort Bragg[5] (CA0023078)	Secondary with disinfection	27	2.2	1.3	650	27	Options for eliminating wet weather problems are being evaluated
Mendocino[6] (CA0022870)	Tertiary with disinfection	1	0.3	0.05	996	<20	Tertiary effluent reused except when irrigation isn't needed

Municipalities or agencies discharging wastewater through the noted outfall include:
1. Crescent City and unincorporated Del Norte County areas
2. City of Arcata and the Glendale area
3. Greater Eureka area
4. 850 residential units plus commercial and public facilities
5. Fort Bragg Municipal Improvement District
6. City of Mendocino

SAN FRANCISCO BAY REGI0N (2) OCEAN DISCHARGER SUMMARY INFORMATION

DISCHARGER (NPDES NO.)	TREATMENT PROCESSES	WASTEWATER CHARACTERISTICS			DISCHARGE LOCATION		COMMENTS
		MASS SOLIDS LOAD (m tons/yr)	MAX DESIGN FLOW (MGD)	AVG DRY WEATHER FLOW (MGD)	DISTANCE FROM SHORE (Feet)	WATER DEPTH (Feet)	
San Francisco[1] (CA 0037681)	Secondary for up to 43 MGD, then primary until the system capacity is reached. Flows below capacity are discharged through the SWOO ocean outfall, while those above capacity are discharged from the shoreline after some screening and solids settling. .	271	43 (secon.), 65 (second. and primary blend)	18	19,800 (SWOO ocean outfall)	87	During wet weather about 87% of the combined wastewater and stormwater, that is a blend of primary and secondary effluents without disinfection, is discharged from the outfall. About 13 % of the time, essentially untreated wastewater that is not disinfected is discharged at 7 shoreline locations at China, Baker, Ocean, and Funston recreation beaches, and Mile Rock Bluff.
Daly City[2] (CA0037737)	Secondary with disinfection	102	25	6.8	2,500	32	
Half Moon Bay[3] (CA0038598)	Secondary	33	15	2.2	1,900	37	Discharges directly to the Monterey Bay National Marine Sanctuary

Municipalities or agencies discharging wastewater through the noted outfall include:
1. City and County of San Francisco
2. Daly City, Town of Colma, and portions of San Mateo County
3. City of Half Moon Bay, and Montara and Granada Sanitary Districts

CENTRAL COAST REGI0N (3) OCEAN DISCHARGER SUMMARY INFORMATION

DISCHARGER (NPDES NO.)	TREATMENT PROCESSES	WASTEWATER CHARACTERISTICS			DISCHARGE LOCATION		COMMENTS
		MASS SOLIDS LOAD (m tons/yr)	MAX DESIGN FLOW (MGD)	AVG DRY WEATHER FLOW (MGD)	DISTANCE FROM SHORE (Feet)	WATER DEPTH (Feet)	
Santa Cruz[1] (CA0048194)	Secondary with disinfection	123	17	9.1 (2002)	5,280	110	
Watsonville[2] (CA0048216)	Secondary	113	12	7.5 (2000-2002)	7,350	64	Discharges to the Monterey Bay National Marine Sanctuary (MBNMS)
Monterey Regional[3] CA0048551)	Secondary	214	30	29.6 (2001)	8,400	100	52% of wastewater treated is recycled. Treats Pacific Grove dry weather urban runoff. Discharges to the MBNMS
Carmel/ Pebble Beach[4] (CA0047996)	Secondary with disinfection	24	3	1.6 (2001)	600	35	17% of wastewater treated is recycled. Discharges to the MBNMS and the Carmel Bay ABS
Ragged Point Inn (CA0049417)	Secondary	0.2	0.015	0.013	Cliff discharge		Proposes to disinfect and reuse wastewater to minimize cliff discharges to MBNMS
San Simeon (CA0047961)	Secondary with disinfection	1.6	0.2	0.05-0.1 (2002)	600	20	Chemical toilet waste disposal. Discharges in the MBNMS
Cayucos/Morro Bay (CA0047881)	Primary and secondary blended with disinfection	21	2.4	1.4 (2002)	2,900	50	Secondary treatment given to about 1 MGD, remainder is given primary treatment before mixing with secondary effluent
Avila/Port San Luis[5] (CA0047830)	Secondary with disinfection	0.5	0.2	0.03 (2003)	2,240	29	
Goleta[8] (CA0048160)	Primary and secondary blended with disinfection	282	9.0 4.4 sec. 4.6 pri.	4.8 (2001)	5,800	90	An upgrade to full secondary treatment is planned under a settlement for 2014.

Santa Barbara (CA0048143)	Secondary with disinfection	176	11	8.5 (2001-2003)	8,720	70	Up to 4.3 MGD can be recycled. I&I problems
Montecito (CA0047899)	Secondary with disinfection	21	1.5	1.0 (2001)	1,550	22	
Summerland (CA0048054)	Secondary with disinfection	3	0.3	0.15 (2003)	740	19	"Tertiary" except when filters are being changed
Carpinteria (CA0047364)	Secondary with disinfection	35	2.5	1.7 (2000)	1,000	25	

Municipalities or agencies discharging wastewater through the noted outfall include:

1. Santa Cruz, City of Scotts Valley
2. Watsonville, Freedom, Salsipuedes, and Pajaro Sanitation Districts
3. Monterey, Pacific Grove, Del Rey Oaks, Sand City, Seaside, Salinas, Former Fort Ord, Boronda, Castroville, Moss Landing
4. Carmel by the Sea, Pebble Beach, Carmel Highlands, Highland Inn
5. Avila Beach, Port of San Luis, State Parks
6. Pismo Beach
7. Arroyo Grande, Oceano, Halcyon, Grover Beach
8. Goleta, UC Santa Barbara, portion of Santa Barbara County, Santa Barbara Municipal Airpor

LOS ANGELES REGI0N (4) OCEAN DISCHARGER SUMMARY INFORMATION

DISCHARGER (NPDES NO.)	TREATMENT PROCESSES	WASTEWATER CHARACTERISTICS			DISCHARGE LOCATION		COMMENTS
		MASS SOLIDS LOAD (m tons/yr)	MAX DESIGN FLOW (MGD)	AVG DRY WEATHER FLOW (MGD)	DISTANCE FROM SHORE (Feet)	WATER DEPTH (Feet)	
Oxnard[1] (CA0054097)	Secondary	224 (2000)	32	21	5,280	48	
Hyperion[2] (LA City) (CA0109991)	Secondary	7,400 (2002)	450	425	26,525	187	2 additional outfalls used in emergencies. Some wastewater reclaimed and reused. Plant treats dry weather storm water runoff
JWPCP[3] (LA County) (CA0053813)	Blended primary and secondary with disinfection	7,390 (2003)	350	320	10,000	200	Discharged effluent in 2003 met secondary TSS and BOD requirements. Not clear when the JWPCP discharges blended primary and secondary effluent
Terminal Island[4] (LA City) (CA0053856)	Tertiary with disinfection	22 (2000)	60	30	Into LA Outer Harbor		This plants treats wastewater from domestic sources and heavy industry. Reuse is being practiced
Avalon[5] (CA0054372)	Secondary	11 (2000)	1.2	0.6	400	130	
San Clemente Island (CA110175)	Secondary	0.15 (2000)	?	0.02	?	?	?= data not found. WTP treats wastes from a US Navy Auxiliary Landing Field

Municipalities or agencies discharging wastewater through the noted outfall include:

1. City of Oxnard
2. Communities of Los Angeles, Beverly Hills, San Fernando, W. Hollywood, Santa Monica, Inglewood, Universal City, Alhambra, Pasadena, S. Pasadena, Culver City, and El Segundo
3. Los Angeles County in the RWQCB 4 watershed except cities discharging to the Hyperion or Terminal Island WTPs
4. Terminal Island in the Los Angeles-Long Beach Harbor, communities of Wilmington, San Pedro and a portion of Harbor City.
5. City of Avalon on Catalina Island

SANTA ANA REGI0N (8) OCEAN DISCHARGER SUMMARY INFORMATION

DISCHARGER (NPDES NO.)	TREATMENT PROCESSES	WASTEWATER CHARACTERISTICS			DISCHARGE LOCATION		COMMENTS
		MASS SOLIDS LOAD (m tons/yr)	MAX DESIGN FLOW (MGD)	AVG DRY WEATHER FLOW (MGD)	DISTANCE FROM SHORE (Feet)	WATER DEPTH (Feet)	
Orange County[1] (CA0110604)	Blended primary and secondary with disinfection	14,000 (2002)	516	320	23,780	195	*9/10/04 Draft Order* requires upgrading treatement to full secondary with nitrification to remove ammonia toxicity

Municipalities or agencies discharging wastewater through the noted outfall include:

1. Communities of Anaheim, Brea, Buena Park, Costa Mesa, Cypress, Long Beach, Rossmore/Los Alamitos, Newport Beach, Orange, Placentia, Santa Ana, Seal Beach, Stanton, Sunset Beach, Tustin, Villa Park, Westminster

SAN DIEGO REGION (9) OCEAN DISCHARGER SUMMARY INFORMATION

DISCHARGER (NPDES NO.)	TREATMENT PROCESSES	WASTEWATER CHARACTERISTICS			DISCHARGE LOCATION		COMMENTS
		MASS SOLIDS LOAD (m tons/yr)	MAX. DESIGN FLOW (MGD)	AVG DRY WEATHER FLOW (MGD)	DISTANCE FROM SHORE (Feet)	WATER DEPTH (Feet)	
AWMA[1] (CA0107611)	Secondary with disinfection	200 (2000)	32.2	17.6	6,700	170	
SERRA[2] (CA0107417)	Secondary with disinfection	285 (2000)	30.0	18.7	10,334	100	
Oceanside[3] (CA0107433 , CA0108031) and (CA0109347)	Secondary without disinfection, and some disinfected tertiary	80 (2000)	27.6	12.3	8,050	102	Discharges may be impacting shellfish harvesting and body contact sport uses
Encina[4] (CA0107395)	Secondary or better	284 (2000)	38.0	22.9	7,000	135	Discharges may be impacting shellfish harvesting and body contact sport uses
San Elijo[5] (CA0107981 & CA0107999)	Secondary and tertiary	45 (2000)	20.2	15.0	6,800	110	
Point Loma[6] (CA0107409)	Chemical assisted primary	9,850 (2003)	240	170 (2003)	23,760	310	
South Bay [7] (CA0108928) & (CA010945)	IWTP- Chemical assisted primary	2,572 (2003)	25	25 (2003)	18,500	93	The International plant (IWTP) will go to full secondary within 4 years under a Dec. 6, 2004 agreement.
	SBWRP-Secondary and tertiary	22.1 (2003)	15	4.1 (2003)			

Municipalities or agencies discharging wastewater through the noted outfall include:

1. Laguna Niguel, Lake Forest, Laguna Beach, Irvine
2. Capistrano Beach, Dana Point, San Clemente, Santa Margarita, San Juan Capistrano
3. Oceanside, Oceanside Vista, Fallbrook, Camp Pendleton
4. Carlsbad, San Marcos, Vista, Leucadia
5. Escondido, Cardiff by the Sea
6. San Diego, Del Mar, El Cajon, Lakeside, National City, Chula Vista, Coronado, Imperial Beach
7. San Ysidro, Chula Vista, Imperial Beach, Tijuana B.C.

APPENDICES

APPENDIX A
Heal the Ocean Virus Testing

Conducted in the laboratory of Dr. Jed Fuhrman, USC

Summer 2001

Beach Location	Hepatitis A	Enteric Viruses
Arroyo Burro Beach	Yes	No
Arroyo Burro Creek	No	No
Butterfly Beach	Yes	No
Carpinteria State Beach	No	No
El Estero sewage treatment plant	No	Yes
Goleta Beach	No	Yes
Goleta Sanitary District	No	Yes
Goleta Slough	No	No
Hope Ranch Beach	No	No
Leadbetter Beach	Yes	Yes
Summerland Beach	Yes	No

Fall 2000

Beach Location	Hepatitis A	Enteric Viruses
Arroyo Burro Beach	No	No
Butterfly Beach	No	No
Carpinteria State Beach	No	No
El Estero sewage treatment plant	Yes	Yes
Goleta Beach	No	No
Leadbetter Beach	No	No
Summerland Beach	No	No

Summer 2000

Beach Location	Hepatitis A	Enteric Viruses
Arroyo Burro Beach	No	No
Butterfly Beach	Yes	No
Carpinteria State Beach	Yes	No
East Beach at Mission Creek	Yes	No
Goleta Beach	No	No
Hope Ranch Beach	No	No
Leadbetter Beach	No	No
Summerland Beach	Yes	No

Winter 1999

Beach Location	Hepatitis A	Enteric Viruses
Arroyo Burro Beach	No	Yes
Butterfly Beach	No	Yes
Carpinteria State Beach	No	Yes
East Beach at Mission Creek	No	Yes
Goleta Beach	No	No
Hope Ranch Beach	No	No
Las Palmas Creek (Hope Ranch)	No	No
Leadbetter Beach	No	No
Summerland Beach	No	Yes

Fall 1999

Beach Location	Hepatitis A	Enteric Viruses
Arroyo Burro Beach	No	No
El Estero sewage treatment plant	Yes	Yes
Goleta Sanitary District	No	Yes
Goleta Beach East	Yes	No
Goleta Beach West	No	Yes
Hope Ranch Beach	No	No
Las Palmas Creek (Hope Ranch)	Yes	No
Leadbetter Beach	Yes	Yes
East Beach at MissionCreek	No	Yes

APPENDIX B

Brief report identifying issues of concern related to the discharge
of secondary and tertiary treated sewage
into shallow coastal waters used for recreational purposes

Howard Kator
Environmental Microbiologist
119 Rich Neck Road
Williamsburg, VA 23185

5-16-03

Hilary Hauser
HEAL THE OCEAN
P.O. Box 90106
Santa Barbara, California 93190

Dear Hilary:

Appended is a brief report identifying issues of concern related to the discharge of secondary and even tertiary treated sewage into shallow coastal waters used for recreational purposes. I hope this report meets your expectations and will be useful in HEAL THE OCEAN's continuing efforts to involve people and improve coastal water quality.

Sincerely,

Howard Kator
Environmental Microbiologist
119 Rich Neck Road
Williamsburg, VA 23185

Title: Concerns and risk factors associated with discharges of secondary treated sewage into very shallow coastal waters.

Introduction

Worldwide, domestic wastewater discharges represent one of the most significant threats to the coastal oceans. The majority of the world's populations live along the coasts where sewage is discharged untreated. From a public health perspective, continued emphasis on better treatment of sewage for discharge into estuarine and marine environments remains a costly but essential societal obligation.

Domestic sewage contains pathogenic microorganisms that can cause serious human diseases. Sewage contamination of fresh and marine waters is a means whereby disease causing microorganisms can be transmitted to people engaged in recreational activities or through consumption of edible filter-feeding shellfish. The United States is among those nations whose coastal waters do not generally receive untreated municipal sewage discharges.

Although sewage treatment in the United States has significantly eliminated many debilitating waterborne diseases (e.g., cholera, typhoid fever), sewage also contains a myriad of chemical toxicants including heavy metals, a variety of household organic chemicals including pesticides and petroleum hydrocarbons, and other chemicals contained in soaps, cosmetic preparations, as well as common everyday pharmaceuticals (pharmaceuticals and personal care products or PPCPs) whose effects on marine life are not well understood and until recently unrecognized (National Research Council 1999). Many of these chemicals pass through sewage treatment facilities unscathed and are known to be endocrine disrupters of aquatic animals. Compounds of concern include the nonylphenols, extremely pervasive compounds found in plastics, pesticides, and other industrial and domestic detergents. Natural and synthetic human estrogens (birth control pills) excreted in human urine may interfere with the developmental physiology and reproduction of aquatic marine organisms. As we learn more about these compounds, it is very likely that the costs of their disposal will be very high indeed.

Sewage also contains antibiotics (Halling-Sorensen et al. 1998) which can select for antibiotic resistant bacteria in the environment and bacterial viruses that carry antibiotic resistance and toxin genes (Miller 1998, Muniesa and Jofre 2000). Concerns relate to disease causing naturally-occurring marine bacteria which incorporate these elements and become unresponsive to antibiotic therapy.

Protection of public health and the indigenous coastal biota are essential and recognized reasons to justify improved discharge quality or to minimize effects, effluent relocation to achieve greater dilution. Treatment to reduce nutrient loading to coastal waters is a second important benefit to prevent the occurrence of undesirable species and harmful algal blooms.

Pathogens. The introduction of human pathogens into marine/estuarine environments is a concern on both local and global scales. Enteric pathogens continue to pose significant risks to fishing, recreational bathing and shellfish-consuming populations (Henrickson et al. 2001, Griffin et al. 2003). Important disease causing waterborne pathogens include bacterial pathogens such as *Vibrio cholerae*, the shigellae and salmonellae, enteric viruses such as the caliciviruses (e. g., Norwalk agent) and hepatitis A, and protists such as *Cryptosporidium*. Many of these microorganisms have been responsible in recent years for disease outbreaks associated with exposure to marine and fresh waters.

The microbiological quality of coastal waters is directly affected by point sources such as sewage treatment plants, riverine discharge, storm derived runoff and possibly, contaminated ground water flow. The feces of marine mammals have been implicated in certain situations on the northwest coast of the United States as sources of indicator organisms. In recent years microbiological studies have demonstrated greater persistence of certain enteric pathogens in marine waters than previously

recognized. Nutrient enrichment of coastal waters and sediment may provide conditions that prolong pathogen survival.

Many countries in the world discharge untreated or inadequately treated sewage into coastal waters. Population growth, landuse alterations, changes in animal populations, intensive agricultural practices, use of waste stabilization ponds, soil transport, and medical therapeutics are some factors which influence the kinds and properties of pathogenic enteric microorganisms transported to marine waters and their fates. Understanding relationships between landuse and the occurrence of fecal indicators and pathogens is an important goal for remediation of coastal waters.

Risk of disease at coastal bathing beaches. There is considerable evidence that exposure to polluted marine bathing waters results in an increased frequency of human disease symptoms (Henrickson et al. 2001). Numerous prospective epidemiologic studies have been conducted to quantify risk associated with exposure to recreational bathing (e. g., Cabelli et al. 1982, 1983; Kay et al. 1994) and to derive quantitative relationships with indicator microorganisms (Cabelli et al. 1983). The latter study is the basis for current EPA recreational water microbiological indicator criterion. Most epidemiologic studies confirm that swimmers have an increased risk of disease compared with nonswimmers (Cabelli et al. 1983, Griffin et al. 2003). Disease symptoms include eye-ear, respiratory, gastrointestinal disorders and infrequently more serious conditions. Pathogens associated with outbreaks attributed to marine recreational waters have generally not been identified but are assumed to be viruses. There is also some evidence to suggest certain pathogens associated with exposure to bathing waters may be passed from person to person. Illnesses associated with recreational waters of nonenteric etiology have been attributed to the staphylococci (Favero 1985: Charoenca and Fujioka 1991, 1995) and *Pseudomonas aeruginosa* (Seyfried and Cook 1984). Evidence presented suggests that sediments can be a reservoir for staphylococci and routine monitoring for this group has been proposed for recreational marine waters (Charoenca and Fujioka 1991). Monitoring for this group is not required and the presence or absence of staphylococci would not be reflected by the fecal coliform indicator.

Submerged swimmers can also be exposed to sewage-derived chemicals which can enter through the mouth, eyes, ears and nose. Recent studies using artificial skin have shown that toxic and other sewage-derived chemicals in the water can possibly enter the body through a process known as dermal adsorption (Moody and Chu 1995). Chronic exposure to chemicals through this mechanism could affect the immune system.

Factors which must be considered with regard to discharge of sewage into shallow coastal waters used for recreational purposes. Even in developed countries such as the United States, significant health risks have been attributed to beach exposure and the frequency of beach closures appears to have accelerated in recent years ((Henrickson et al. 2001)). The National Resources Defense Council (2001) reported a doubling of beach closings (fresh and marine) from 1999 to 2000. Causes of increased frequencies of beach closures are complex and may be related to population increases, beach usage, degree of sewage treatment, increased volumes of sewage discharge, changes in coastal water quality, runoff, climate changes and improved surveillance.

Dispersion of the sewage discharge plume. An obvious concern with coastal discharges is that they be situated in well characterized waters where the chance of pathogen transport (hence disease risk) into beach waters is minimized. The dispersal dynamics of a sewage plume are complex and subject to many hydrographic factors including dilution volume, stratification, surface and bottom currents, their seasonal directions, internal waves, seasonal and short-term wind directions, bottom topography, density and volume of effluent, and climate. These factors should be evaluated over the range of seasonal and climatic conditions which are normal to coastal environments. Adequate seasonal coverage is not only important because of environmental factors, but because some pathogens such as hepatitis A show seasonal patterns of occurrence. It is not unreasonable to assume that under certain conditions shallow water discharges such as those into Santa Barbara waters would move in the direction of bathing areas.

Published studies have shown that differences in density between the effluent and its constituents and surrounding waters will affect effluent fate and transport. Particle-associated viruses and bacteria would behave differently than buoyant components and could be deposited in sediment and later transported inshore by wave action. If the dispersion and dilution characteristics of the plume and the concentration of viruses in the effluent are known, predictions of viral concentrations bracketing a range of release efficiencies could be calculated, Dye or isotopic methods have been used to trace discharge plumes for modeling purposes. Biological (bacteria or virus) or chemical (fecal sterols) indicators can be used to study transport of microorganisms and to evaluate the influence of weather and wind patterns.

Effectiveness of sewage treatment and disinfection against some enteric viruses. Secondary sewage treatment utilizes microorganisms within the treatment plant to biochemically digest under favorable oxygen regimes settled sewage solids from the primary sedimentation step. Secondary treatment is expected to reduce biological oxygen demand (BOD) and suspended solids by 85-90%, and to remove 90-99% of coliform bacteria. This process generally can reduce the pathogenic bacterial and viral load by values which may range from 99 to 90%, respectively. Actual values vary and depend on a variety of factors such as plant design, processing time within the plant, loading, and disinfection contact times.

Treatment of sewage is not a stoichiometric process because the characteristics and composition of the material received varies, the volume, hence the holding time may be affected by weather conditions (i. e., significant precipitation events), environmental temperatures affect sewage treatment processes, and therefore the efficiency of pathogen removal may also be expected to vary. Departures from ideal conditions do occur and the quality of the effluent can fluctuate. Importantly, there is always a range of treatment efficiency with regard to bacterial and viral removal. Although laboratory studies with cell-culture adapted strains of hepatitis A can demonstrate effective removal through disinfection, similar studies have not been done with wild-type hepatitis viruses in actual effluents because of analytical limitations.

Secondary sewage treatment effluents are generally disinfected, usually with chlorine or UV light. One study has shown that ozone is an effective disinfectant for hepatitis A in the laboratory (Vaughn et al. 1990). There is considerable evidence that enteric viruses are differentially affected by disinfection (Seyfried et al. 1984, IAWPRC 1991). Viruses especially resistant to chlorine disinfection and UV include hepatitis A and norvoviruses such as Norwalk agent. Studies to evaluate a bacterial virus known as a male-specific bacteriophage, (which is similar in gross structure and size to hepatitis A virus) as a viral indicator show it present at comparatively high levels in secondary effluents after chlorination. By comparison, bacterial indicator concentrations were reduced to counts on the order of one magnitude or undetectable. Because the minimal infectious dose of viruses is assumed to be very low, disinfected effluent free of indicator bacteria provides a false sense of safety because the effluent can still contain infectious virus at comparatively high levels.

Tertiary treatment is a laudable goal for all ocean discharges because it raises the standard of effluent quality to a higher level than secondary treatment. Tertiary treatments can be focused on nutrient removal, such as reductions in phosphate and nitrogen levels or employ additional disinfection through UV or microfiltration.

Inadequacy of bacterial indicators and standards to reflect health risk. The basic rationale of the indicator concept is that it should reflect the presence of pathogens. When this concept was conceived in the early 1900's first applied to marine waters in the United States viral pathogens were not considered. In the years that followed bacterial standards were pressed into action by extension to also predict viral presence. Standardized methods for routine detection of viral pathogens in marine waters do not exist and viral presence is highly variable. A variety of "indicator" viruses have been studied as alternative indicators (IAWPRC 1991) but none thus far have been formally adopted for marine or recreational waters.

Numerous reports in the technical literature have shown that bacterial indicators such as the fecal coliform or the enterococci are poor or inappropriate predictors of viral pathogens (e. g., Jiang et al. 2001, Noble and Fuhrman 2001) owing to the protracted persistence of the latter and their resistance to disinfection. Many investigators have reported the presence of enteric viruses in waters meeting the more stringent water quality criterion for shellfish growing waters (Richards 1985). Recent studies using new molecular techniques to detect some enteric viruses support older studies showing that bacterial indicator densities are not predictive of viral presence (Griffin et al. 2003). Jiang et al. (2001) detected enteric adenoviruses in Southern California beach waters which at times did not exceed the water quality standard. Detection of adenovirus in southern California nearshore waters implies that other equally or more resistant enteric viruses are likely to persist in coastal waters. Adenoviruses can be ingested orally and are known to cause sore throat, diarrhea, fever and nausea. An approved routine laboratory test to detect hepatitis A virus is still unavailable. Monitoring STP effluents based on conventional bacterial indicators must therefore be used with caution to assess effluent quality as this provides no information on viral water quality.

The derivation and validity of the current federal water quality criterion used to assess and regulate the sanitary quality of marine recreational waters has been questioned (Fleisher 1991). The fact that the EPA criterion for marine waters is to apply universally to all US coastal waters seems a poor assumption given the observation that environmental conditions which influence pathogen and indicator persistence differ markedly by region. In general, the research community has shown that waters meeting coliform bacterial standards do not adequately reflect the health risks.

Other studies suggest that some bacterial indicators and pathogens when exposed to seawater enter a kind of dormant state but still remain viable and capable of causing disease (Roszak et al. 1984, Pommepuy et al. 1996, Caro et al. 1999). Microorganisms in this state are called viable-but-nonculturable (VBNC), meaning that they will not be detected using culture-based methods such as the approved total and fecal coliform MPN tests. An assessment of sanitary water quality populated with indicator bacteria in the VBNC state will lead to an underestimation of the health risk.

Persistence of pathogens in sediments. Given that a secondary or even tertiary effluent can contain disinfection-resistant viral pathogens, we have very little data on their persistence in natural marine waters. Aside from many reports demonstrating that certain viruses can survive under in vitro conditions much longer than bacterial pathogens (months as opposed to days), field experiments to understand the effects of salinity, seasonal temperature, sunlight, and sediment on viral pathogen persistence remain to be conducted. As noted, the lack of routine detection methods for pathogenic viruses limits survival studies of any type. The older literature shows increased survival when viruses are associated with sediment and organic particles (Richards 1985). Shiaris et al. (1987) observed a protective effect of intertidal sediments on indicator bacteria. Discharge of effluent at shallow depth may provide conditions more favorable for association of pathogens with sediment. Not only is the vertical path length shorter, but near shore sediments with high suspended particulates may provide conditions more conducive to pathogen survival and resuspension than deeper discharge areas.

There is a comparatively small body of literature suggesting that sediment resuspension will facilitate transport of bacteria and viruses into the water column. Sediment resuspension processes on beaches can be caused by waves or by actions of the bathers themselves could be expected to result in increased exposure to pathogens.

Surveillance frequency. The ability to detect fluctuations in indicator and perhaps pathogen densities is affected by sampling frequency. Given the very dynamic nature of beach environments sampling frequencies ideally should be continuous and integrative and adjusted in response to usage, storm events, or shifts in hydrographic parameters that might be anticipated to lead to adverse discharge quality and increased potential health risk. Unfortunately continuous integrative samplers are not yet available for any pathogen. Sampling and processing costs will usually present practical limits to high frequency discrete or grab sampling with extended spatial coverage. Thus, it is unlikely that all contamination events at beaches will be detected using minimal sampling regimens now followed. Results from a World Health Organization (WHO) workshop on recreational waters

(November, 1998) showed that densities of indicator organisms in coastal beach waters varied greatly over time with little predictability, within and between days and locations. Overall, it is very unlikely given the current state of monitoring that exceedances of indicator densities and pathogen presence, hence disease risk, will be detected for a proportion of the time.

Dissemination of antibiotic resistance elements into coastal waters. As previously noted widespread and permissive use of antibiotics in agriculture and for human therapeutic use where antibiotics are ineffective have resulted in a explosion of drug resistance among environmental bacterial species (e. g., Rice et al. 1995). Genetic elements conferring such resistance can be found in bacteria (Al-Jebouri 1985) and bacterial viruses discharged in sewage. Considerable evidence now exists that genetic information coding for antibiotic resistance is commonly transferred between microorganisms organisms through common mechanisms such as transduction and conjugation, whereby genetic elements conferring resistance to antibiotics and toxics can be exchanged in the environment (Boyd and Hartl 1997, Davison, J. 1999). Genetic exchanges can occur in sediment or for example within the gastrointestinal tracts of animals. While the effect of discharged genetic elements may not present an immediate health concern owing to exposure to disinfected effluents, it does provide a source of antibiotic resistance or other virulence elements to bacteria indigenous to the marine environment. Such bacteria may include bacterial genera capable of causing opportunistic infections in humans exposed to coastal waters, e. g., *Vibrio* spp. and the nontuberculous mycobacteria, thereby rendering treatment potentially more difficult, protracted and costly.

Conclusions

Pearson (1975) describes various scenarios associated with the location of sewage discharge outfalls into coastal waters and considers reciprocal relationships between discharge quality and distance of outfall dispersion system from shore. He concludes that longer outfall dispersion systems are more effective, providing more dilution of nonconservative elements and more “decay” time for removal of coliform microorganisms. He suggests that moving discharge outfalls inshore based on improved levels of treatment will not provide an appropriate level of effluent dilution nor will it reduce adverse environmental impacts. Based on his comments desirable goals to improve coastal beach water quality in the Santa Barbara area would therefore be (a) to locate discharges as far offshore as possible and (b) to apply advanced tertiary treatment to the discharge for the effective removal of viral pathogens, nutrients and harmful or ecologically disruptive chemicals. Goal (b) will require development of sampling approaches and routine methods to detect and verify the effectiveness of viral removal.

References

Al-Jebouri, M. M. 1985. A note on antibiotic resistance in the bacterial flora of raw sewage and sewage-polluted river Tigris in Mosul, Iraq. J. Appl. Bacteriol. 58:401–405.

Boyd, E. F., and D. L. Hartl. 1997. Recent horizontal transmission of plasmids between natural populations of *Escherichia coli* and *Salmonella enterica*. J. Bacteriol. 179:1622–1677.

Cabelli, V.J., A. P. Dufour, L. J. McCabe, and J. Levin. 1982. Swimming associated gastroenteritis and water quality. Amer. J. Epidemiol. 115:606-616.

Cabelli, V. J., Dufour, P. A., McCabe, L. J., & Levin, M. A. 1983. A marine recreational water quality criterion consistent with indicator concepts and risk analysis. J. Water Pollut. Control Fed. 55:1306-1314.

Caro, A., P. Got, J. Lesne, S. Binard, and B. Baleux. 1999. Viability and virulence of experimentally stressed nonculturable *Salmonella typhimurium*. Appl. Environ. Microbiol. 65: 3229-3232.

Charoenca, N. and R. S. Fujioka. 1993. Assessment of *Staphylococcus* bacteria in Hawaii’s marine recreational waters. Wat. Sci. Tech. 27:283-289.

Charoenca, N. and R. S. Fujioka. 1995. Association of staphylococcal skin infections and swimming. Wat. Sci. Tech. 31:11-17.

Davison, J. 1999. Genetic exchange between bacteria in the environment. Plasmid 42:73-91.

Favero, M. S. 1985. Microbiologic indicators of health risks associated with swimming. Am. J. Public Hlth. 75:1051-1053.

Fleisher, J. M. 1991. A reanalysis of data supporting U. S. federal bacteriological water quality criteria governing marine recreational waters. J. Wat. Pollut. Control. Fed. 63:259-265.

Goyal, S.M., C. P. Gerba, and J. L. Melnick. 1979. Human enteroviruses in oysters and their overlying waters. Appl. Environ. Microbiol., 37:572-581;

Griffin , D. W., K. A. Donaldson, J. H. Paul, and J. B. Rose. 2003. Pathogenic human viruses in coastal waters. Clin. Microbiol. Rev. 16:129-143.

Halling-Sorensen, B., N. Nielsen, P. F. Lanzky, F. Ingerslev, H. C. Holten-Lützhoft, and S. E. Jorgensen. 1998. Occurrence, fate and effects of pharmaceutical substances in the environment- a review. Chemosphere 36:357-393.

Henrickson, S. E., T. Wong, P. Allen, T. Ford, and R. R. Epstein. 2001. Marine swimming-related illness: implications for monitoring and environmental policy. Environ. Hlth. Perspectives 109:645-650.

IAWPRC. 1991. Bacteriophages as model viruses in water quality control. IAWPRC Study Group on Health Related Water Microbiology. Wat. Res. 25:529-545.

Jiang, S. R. Noble, and W. Chu. 2001. Human adenoviruses and coliphages in urban runoff-impacted coastal waters of southern California. J. Appl. Environ. Microbiol. 67:179-184.

Kay, D., J. M. Fleisher, R. L. Salmon, F. Jones, M. D. Wyer, A. F. Godfree, Z. Zelenauch-Jacquotte, and R. Shore. 1994. Predicting likelihood of gastroenteritis from sea bathing: results from randomised exposure. Lancet 344:905-909.

Miller, R. V. 1998. Bacterial gene swapping in nature. Sci. Amer. 278:47-51.

Moody, R. P. and I. Chu. 1995. Dermal exposure to environmental contaminants in the Great Lakes. Environ. Hlth Perspect. 103:103-114.

Muniesa, M. and J. Jofre. 2000. Occurrence of phages infecting *Escherichia coli* 0157:H7 carrying the STX 2 gene in sewage from different countries. FEMS Microbiol. Let. 183:197-200.

National Research Council. 1999. Hormonally-active compounds in the environment. National Academy Press, Washington, DC,

Noble, R. T. and J. A. Furhman. 2001. Enteroviruses detected by reverse transcriptase polymerase chain reaction from the coastal waters of Santa Monica Bay, California: low correlation to bacterial indicator levels. Hydrobiologia 460:175-184.

Pearson, E. A. 1975. Conceptual design of marine waste disposal systems. Paper No. 40. In Gameson, A. L. H. (ed.) Discharge of sewage from sea outfalls. Proceedings of an International Symposium. Church House, London, 27 August to 2 September 1974.

Pommepuy, M., M. Butin, A. Derrien, M. Gourmelon, R. R. Colwell, and M. Cormier. 1996. Retention of enteropathogenicity by viable but nonculturable *Escherichia coli* exposed to seawater and sunlight. Appl. Environ. Microbiol. 62: 4621-4626,

Rice. E. W. J. W. Messer, C. H. Johnson and D. J. Reasoner. 1995. Occurrence of highlevel aminoglycoside resistance in environmental isolates of enterococci. Appl. Environ. Microbiol. 61: 374–376.

Richards, G. 1985. Outbreaks of shellfish-associated enteric virus illness in the United States: requisite for development of viral guidelines. J. Food Prot. 48:815-823.

Roszak, D. B. , D. J. Grimes, and R. R. Colwell. 1984. Viable but non-recoverable stage of *Salmonella enteritidis* in aquatic systems. Can. J. Microbiol. 30:334-338.

Seyfried, P. L. and R. J. Cook. 1984. Otitis externa infections related to *Pseudomonas aeruginosa* levels in five Ontario lakes. Can. J. Public Health 75: 83-91.

Seyfried, P. L., N. E. Brown, C. L. Cherwinski, G. D. Jenkins, D. A. Cotter, J. M. Winner and R. S. Tobin. 1984. Impact of sewage treatment plants on surface waters. Can. J. Pub. Hlth. 75:25-31.

Shiaris, M. P., A. C. Rex, G. W. Pettibone, K. Keay, P. McManus, M. A. Rex, J. Ebersole, and E. Gallagher, 1987. Distribution of indicator bacteria and *Vibrio parahaemolyticus* in sewage-polluted intertidal sediments. Appl. Environ. Microbiol. 53:1756-1761.

Vaughn, J. M., Yu-S. Chen, J. F. Novotny, and D. Strout. 1990. Effects of ozone treatment on the infectivity of hepatitis A virus. Can. J. Microbiol. 36:557-560.

APPENDIX C

Potential human health risks arising from exposure to sewage
World Health Organization (WHO), 2000.[6]

Level of treatment	Discharge type		
	Directly on beach	**Short outfall**[1]	**Effective outfall**[2]
None[3]	Very high	High	NA
Preliminary	Very high	High	Low
Primary (including septic tanks)	Very high	High	Low
Secondary	High	High	Low
Secondary plus disinfection	Medium	Medium	Very low
Tertiary	Medium	Medium	Very low
Tertiary plus disinfection	Very low	Very low	Very low
Lagoons	High	High	Low

[1] The relative risk is modified by population size; relative risk is increased for discharges from large populations and decreased for discharges from small populations.

[2] Assumes that the design capacity has not been exceeded and that climactic and oceanic extreme conditions are considered in the design objective (i.e. no sewage on the beach zone.

[3] Includes combined sewer overflows.

RECOMMENDATIONS

The regulations guiding California's Ocean Plan, or any use of the ocean for waste deposal, must be expanded to include public health along with the health of sea animals and the ocean environment.

In regulating the effects of waste disposal in the ocean it is incumbent on regulatory agencies to move beyond the practice of approving waste disposal permits based on discharger's self-monitoring programs, and to initiate proactive measures to protect not only the nearshore areas of the ocean – the coast – but public health as well.

In its assessment of potential human health risks arising from exposure to sewage, the World Health Organization indicates that *very low health risks can be obtained if sewer outfalls are extended beyond the shallow, inshore "recreational" zone – where people swim, surf or dive – to a minimum of a mile offshore, and/or a minimum depth of 60 feet of water.*

In establishing safe depths and distance from shore, consideration must be given to local ocean conditions and the amount of sewage discharged, but proper proactive reform can be initiated immediately, to require wastewater dischargers to extend their sewer outfalls to a minimum of a mile offshore, and/or a minimum depth of 60 feet.

Additionally, sewer districts, as well as the state water quality regulatory agencies, must begin now to compile the information needed for future upgrade to full tertiary treatment. Actual construction costs will certainly rise from the date of study completion, but information gained will serve as a valuable guide for present decision-making.

Such general studies are not expensive. Heal the Ocean expended $15,000 for a cost feasibility study to determine the cost, per ratepayer, for tertiary upgrade of all five wastewater treatment plants discharging into the Santa Barbara Channel.

Based on the information contained in this report, Heal the Ocean respectfully makes the following recommendations:

1) **That all sewer outfalls be extended to a minimum of a mile offshore, and/or a miminum depth of 60 feet of water, depending on which comes first. And that a state water quality regulatory agency develop deadlines for sewer districts to submit design engineering and plan submittals for outfall extension.**

2) **That each California wastewater treatment plant discharging sewage into the Pacific Ocean be required to perform a cost feasibility study for full tertiary treatment, calculating the monthly and annual rate increase per ratepayer, with each study to be completed within two years, and submitted to a state water quality regulatory agency.**

END NOTES

[1] Haile, R. W. et al, *An Epidemiological Study of Possible Adverse Health Effects of Swimming in Santa Monica Bay***,** Santa Monica Bay Restoration Project, 1996. 70 pp.

[2] N. Stoner, M Merkel, M. Dorfman, Natural Resources Defense Council, *Swimming in Sewage; The Growing Problem of Sewage Pollution and How the Bush Administration is Putting Our Health and Environment at* Risk, 2004. 75pp.

[3] Kator, H., *"Concerns and Risk Factors Associated with Discharges of Secondary Treated Sewage into Very Shallow Coastal Waters,"* Heal the Ocean, Santa Barbara, CA, May, 2003. 10 pp.

[4] Katonik and Rose, *The Beaches Environmental Assessment and Coastal Health (BEACH) Act*; *Adoption of coastal recreation water quality criteria and standards by states.* 2000. *p. 28.*

[5] N. Stoner, M Merkel, M. Dorfman, Natural Resources Defense Council, *Swimming in Sewage; The Growing Problem of Sewage Pollution and How the Bush Administration is Putting Our Health and Environment at* Risk, 2004. 75pp.

[6]Table 9.10, from "Monitoring Bathing Waters: A Practical Guide to the Design and Implementation of Assessments and Monitoring Programmes," Chapter 9: *Approaches to Microbiological Monitoring*. Spon Press, UK. 352 pp. © 2000 World Health Organization (WHO).

CALIFORNIA'S DUMPING OF SEWAGE INTO PACIFIC OCEAN INVENTORIED BY HEAL THE OCEAN

For immediate release
March 18, 2005

A billion and a half gallons of sewage per day is dumped by California coastal communities directly into the Pacific Ocean, and a total of 44 billion tons of solids (sewage sludge) also goes into the sea every year.

Nearly half of the wastewater treatment facilities discharging sewage into the ocean off California are discharging into the "surf zone" of the ocean – into waters 50 feet or less. In some areas, the sewage is shot into the ocean waves, including 1.9 million gallons per day (mgd) a day in Crescent City and 0.17 in Shelter Cove.

According to a report newly released by the environmental organization Heal the Ocean, Santa Barbara, the likelihood of contact of sewage to humans recreating in the ocean in areas of shallow sewage disposal is not only high, but probable.

This survey, "Ocean Wastewater Discharge Inventory for the State of California," is compiled from four months of research commissioned by HTO from Dr. D. Craig Barilotti, who helped the group in its campaign to require the Goleta Sanitary District to upgrade to full secondary treatment. Dr. Barilotti's research focused on the records of the state's Regional Water Quality Control Boards, NPDES permits, NOAA nautical charts, and/or direct telephone contact with discharger or public works departments of the coastal cities involved.

The Wastewater Discharge Inventory is being released just days before the first California Ocean Protection Council Meeting, which convenes in Sacramento on Monday, March 21, 2005.

Heal the Ocean's survey lists sewage outfalls disposing wastewater in shallow depths, very close to shore where people swim. The report indicates that these outfalls are currently considered as "meeting state standards," because the current California Ocean Plan, which is the basis for the standards, does not consider public health. Howard Kator, an environmental microbiologist commissioned by Heal the Ocean to research the health hazards of coming into contact with secondary-treated sewage, has contributed his report to Heal the Ocean's survey.

Heal the Ocean asks state legislators to revise the Ocean Plan so that the "bacteria standard" be replaced with measurement of viruses. "The bacteria standard may provide plant operators with a measure of plant performance, but is an inadequate indicator of contamination or risk to ocean users," the report says.

Heal the Ocean is also calling for regulations requiring the extension of sewer outfalls to a minimum distance of one mile from shore, or 60 feet of water, whichever comes first. Also recommended in the report is the requirement that wastewater dischargers depositing sewage into the ocean perform cost feasibility studies for tertiary treatment upgrade.

Heal the Ocean's OCEAN WASTEWATER DISCHARGE INVENTORY FOR THE STATE OF CALIFORNIA is attached. For more information, please call Heal the Ocean, 805 965-7570 or e-mail: info@healtheocean.org

Heal the Ocean, 1129 State Street, Santa Barbara, CA 93101 (805) 965-7570

-----Original Message-----
From: Joey Racano [mailto:joeylittleshell@yahoo.com]
Sent: Saturday, March 19, 2005 1:44 PM
To: Cyndy Paulsen
Cc: oceanoutfallgroup@yahoogroups.com; desalisnopal@yahoogroups.com; demogreens@yahoogroups.com; savebigshell@yahoogroups.com; californiademocrats@yahoogroups.com; dukesahazard@yahoogroups.com; green_all_views@yahoogroups.com
Subject: ~Letter To California Ocean Protection Council~

Cynthia J. Paulsen
Assistant to the Secretary for Resources:

Mr. Mike Chrisman, chairman
Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

Dear Mr. Chrisman:

You were recently e-mailed a report from Heal the Ocean entitled "Ocean Wastewater Discharge Inventory for the State of California."

You will see in this report the number of coastal communities that are discharging sewage into 20 feet of water or less, into the recreational zone of the ocean. You will see the communities that are literally shooting sewage into the waves (0 feet of water)! There is also the not-so-small matter of single-pass cooling on the Morro Bay Estuary by Duke Energy and the two remaining 301(h) waivers in Morro Bay and San Diego at Point Loma, respectively.

As you convene the first meeting of the California Ocean Protection Council, we ask that your panel seriously consider the information in this report about the amount of sewage California coastal communities are putting intothe ocean each day - and to put the Heal the Ocean recommendations at the top of your workshop agendas.

These recommendations are:

* That all sewer outfalls be extended to a minimum of a mile offshore, and/or a minimum depth of 60 feet of water, depending on which comes first, and that deadlines be established for sewer districts to submit design engineering and plan submittals for outfall extension or elimination.

*That each California wastewater treatment plant discharging sewage into the Pacific Ocean be required to perform a cost feasibility study for full tertiary treatment, calculating the monthly and annual rate increase per ratepayer, witch each study to be completed within two years, and submitted to a state water quality regulatory agency with complete recycling as an ultimate goal.

In the interest of cleaning up the polluted beaches of California, we urge your serious attention to this matter. Thank you.

Sincerely,

Joey Racano
Ocean Outfall Group
Morro Bay Ca
93442

www.stopthewaiver.com

"Polite conservationists leave no mark save the scars upon the Earth that could have been prevented had they stood their ground."

David Ross Brower

Want to save the world but not sure exactly how to go about doing it? Get an e'mail copy of my book ('An Activist's Almanac') -just ask and I'll send it to you.

let's save the world!

cc: BRIAN BAIRD

California Ocean Science Trust
3700 Chaney Court
Carmichael, CA 95608
Tel: 916.944.7315
Fax: 916.944.2256

March 21, 2005

Secretary Mike Chrisman
Resources Agency
1416 9th Street #1311
Sacramento, CA 95814

SUBJECT: Offer to Assist the California Ocean Protection Council

Dear Secretary Chrisman:

As you are aware, the California Ocean Science Trust (CalOST) is a non-profit organization created by statute to fund marine and coastal research in California, and to encourage coordinated, multi-agency, multi-institution approaches to ocean resource science. Our Board of Trustees is comprised of a broad cross-section of professionals who work in various private and government capacities in the coastal and ocean field.

CalOST is encouraged that the California Ocean Protection Council (Council) has been formed and that it will be holding its first meeting on March 21, 2005. Several of our Trustees plan to attend this important inaugural meeting.

On behalf of our Trustees I would like to offer the services of our organization to assist you in meeting the Council's goals. Specifically, we envision that CalOST may be able to serve in some scientific advisory function to the Council. We believe that such collaboration will enhance coordination of effort and optimize limited resources available to improve the management of our coastal and ocean resources.

Please feel free to contact me at 858.534.2627 or ckennel@ucsd.edu or our Executive Director, Justin Malan at 916.944.7315 or jgmalan@aol.com to discuss ways in which the Council and CalOST can work together.

With best wishes for every success of the Council.

Charles F Kennel

Charles Kennel, Ph.D.
Chair

Cc: CalOST Trustees

-----Original Message-----
From: Nightsongs@aol.com [mailto:Nightsongs@aol.com]
Sent: Tuesday, March 22, 2005 4:40 PM
To: Cyndy Paulsen
Subject: Attention: Mr. Mike Chrisman, Chairman

Dear Mr. Chrisman:

I am aware that the nonprofit organization, Heal the Ocean of Santa Barbara, recently provided you with a report--"Ocean Wastewater Discharge Inventory for the State of California."

I live in Carpinteria, CA, just below Santa Barbara. I am quite concerned to learn from the HTO report about the amount of sewage being discharged into the shallow areas of the ocean in many coastal communities where residents and visitors alike recreate.

I strongly urge you and the California Ocean Protection Council to read this report carefully. We need your help and protection from this harmful practice that occurs each and every day right where we live. In my own coastal area, such outfalls exist in the nearby towns of Summerland and in Montecito, where I and my family frequently go to the beach.

Heal the Ocean has made some recommendations such as, establishing deadlines for sewer districts to submit plans to extend outfalls to a minimum of a mile offshore and requiring treatment plants to perform cost feasibility studies for full tertiary treatment. The studies would include calculating projected rate increases to ratepayers and would be submitted to a state water quality regulatory agency.

Please give your attention to the HTO recommendations. We need to regulate those who would irresponsibly pollute our beautiful beaches and compromise the safety of our coastal recreational areas.

Sincerely,

Alicia Bottoms
4505-A Aragon Drive
Carpinteria, CA 93013

-----Original Message-----
From: Charles S. Cox [mailto:cscox@ucsd.edu]
Sent: Wednesday, March 23, 2005 11:33 AM
To: COPCpublic
Subject: Research on tsunami dangers is needed in California

Mike Chrisman, Chairman
California Ocean Protection Council
California Resources Agency

The following remarks may seem somewhat distant from the charge to the Ocean Protection Council, but they do have an aspect relating to the protection of the shoreline environment, and I submit them for your consideration

The devastating tsunami of December 2004 has shown that rare tsunami events have such disastrous effects that efforts to determine their probability are an important aspect of state governance. Although the tsunami warning system in the Pacific can provide timely warnings for the arrival of tsunami waves from distant earthquakes, it is not able to give effective help for tsunamis from local sources.

The danger of a giant subduction earthquake and subsequent tsunami is now known for the Pacific Northwest Coast, and considerable educational efforts have been expended in Oregon and Washington where the principal dangers occur. The northern coast of California is likely to be subjected to great damage under some circumstances of such an earthquake/tsunami. Much of the knowledge of inundation on the Oregon and Washington Coasts has been derived from geological studies of trenching carried out on seacoast marshes. Would it not be wise to extend such studies on more of the California coastal marshes?

There are other possible sources of local tsunamis that should be studied for understanding the risks posed to shore developments. A feature of Southern California housing in the last half century has been the building of numerous houses along exposed shorelines. Such houses are at risk from large storm waves, and in addition are likely to be swept away by a large tsunami. It is an historic accident that no large tsunami has struck the coast of Southern California since the tsunami of 1960 generated by a gigantic subduction earthquake on the coast of Chili. This large tsunami happened to arrive at low tide, so no lessons seem to have been learned in California.

Although there is little historical evidence of damaging tsunamis in Southern California, the possibility of rare but large tsunamis of local origin cannot be dismissed. Such a tsunami could be generated by earth movements associated with an earthquake or seafloor slumping from any cause. The multiple wave cut terraces forming characteristic features of the shoreline of Southern California and its offshore islands implies past vertical motions on a time scale that is short in a geological sense. Whether these vertical motions are sudden enough to generate tsunamis is unknown, but should be investigated.

In summary, my view is that an effective research effort should be devoted to understanding the risks for people living or working near the shoreline by tsunamis from various sources. Although rare, the damage from them can be very large.

Charles S. Cox
Professor of Oceanography, emeritus
Scripps Institution of Oceanography
La Jolla, California 92093-0213
Tel: 858 534 3235

From: Elizabeth Pepin [mailto:EPepin@KQED.org]
Sent: Tuesday, March 29, 2005 11:39 AM
To: Kathleen Lewis; Brian Baird; Leah Akins
Subject: public comments on workshop

Overall, the workshop report is a great document. However, I do feel that public education has been left out of the picture. It is wonderful that the workshop realized that there needs to be better communication between the scientific and government sectors, but unfortunately, the way these two groups interact with the public was not addressed. In making our documentary on California's coastline, three things quickly became apparent:

1. Nearly everyone who lives in California goes to the beach at least once a year and feels a deep appreciation for our State's coastal resources
2. Few people understand how our beaches work, nor the laws or agencies that oversee our beaches
3. Most people feel that information on beaches and our coastline is hard to understand and "boring."

Without public buy in, many of the items listed in the workshop will not be able to be fully implemented. It is imperative that the scientific and government communities figure out interesting and entertaining ways to educate the public about these issues. Even when asked to put things in "laymen" terms, some of the people we worked with on the film still conveyed information in a scientific way that would not engage people past the first few seconds. By finding a way to make the information matter to people, our beaches and coastlines will benefit from the public's buy-in, and politicians and scientists will find their jobs will become easier, not to mention the possible freeing up of funds because of public sentiment that our shoreline is an important part of California.

Best wishes,
Elizabeth Pepin
Producer, Coastal Clash

****

Need a day at the beach? Are you sure you can get there?

Coastal Clash takes an in-depth look at the struggle between public and private interests for California's shores.

Go to www.kqed.org/coastalclash and learn more about our coastline.

****

From: Peter Grenell [mailto:pgrenell@smharbor.com]
Sent: Monday, April 04, 2005 3:01 PM
To: Leah Akins
Cc: page@igc.org
Subject: Comments on draft final summary report: Info, Res, Out Needs

Hello,

I'm Peter Grenell, General Manager of San Mateo County Harbor District. We operate Pillar Point Harbor on Half Moon Bay. Following are a few comments I have on your draft report:

1. I understand the basic purpose of the gathering and representation at the workshop. But, I recall attending a symposium in Orange County about a dozen years ago where the same theme - how scientists and decision-makers can better communicate, including how scientists can provide information of use to decision-makers, and how decision-makers can better understand what scientists are trying to tell them. Seems we have not progressed very far. My question is: What is being proposed, considered, or simply thought about this time around that is new and might make some real progress? I don't see any signs of this in the draft report.

2. Second, to make this really work, I think more emphasis earlier in the process needs to be given to input from decision-makers, "users", if you will. Surely, as stated on page 3 bullet 1, a needs exists for improved communication between state agency staff and marine scientists. But, what about local governments, harbor managers, and others who make important decisions all the time, who must apply for permits and comply with a multitude of regulations, who must seek funds, who must serve the public and various user groups including other agencies. The turbulent ongoing discussions regarding marine protected areas and fisheries management show clearly that research cannot proceed in a vacuum.

3. Re: Ecosystem Health: Given the needs stated in the report and as summarized on p. 3, seems that an appropriate recommendation would be to temporarily suspend the MLPA process regarding marine reserves until some more of this sort of information is available. Now, an argument is made that some sort of provision must be made precisely to obtain such information, if only for comparative purposes. If so, then it is imperative that those most affected by such a move, e. g., fishermen, must be involved directly in the design, monitoring, and where possible, other relevant research. Much more attention should be given expllicitly to this issue, beyond "socio-economic analysis".

4. Re: Fisheries Management: Ditto #3 above, especially as linked to increased monitoring of Existing MPAs, such as the Rockfish Conservation Area. This is basic stuff: a lot more support and constructive action can be achieved if attention is paid to this issue.
5. Re: Pollution: What about potentially unwarranted "bad PR"? Lurid headlines about "the most polluted" beaches, e. g., are not necessarily helpful in really address a given problem. We have one situation where the causes of certain bacterial counts appear to be both storm drain outfall - human caused - and seabird fecal matter - not human caused. Recent headlines make no mention of this situation. My point is that education of certain environmentally concerned groups as to the complexities of given situations may result in more constructive action - and support - than a National Inquirer-type approach.

6. Re: participant views: What about assessing decision-makers' views about "bridging the gap" between them and scientists? Wouldn't it be helpful to know more about what they see as useful contributions from scientists?

7. Re: participant views: The fascinating "disconnect" between how participants view cooperation: They are cooperative but others are not, raises a basic question: If scientists have this problem of both fact and perception, how do they expect to improve their communication with decision-makers? Seems to me that this Must be addressed first, before all this other stuff begins.

Hope this helps your process.

Peter Grenell
SMCHD
harbordistrict@smharbor.com

Copies sent to: BB, LA, KL
Date: 4.7.05

April 6, 2005

The Honorable Mike Chrisman
California Ocean Resources Management Program
The California Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814

RE: Ocean Protection Council Comments

Dear Secretary Chrisman:

On behalf of Bluewater Network and the countless concerned Californians we represent, I respectfully submit the following supplement to my oral comments during the council's meeting on March 21, 2005.

Specifically, I promised to forward information regarding the Government Accountability Office's (GAO) current research into the impact of global climate change on federal resources. Early last year, Senators John McCain and Ernest Hollings sent a request to the GAO for a comprehensive assessment of the effects of global warming on the nation's federal natural resources (see enclosed letter).

Senators McCain and Hollings asked the GAO to identify the losses and stresses on all of America's public lands (including coastal and ocean resources) that will result from global warming. The GAO report will inventory the impacts of global warming and predict the timing of their environmental and socio-economic consequences. In addition, the Senators are asking the GAO to identify the resources that can be saved by adaptive measures such as the construction of sea walls to protect coastal lands, and improved networks of reserves to protect species.

Currently, the GAO is in the early stages of this review. They hope to identify several areas that can serve as examples of potentially impacted areas. The California coast should serve as one of those representative areas. David Marwick is heading this research for the GAO and can be reached at either (202) 512-6775 or marwicke@gao.gov.

Sincerely,

Sean Smith
Public Lands Director

cc. Cruz Bustamante, Lieutenant Governor
Sheila Kuehl, State Senator
Alan Lloyd, Secretary Cal/EPA
Brian Baird, Assistant Secretary for Ocean and Coastal Policy
Jane Delay, Executive Director, Save our Shores
Warner Chabot, Vice President for Regional Operations, Ocean Conservancy

311 California, Suite 510 ~ San Francisco, CA 94104
T: 415.544.0790

BLUEWATER NETWORK

www.bluewaternetwork.org ~ bluewater@bluewaternetwork.org
F: 415.544.0796

United States Senate

COMMITTEE ON COMMERCE, SCIENCE,
AND TRANSPORTATION

WASHINGTON, DC 20510-6125

March 8, 2004

The Honorable David M. Walker
Comptroller General of the United States
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Walker:

We are writing regarding the growing problem of global climate change – the most significant environmental issue of our lifetime. Scientists have estimated that on average, global surface temperatures have increased by 0.4 to 0.8 degrees Celsius over the past 100 years, with much of that increase occurring during the past 20 years. Two of the warmest years on record in terms of average global temperatures were 1998 and 2002.

Our nation is already experiencing the effects of this warming trend, including adverse impacts on public lands. From coastal wetlands and coral reefs to glaciers and tundra, America's precious and protected natural resources are threatened by increasing temperatures and rising sea level. In some areas, as with Everglades National Park, we may be able to mitigate some global warming effects. Unfortunately in others, such as Glacier National Park, nothing can be done as wildlife species disappear and unique ecosystems literally melt away.

The federal government has placed nearly 30 percent of America's land mass under public management in order to preserve our natural resources and amenities for public benefit.[1] As the threats posed by global climate change increase, there is a critical need for Congress to be better informed concerning current and projected impacts of global warming on our federal lands and other natural resources, and implications for the management, use, and value of such resources.

Although the Global Change Research Act of 1990 required comprehensive assessments on the effects of climate change at least every four years, only one such national assessment has been prepared to date. Further, it is our understanding that no follow-on national assessment is expected to be undertaken, despite advances in measurement and assessment methods and accelerating warming trends.

In an effort to help Congress take appropriate actions to better protect our natural resources to the extent possible from the impacts of global warming, we request that the General

[1] Mandates ranging from National Parks Service's use and enjoyment of future generations to the Bureau of Land Management's multiple use and sustained yield.

Accounting Office (GAO) conduct an assessment of projected climate change effects on our public lands and other natural resources, (including coastal and ocean resources) under several well-established climate change scenarios, including those set forth by the Intergovernmental Panel on Climate Change (2001) (IPCC) and certified by the U.S. National Research Council.[2] We urge that in this effort, the GAO consult with the National Academy of Sciences and other appropriate experts to help ensure the credibility of the report's underlying scientific research.

The study should report on the resources on all of America's public lands that may be lost, stressed, or otherwise adversely affected over the next 100 years as a result of rising temperatures or sea level rise, the predicted timing of such effects, and the management challenges (and associated environmental and socio-economic consequences) of those losses and stresses. Where applicable, the study also should identify those resources that can be saved by anticipatory adaptive measures (i.e. construction of sea walls to protect coastal lands, improved network of reserves to protect species, etc.) and, where possible, the estimated cost and anticipated timing of which such action would be required.

In addition, we also request the GAO's further assistance in analyzing the federal government's response to the problem of global climate change. In particular, we found the GAO's October 1, 2003, testimony before the Senate Commerce Committee on the Administration's February 2002 Global Climate Change Initiative very helpful and request the GAO's further analysis in two areas of concern:

1. Please analyze trends in federal spending on climate change (*e.g.*, spending on programs directly related to reducing greenhouse gas emissions vs. those indirectly related to reducing emissions; spending on basic science vs. applied science; and spending on an agency basis);

2. Further, please identify which industries account for the largest share of U.S. greenhouse gas emissions; ascertain whether the companies that have signed up for the Administration's Climate Leaders and other programs are from the most emissions-intensive industries; and identify the metrics participating companies will use to quantify their emissions reductions.

Thank you for your time and attention to these requests.

Sincerely,

Senator John McCain

Senator Ernest F. Hollings

---

[2] *Climate Change Science: An Analysis of Some Key Questions (2001)*, U.S. National Research Council, produced in response to President Bush's request that the National Academy of Sciences review the United Nation's IPCC Reports and summaries. The National Academy of Sciences certified the soundness of the IPCC's science and conclusions, stating that "The body of the WGI report is scientifically credible and is not unlike what would be produced by a comparable group of only U.S. scientists working with a similar set of emission scenarios..." p.22.

May 2, 2005

Brian Baird
California Resources Agency
Oceans Program Manager
1416 9th St., 13th floor
Sacramento, CA 95814

Dear Brian,

We want to thank you, California Sea Grant, the UC Marine Council, and the Ocean Science Trust for convening the November 18-19, 2004 meeting in Santa Cruz to discuss the state's ocean research priorities. The meeting provided an excellent opportunity for a broad spectrum of the ocean community to share ideas.

However, we strongly feel that the meeting itself, and the resulting workshop report, should be seen only as a first step towards designing a more focused set of priorities for the state. The workshop structure had some inherent limitations, such as the original division of subject groups. This division gave the impression that the five general topics had already been prioritized as written, and left little opportunity for the development of cross-cutting or interdisciplinary proposals. The groups themselves ended up proposing specific projects, which may indeed be important projects. However, many are both too narrow to be strategic research priorities and too lacking in detail to be free-standing pilot projects on their own.

Rather than picking one of these specific projects and building a research strategy from it, it may be more appropriate for the state to pick certain research emphases and use these as themes for competitive grantmaking and integrated projects that draw on a broad array of public and private resources. We would also suggest that the state bring together a small group of workshop participants to help draft a state-wide science strategy once comments on this draft are received.

This additional meeting should also consider the priorities for pilot projects outlined in the California Ocean Protection Act. We believe these pilot projects are the appropriate place for a high degree of specificity, rather than in a statewide ocean research strategy. To that end, we have submitted a list of possible research projects to the Ocean Protection Council, which draw on themes expressed in the Governor's Ocean Plan. That list is attached in case it may be useful as you develop your research priorities.

We appreciate your dedication to this project and look forward to helping you as it moves forward.

Sincerely,

Kate Wing NRDC	Linda Sheehan California Coastkeeper Alliance	Burr Heneman Commonweal	Rod Fujita Environmental Defense

cc: Leah Akins
Justin Malan
Gary Griggs

FUNDING THE OCEAN:
A STRATEGY FOR SUCCESS

California has long been a leader in ocean science, conservation, and management. The state should continue its leadership by improving and expanding ocean initiatives in the near term and to creating stable, long-term funding for the future. We offer these recommendations as a strategy for success. May 2, 2005

Chuck Cook, The Nature Conservancy
Tim Eichenberg, The Ocean Conservancy
Rod Fujita, Environmental Defense
Burr Heneman
Linda Sheehan, California Coastkeeper Alliance
Kate Wing, NRDC

NOW IS THE TIME FOR ACTION

California has become the leader in ocean policy, management, science, and governance in recent years. Today, the legacy of prior conservation laws and regulations is combining with new partnerships and emerging critical needs to create an exceptional opportunity for change.

- The state has begun to apply model policies to maintain or improve both the health of our coastal ecosystems and the economic viability and enjoyment of fisheries that depend on those systems.
- The state is continuing to improve coastal water quality for recreational us and for healthier marine life through its leadership on nonpoint source pollution, invasive species, and special protection for the most ecologically important parts of the coast.
- California is making the largest investment of any state in advanced science for understanding the complex patterns of coastal currents. Integrating that understanding with information from other sources will benefit the full range of the state's coastal ocean management concerns.
- California's new Ocean Protection Act and the high-level Ocean Protection Council it created will bring much-needed coordination and streamlining to the state's ocean resource management.
- Even in tough fiscal times the state is developing mechanisms, such as the Ocean Protection Trust Fund and the Fisheries Revolving Loan Fund, to maintain California's leadership in ocean management and create new models for the sustainable financing of ocean management and conservation.

THE PROJECTS

The economic and ecological importance of California's coastal ocean make it imperative that the state retain its leadership in ocean policy, management, and science. The needed policies are largely in place. Implementation of most of those policies through management measures and science programs is off to a strong start, but continued leadership will depend on maintaining our momentum. The following project priority list for the Ocean Protection Trust Fund is designed to maintain that leadership:

1. Ecosystem-based marine life and fisheries management

1A. Strong science to support fishery and marine protected area management.

Increase nearshore monitoring at the new Channel Islands marine protected areas and at high-priority sites within the Marine Life Protection Act central coast study area through the Cooperative Research and Assessment of Nearshore Ecosystems program (CRANE). CRANE, which is coordinated by the Department of Fish and Game, is a multi-agency and institution monitoring partnership to provide essential information for management of both fisheries and marine protected areas. Through the Coastal Conservancy's Coastal Ocean Observing System program (see below), establish a management system for data from CRANE monitoring and begin immediately to apply CRANE information to fishery and marine protected area management.

1B. Sustainable fisheries financing.

As authorized by the California Ocean Protection Act, create a fisheries revolving loan fund to foster sustainable fisheries and manage fishing capacity. A competitive process would provide loans to fishermen for projects that can demonstrate substantial economic and conservation benefits. Projects could include management reforms to increase efficiency of fishing operations within conservation guidelines; much-needed fleet capacity management; and value-added processing, marketing, and purchasing agreements. Loans would be repaid by the fishermen as fisheries are revitalized, allowing the fund to invest in new projects.

2. Coastal water quality/pollution

2A. Water quality monitoring.

Improve coordination and integration of existing coastal and nearshore water quality monitoring by dischargers, agencies and citizens in order to obtain more comprehensive information about the health of nearshore and ocean waters. COPA funds should be used to accelerate efforts at the State Water Board to integrate existing monitoring and to add new monitoring efforts where gaps are evident. This effort shall be coordinated with other marine ecosystem assessment efforts, such as the (see below), through the Coastal Conservancy's Coastal Ocean Observing System program.

2B. Nonpoint source pollution coordination.

Recent studies confirm that polluted runoff significantly harms nearshore marine ecosystems and the marine life that depends on them[1]. COPA funds should be used to implement a pilot project in the Central Coast Regional Water Quality Control Board's

[1] See http://newsservice.stanford.edu/news/2005/march16/gulf-030905.html

jurisdiction to coordinate efforts among federal, state and local agencies and citizens to control polluted runoff. Lack of coordination has significantly impeded progress towards addressing polluted runoff, which numerous agencies have at least some responsibilities to control. This region is ideal because it is coastal, is affected by a wide range of nonpoint pollution sources (timber, agriculture, septic systems, marinas/boating, urban runoff, etc.), and therefore would bring in a significant number of agencies. The area also includes the Marine Life Protection Act study area and is home to the California sea otter, significant mortalities of which have been traced to land-based pathogens in recent years. The Water Board-Coastal Commission's "Critical Coastal Area" project has identified pilot areas and projects along the Central Coast that are in need of funding, and should be the vehicle for moving this coordination effort forward.[2]

2C. Invasive species control and prevention.

In a 2005 University of California study, researchers found that hundreds of non-native species inhabiting the country's coastal waters pose a newly emerging threat that brings aquatic ecosystems closer to an "invasional meltdown." The study, which focused on Bodega Bay, forged new ground by clearly showing indirect effects of invasive species in altering ecosystems, and the danger that poses as the number of invasive species in coastal regions increases. COPA funds should be used to complete and implement the plan for addressing aquatic species that was called for by SB 1573 (Karnette), with a focus on coastal areas at particular risk from direct or indirect impacts of invasive species.

3. Integrated coastal ocean observing systems

3A. Complete essential seafloor mapping.

Complete seafloor mapping of high-priority, nearshore state waters, which is needed for fisheries management, marine protected area design, and modeling very nearshore currents that affect beach water quality, sediment transport, and coastal erosion management. High priority areas include beaches with periodic closures related to water quality and the central coast Marine Life Protection Act study area.

3B. Initiate the Coastal Ocean Observing System program.

Initiate the Coastal Conservancy's Coastal Ocean Observing System program (CalCOOS) to ensure integration of information from many sources and application of that information to ocean management concerns. First priorities should be applying CRANE and Coastal Ocean Current Monitoring Program information to oil spill response, coastal water quality, marine protected areas, and fisheries management.

[2] See http://www.coastal.ca.gov/nps/cca-nps.html

BACKGROUND ON CALIFORNIA'S HISTORIC LEADERSHIP

California is increasingly recognized internationally as a leader in many aspects of ocean resource policy, management, and science, including:

1. Ecosystem-based and sustainable marine life and fisheries management
Under the pioneering Marine Life Management Act (1998) and Marine Life Protection Act (1999), California's standards for marine and fisheries management include recognition that fishing, non-consumptive ocean tourism and recreation, education, and science are all priorities for marine life management; allowing only sustainable fishing or other uses of marine life; precautionary fisheries management to reduce the risk of overfishing; and recognition that a system of marine protected areas is an essential tool for fulfilling all of these management objectives.

Implementation – Highlights of the implementation of these progressive policies include a model ecosystem-based fishery management plan for the nearshore fishery, one of the state's most important; designation of 12 marine protected areas totaling 163 square miles at the Channel Islands; initiation this year of a process to develop a system of marine protected areas for the rest of the California coast; and protection for ecologically important species, such as white sharks, the state's top ocean predator, and krill, an important source of food for many fish, whales, and marine birds.

Ecosystem-based science -- The state and several partners have initiated the model Cooperative Research and Assessment of Nearshore Ecosystems program (CRANE) to support ecosystem-based marine life management. Initiated at the Channel Islands, CRANE is intended to provide the ecosystem information for the entire coast needed for both fisheries management and marine protected area evaluation.

2. Coastal water quality and pollution

Non-point source pollution – California is the only state to mandate controls on agricultural and logging runoff, and the state has begun to develop and implement controls on runoff dischargers. Under the Schwarzenegger Administration, the state has assigned dozens of new staff to this critical problem and will be paying for those staff through fees on the dischargers, another first in the nation.

Marine invasive species from ballast water – California was the first state in the nation to mandate controls of ballast water discharges from vessels to protect against the economic and ecological impacts of new marine invasive species. California's law was quickly hailed as a model and adopted by neighboring Washington and Oregon, and is spurring the establishment of stronger controls at the federal level. Under the current Administration, the State Lands Commission has been working with neighboring states to develop consistent regulations on ballast water discharges from vessels traveling along the coast; these regulations are currently out for public review.

Pollution controls for high priority coastal areas – Under the Schwarzenegger Administration, California has taken the lead on ecosystem-based management by

beginning to enforce in earnest the state's ban on pollution discharges into 34 of the state's most ecologically important areas in the nearshore environment (Areas of Special Biological Significance (ASBS). The Administration has also supported current efforts to identify "critical coastal areas" that drain to important marine ecosystems such as the 34 ASBSs, and to fund pilot programs to integrate land management in those coastal watersheds with the health of the downstream marine ecosystems.

3. Integrated coastal ocean observing systems

The US Commission on Ocean Policy and the Pew Oceans Commission both urged progress in integrated ocean observing systems (IOOS) that take advantage of both existing monitoring programs and new, cost-effective technologies. The state's many outstanding marine science programs have made California an IOOS leader since launching the California Cooperative Oceanic Fisheries Investigations (CalCOFI) over 50 years ago. We have many other statewide and regional examples of existing biological, physical, and chemical long-term monitoring systems that provide useful information, such as sea surface temperature, beach water quality, wave height, winds, ocean productivity, extent of kelp forest canopy, and annual juvenile rockfish production. Information is gathered from technologies as diverse as satellites, instrumented buoys, and visual surveys by scuba divers. The challenge for the 21st century is to integrate information from these and other observing systems and to ensure that the information is available in usable form for management agencies, industry, and the general public. California is making great progress in expanding the scope and effectiveness of its IOOS infrastructure with these new programs:

Surface current mapping – The Coastal Ocean Current Monitoring Program (COCMP) is the backbone of an eventual statewide integrated coastal ocean observing system designed to fit into a national system. This administration has put more funding into IOOS through COCMP than any state and more into surface current monitoring than the federal government. Coastal current monitoring will eventually be useful for a wide range of state ocean management concerns, including beach water quality, coastal processes such as beach erosion, fisheries management, evaluation and design of marine protected areas, oil spill response, safety for recreational boaters, efficiency of maritime shipping operations, Coast Guard search and rescue, and others.

Tracking nearshore ecosystem health – The Cooperative Research and Assessment of Nearshore Ecosystems program **(**CRANE**)** will become the source of basic ecological information to support both fisheries and marine protected area management in the nearshore. Begun at the Channel Islands, CRANE is a partnership between the Department of Fish and Game and University of California, California State University, and other marine scientists.

Making existing information more useful – California Coastal Ocean Observing System (CalCOOS) embodies the state's interests in coordination, funding, data management, and useful applications in regard to the many long-term coastwide or regional observing programs that are useful for management agencies, industry, or the general public. CalCOOS will be the key for achieving broad, coast and ocean ecosystem-based management by supporting marine life and fisheries management, beach water quality

monitoring, coastal erosion studies, oil spill response, marine aquaculture, and other concerns. This administration has charged the State Coastal Conservancy with designing and implementing CalCOOS. The initial high priorities for CalCOOS are to help ensure that information from CRANE and COCMP are accessible and useful.

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SCRIPPS INSTITUTION OF OCEANOGRAPHY
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FAX: (858) 453–0167

5 May 2005

Mr. Brian Baird
Assistant Secretary for Ocean and Coastal Policy
California Resources Agency
1416 Ninth Street
Sacramento, CA 95814

Dear Brian:

Thank you for the opportunity to comment on the findings of the California ocean and coastal information, research, and outreach needs workshop. I was a participant in the meeting, but believe that there are several additions that can inform a developing strategy.

National programs for coastal observations are developing relatively slowly and may take 3-5 years to evolve support for a major coastal observatory. It's in California's interest to develop leadership and autonomy in determining the future of its coast as the federal government develops its programs more fully. Scripps believes that California should remain in the lead in coastal basic and applied research as well as operational observations. Developing state funding streams for research and observational infrastructure will assure leadership both within the state and nationally as federal programs grow. If California anticipates some autonomy over the future of its coast, it's important that it take the lead in promoting the importance of its ocean...from environmental, recreational, aesthetic, and economic perspectives.

Understanding the California system—its natural and human-induced hazards, ecosystem health, fisheries, invasive species, climate, pollution and water quality—is crucial to enhancing human health, safety and welfare, reducing disaster losses, and achieving sustainable development. Observations of the coastal system constitute critical input for advancing this understanding. The workshop report enumerates many of these issues quite effectively. However, the integration of the allied observations is dealt with only piecemeal.

The expansion of the coastal observation system must build on and add value to existing coastal observation systems by coordinating their efforts, addressing critical gaps, supporting their interoperability, sharing information, reaching a common understanding of user requirements and improving delivery of information to users. For example, the report touches upon information systems as shown in the following table:

California Spatial Reference Center

IGPP - SIO

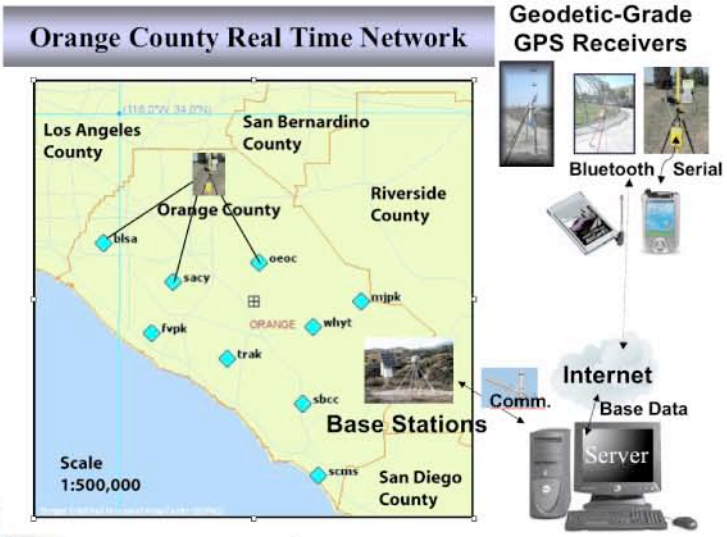
Geodetic services to ensure accurate and consistent spatial referencing of information within California.

CSRC Mandate

Provide the necessary space-based geodetic services to ensure the availability of accurate, consistent, and real-time spatial referencing data in California, including its coastal waters, waterways and islands.

Monitor temporal changes in 3D geodetic coordinates due to tectonic motion, volcanic deformation, land subsidence, and major landslides.

CGPS Technology
Scripps is a leader in the development of real-time continuous GPS technology, such as state-of-art geodetic monuments (left) and data telemetry buffers (below.



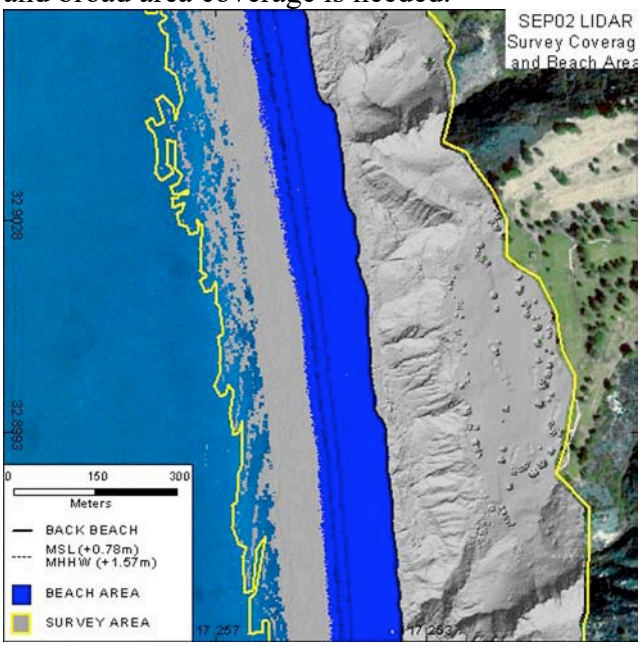
Applications of Real Time GPS Networks

Disaster preparedness and relief efforts
Earthquake, volcanic and subsidence research
Geographic Information Systems (GIS)
Flood plain management
Water transportation infrastructure
Precision Agriculture
International and offshore boundary mapping
Aircraft landing systems
Intelligent Transportation and Telematics
Fleet Management Systems
Coastal and Harbor Navigation

The California Spatial Reference Center is located at the Cecil H. and Ida M. Green Institute of Geophysics and Planetary Physics (IGPP), at UCSD's Scripps Institution of Oceanography. In partnership with NOAA's National Geodetic Survey (NGS) and the California Department of Transportation (Caltrans), CSRC has designed a plan to expand and maintain an accurate network of control stations necessary to meet the demands of local and state government and the private sector for a reliable reference frame in California.

CALTM Center for Airborne LIDAR Terrain Mapping
Scripps Institution of Oceanography, UCSD

Scripps Institution of Oceanography (SIO) has undertaken research over the past several years in the application of ALTM to the observation of changes in beach morphology and earthquake faults. The success of this work has led other SIO investigators to consider applying the technology to a wide range of environmental, geological and physical applications where rapid and broad area coverage is needed.



A group of these investigators has been formed to create the CALTM with capabilities to meet present and future airborne mapping needs. The first task is the acquisition of a dedicated light aircraft outfitted with the LIDAR mapping system and digital photography capabilities.

The second task is the training of personnel, creation of data analysis and archiving software, and the quality control procedures necessary to assure the accuracy of data products. The costs of these tasks over a two year startup period are shown in the table.

In addition to the already demonstrated capability for identification of seismic hazards and the broad scale mapping of seasonal variations in beach morphology, CALTM proposes to solicit support for research aimed at establishing capabilities in the following fields:

- Measurement of the spatial and temporal variability of the depth of mountain snow pack.
- Mapping stream channels, stream and lake levels, and other hydrological characteristics.
- Characterization of major landslides.
- Rapid response assessment of fire, storm waves, earthquake or tsunami damage.
- Improved coastal wave impact models.
- Coastal-ocean resources modeling and monitoring.
- Earthquake fault mapping in forested areas.

CALTM Startup Costs ($millions)

	Year 1	Year 2
Equipment	1.77	
Aircraft	0 .39	
Labor & other	0 .55	0.76
TOTAL	**2.71**	**0.76**

Data, Knowledge and Information	
Topic Area	Recommendation
Natural Hazards	…top recommendation was the creation of a communication system to connect the information needs of managers and the expertise of those in academia.
Ecosystem Health	…their top recommendation was the developent of a "Living Obseravtion System" to quantify how critical coastal ecosystems are responding to natural and human drivers
Fisheries Management	Improving single species management by gathering more information on mortality, discards, abundance, life history, and age struction.
Coastal Pollution, water and sediment quality	The group's top recommendation was that a web-based information clearinghouse be created for all seven priority issues.

The forthcoming Ocean Protection Council strategic plan should provide an overall conceptual and organizational framework to build towards integrated coastal and watershed observations to meet user needs. The goal will be to integrate existing and future observation systems, supplementing but not supplanting existing systems' mandates and governance arrangements. The strategic plan should provide the institutional mechanisms for ensuring the necessary level of coordination, strengthening and supplementing existing global observation systems, and reinforcing and supporting them in carrying out their mandates.

The contributing information technology system needed to support integration will range across the processing cycle, from primary observation (data) to information to knowledge. By implementing the strategic plan, they will share observations and products with the system as a whole, and will take the necessary steps to ensure that the shared observations and products are accessible, comparable, and understandable, by supporting common standards and adaptation to users needs.

The strategic plan should seek to encompass the entire California coast and watersheds, and include *in situ*, airborne, and space-based observations. Scripps believes that it is important to base system integration and observation system growth on a modern, distributed, data and computational grid-based system. The nascent California Ocean Current Monitoring Program (COCMP), for example, is employing such a system from northern California to southern California and into Mexico to ensure broad, real-time

access to data collected by the various partners. The complete data set will also be assimilated in regional ocean models to interpolate the data and predict ocean conditions into the future.

Sound management of California's coastal system, in both its natural and human aspects, requires information that is timely, of known quality, long-term, and comprehensive. Ensuring that such information is available to those who need it is a function of governments and institutions at all levels. The current situation with respect to the availability of coastal and watershed observations is not optimal. This situation is particularly true with respect to coordination and data sharing among local and regional governments, organizations and disciplines. There are large spatial and temporal gaps in data coverage. Moreover, there is an eroding observational infrastructure, inadequate long-term data archiving, and no assured continuity for many essential observing systems. Consequently, targeted collective action is needed to bring California's observing systems in line with the requirements for addressing a range of issues of concern to society.

Technically, the goals for an effective information system for California are:

- To address identified common user requirements;
- To acquire observational data;
- To process data into useful products;
- To exchange, disseminate, and archive shared data, metadata, and products; and,
- To monitor performance against the defined requirements and intended benefits.

California is a particularly good position to adopt a modern grid-based information system to federate existing systems and provide a framework for growth. The federally-sponsored Laboratory for Ocean Observatory Knowledge and Information Grid (LOOKING) is one example for data, knowledge, and information integration. Partners in this effort include Southern California Coastal Ocean Observing System (SCCOOS), the aforementioned COCMP, the California Institute for Telecommunications and Information Technology (Calit2), CalPoly, and the Monterey Bay Aquarium Research Institute (MBARI). LOOKING has adopted a information model based on the five goals above that is illustrated in the following figure.

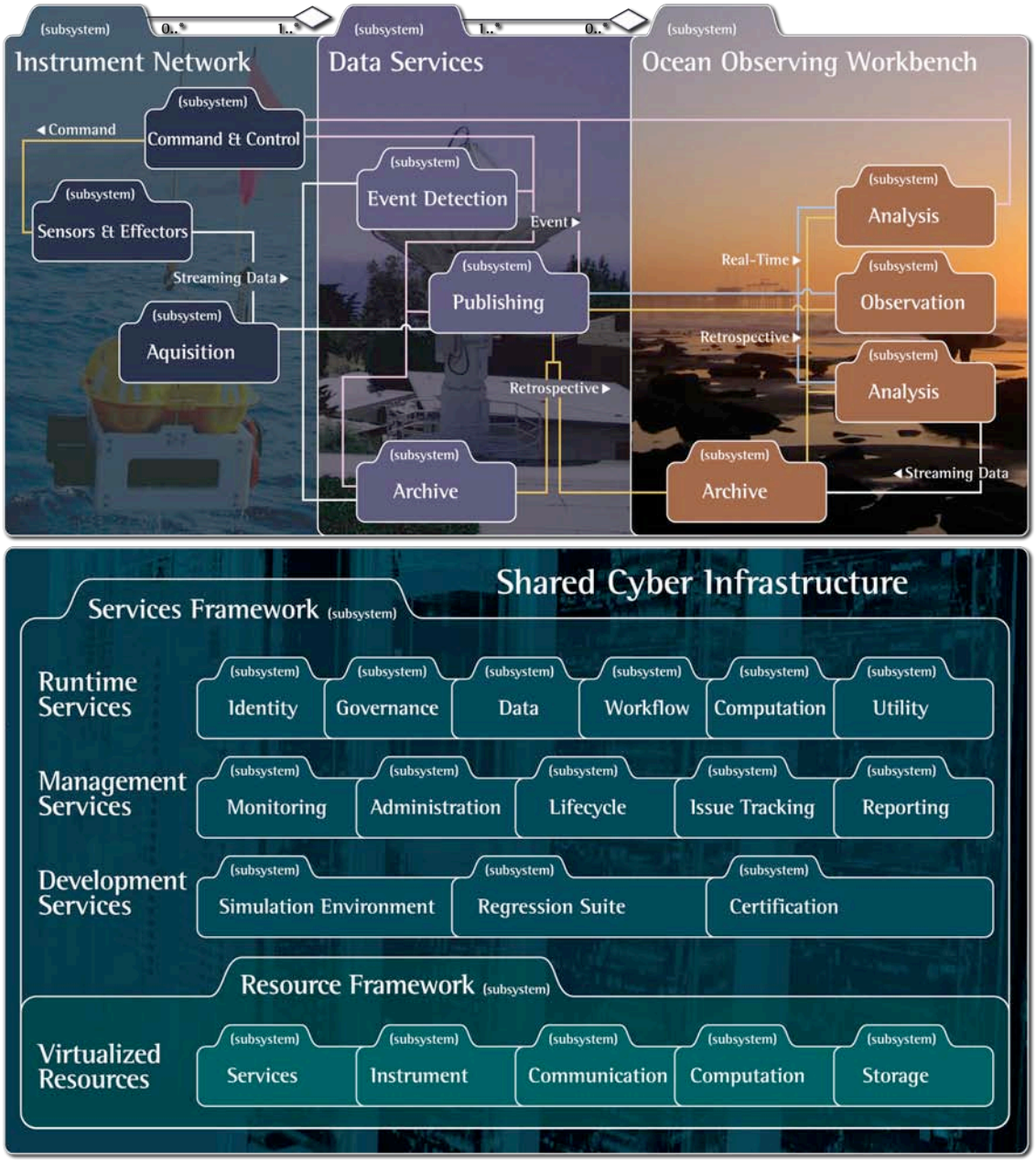


Figure 1: The top figure illustrates the connectivity between a sensor at sea in the left frame to archives and event detection algorithms ashore in the center. The frame to the far right includes standard analysis and modeling tools for transforming data into information and knowledge that can be tailored to be of use to policy makers for coastal observing systems. Most importantly, the sensor, archiving, and analysis systems and centers can be distributed throughout California and not concentrated in any particular facility.

In this implementation of the California ocean observing system, increased sharing of methods for modeling and analysis needed to transform data into useful products will be advocated. In the implementation, harmonization of observations, real- or

near real-time monitoring, integration of information from *in situ,* airborne and space-based observations through data assimilation and models, and early detection of significant and extreme events will be possible. Integration of *in situ,* airborne and space-based observations within the various societal benefit areas cited in the workshop report will be encouraged, as will the establishment of state-wide, efficient, and representative networks of *in situ* observations to support process studies, satellite data validation, and algorithm and model development, as well as the detection, documentation and attribution of change.

We believe that adopting a comprehensive data and information system, based on leading edge information technology developed in California, is essential. We urge the California Ocean Protection Council to include planning and funding for such a system. The investment will leverage federally sponsored work already in place and maintain California in a very competitive position and leadership in the US for supporting nascent systems in other states and the federal government.

I have also attached two single page descriptions of new related tools essential for modern measurements of detailed topography along coastlines, watersheds, slumps, snow pack and earthquake faults in California. The first deals with a high-resolution method for topographic mapping (CALTM – Center for Airborne LIDAR Terrain Mapping) and advocates the acquisition of a dedicated aircraft and modern instrumentation to support regular use of the system in California. The second describes the California Spatial Reference Center (CSRC) and its program for real-time, high speed GPS geolocation. The program has many stations deployed in San Diego, Imperial, and Orange Counties and new installations have begun in Riverside County. The CALTM aircraft depends upon GPS for detailed navigation of the aircraft for accurate surface mapping.

Thanks for the opportunity to provide input to the strategic plan on behalf of Scripps Institution of Oceanography. If questions arise and assistance is needed, please feel free to call on me.

Sincerely,

John A. Orcutt
Deputy Director

Cc: Charlie Kennel
Kathleen Ritzman
Rudy Murillo

From: TWest90731@aol.com [mailto:TWest90731@aol.com]
Sent: Friday, May 13, 2005 7:27 AM
To: Amber Mace
Subject: Re: California Ocean Protection Council Meeting - Friday, June 10, 2005

Dear Council,

I am very glad you all are concerned about California's coast. In speaking for my husband and many fishermen, this is the beginning of the salmon season and the albacore season. This winter was very slow due to the effects of the rain and now is the chance to make up for expenses and living costs. So it becomes impossible to attend meetings of this sort and I think the fishermens voice should be heard and they should hear what the speakers have to say and work together. I know this is already scheduled, but I hope you can take this into account for the next meeting. Thank you.

Sincerely,
Barbara West
For Tony West

SOLOMON LIVE FISH
7532 Sandholdt Rd. #2
Moss Landing, Ca 95039
831-632-0304

May 17, 2005

RE: Misrepresentation of Individual
Ocean Protection Trust Fund

In late September two individuals, Rod Fujita of Enviornmental Defense and Chuck Cook of Nature Conservacy, requesting a meeting in reference to S.B.1459 and A.B. 1318. During this meeting Chuck Cook did most of the talking and since this meeting we have had no further contact with Rod Fujita.

Because of the above bills, we were facing stricter fishing regulations, which we were aware of. We asked many questions in order to understand what was available to us if we were to leave the fishery, which is what they had an interest in representing us in. We asked about the time frame for closing and receipt of funds to which Chuck Cook stated that December would be the earliest but more than likely we should expect no later than March of 2005 as a realistic timeframe. Since our company wanted a quick sale we agreed to have Mr. Cook represent us in efforts to obtain funds from the Ocean Protection Council to acquisition our business as well as our companys vessel. Mr. Peter Nguyen, also present at this meeting, agreed as well to sell out the rights to the vessel he operates.

We kept in contact with Mr. Cook thoughout the months, and in January he told my husband that since we were so eager to close this sale there was the option of his company to purchase us out and then he would be reimbursed from the state. He needed a lot of information about our company and vessel before he could proceed with anything.

It took us time to get together the information which Mr. Cook requested. He needed seven (7) years of profit and loss statements of the business, tax returns (if available), and landings records of our vessels. In February I had finally gotten all of this together as well as our contributions and fishery involvement, panels with the Dept. of Fish & Game we volunteered to be on and other workshops and volunteer panels from scientiest, enviornmentalist and conservation groups. In addition, I included a restocking program which we had invested our company's interest and funds as well as founding this project. All of this privileged and confidential information was sent to Chuck Cook on April 13th per his request and statement that he could not proceed until receipt of this paperwork.

We allowed our fishers that landed their fish to our company and buyers notice of our company closure. Since notice of the closure within the timeframe given us from Mr. Cook, we have lost all but a handful of boats coming to land thier fish with our company. The loss of income didn't bother us until in April when, after receipt of all of our company records and that of our vessel, it was quick clear, after a phone conversation with him from our company and our attorney, that his intentions had changed as well as the timeline. He now stated the closing as *sometime* in 2006. We are outraged! We have waited to the last possible moment,but now are having to file Chapter 13 bankruptcy due to the timeframe being more than a little off scheduled. We are also upset over having allowed him the possession of confidential information.

Two years ago we considered selling our business and were told our companies worth to be $600,000. We are faced with selling out pieces of our company assets at a fraction of the value.

We are now trying to see how to go directly to the Ocean Protection Council in our efforts to leave the fishery quickly without losing all of our investment in the company. We had planned pay off our bills, including our home in Idaho, and start a new business there while we semi-

retired after the division to our investors. Our dreams of our future due to the investments within our company and its worth, have been devistatively crushed due to this involvement with Mr. Cook. I never would have thought at our age and value as fishery representatives that our investment in this company would crash and that we would have had to face bankruptcy. We felt a obligation to make our fishers aware of our intentions to allow the acquisition of our business so they could secure another buyer. We had thought the same respect would be given us.

Mr. Cook was not honest about the timeframe for closure. This is evident in recent discussions with him. He has indirectly, therefore, caused our collapse. I have taken this last effort in hopes something can be done to help us.

Sincerly,

Donna Solomon
Kurt Solomon

From: Johanna Thomas [mailto:jothomas@environmentaldefense.org]
Sent: Tuesday, May 31, 2005 11:26 AM
To: Brian Baird; Leah Akins; Tim Corrigan (tcorrigan@scc.ca.gov)
Subject: Proposal for funding the development of a Fisheries Revolving Loan Fund
Importance: High

<<Development of the Sustainable Fisheries Revolving Loan Fund.doc>>
We submit this proposal in the hope that it can be considered under the "pilot projects" section of the agenda at the June 10 meeting of the Ocean Protection Council.

Please contact Rod Fujita or Johanna Thomas at Environmental Defense (510) 658-8008 if you need additional information.

Thank you,

Johanna Thomas

Johanna Thomas
Deputy Program Director, Oceans Program
Environmental Defense
5655 College Ave, Suite 304
Oakland, CA 94618
(510) 658-8008

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Development of the California Sustainable Fisheries Revolving Loan Fund
Proposal to Environmental Defense
Total Project Cost: $164,400
May 26, 2005

We appreciate the opportunity to provide this proposal to Environmental Defense to develop the concept of a Fisheries Revolving Loan Program that would operate in California. We believe the process of establishing the fisheries revolving loan program needs to be as much about strategy, politics, and local understanding as the mechanics of how to build and operate a loan fund. Taking a fairly surgical, strategic approach, will initially require more time and patience but will ultimately result in a fund that has the ability to grow and have lasting impact. That said, the mechanics of the fund (marketing, operations, portfolio management, return expectations, risk tolerance, etc), need to be kept in mind throughout the process in order to stay grounded in reality.

We look forward to working as a partner with Environmental Defense in its capacity as manager of this project, and understand Environmental Defense's roles and responsibilities to be as follows:

1.) Provide overall project management, including fiscal responsibility and reporting
2.) Provide perspective and guidance on the program criteria and goals for recovery of California fisheries and related marine resources
3.) Contribute expertise on California fisheries and introduction to stakeholders
4.) Contribute policy expertise

The following are the proposed strategy, timelines, and description of activities and deliverables, and finally cost estimates for the job.

PROPOSED STRATEGY AND TIMELINE

Stage	Description	Product	Duration
Concept	Analysis of stakeholder interests, expectations, outcomes and opportunities for collaborations	Concept Paper	2 months
Planning	Governance, markets, products, operations, organizational items, outcomes, management, and financial performance	Business Plan	4 months
Capitalization	Grant and investment commitments to finance five year start up period	Offering Document	9-12 months

Implementation	Financial closings, staffing, marketing, operating systems, risk management systems, reporting protocols	Operating Entity	3-6 months

The following are costs and activities for carrying out this strategy in the given timeframes above. These costs do not include travel costs, which we would estimate at roughly an additional $10,000.

Stage One – Concept Paper (Cost: $7,000)

We would work closely with Environmental Defense to write the initial loan fund concept paper. The primary Enterprise staff involved would be Mike Dickerson, Deputy Director and John Berdes, Executive Director. We would also involve members of our Community Seafood Initiative team in an advisory role as needed. The scope of work would include:

- *Research and Analysis:* You provide us with any additional information we should be digesting that will bring us up to speed prior to starting rewrite. This includes reports and other relevant documents.
- *Interviews:* We would meet one-on-one with key constituencies and funders in order to gain a true understanding of competing expectations and opportunities for addressing multiple agendas through capital products.
- *Concept Development:* Will require some discussions between us. Most efficient is probably a face-to face meeting and carve out the bulk of a day to meet and brainstorm concept. You could either come to Ilwaco or we come to you.
- *Draft Document:* Rewrite concept paper based on results of interviews, research and discussions. Will include broad thinking of options, pros and cons of various options, and recommended next steps. You review and we refine as needed.
- *Presentation:* We would present final concept to you, Ocean Protection Council staff and council members, Resources Agency, Coastal Conservancy, and others at your discretion.

Stage Two – Business Planning ($70,000)

Activities would include:

- *Establish Initial Broad Objectives and Impacts:* Confirm the elements of the concept paper and make sure all involved parties in basic agreement.
- *Research, Reconnaissance, and Analysis:* Collect and analyze all available relevant information specific to California fisheries (effort, landings, value, markets, infrastructure, etc). Enter into discussions with key players (our initial thinking is this should be somewhat of a "stealth" process rather than a big, broad public process). Key players include: State and other relevant agencies; Ports and other relevant local agencies; Industry (advocacy groups, fisherman, processors, off-loaders, markets); Environmental groups and relevant science-based

institutions; and, other special interests. The purpose of these activities is to define *strategic* opportunities that inform the business planning process going forward.

- *Refine Objectives:* Upon completing reconnaissance, refine initial objectives and land on specific targets and desired impacts. Reconnect with key parties and get consensus for moving forward.
- *Model:* Develop model that will best meet objectives. Includes: Structure; Governance; Management; Operations: Products; Expected Portfolio Profile; and Risk Tolerance.
- *Financial Forecasts:* Develop financial projections for operating costs and portfolio performance.
- *Capitalization Strategy:* Develop an initial and long-term capitalization plan.
- *Implementation Plan and Timeline:* Develop the critical path for implementation and associated timeline.
- *Risk Analysis:* Perform a risk analysis on overall plan and develop appropriate mitigation strategies.

Stage Three – Capitalization ($50,000)

Based on the business plan, an "offering" would be developed for different kinds of capital necessary to implement the plan:

- Operating Subsidies: The business plan will forecast increasing levels of internally financed operations fueled by return on investment. Substantial amounts of "working capital" subsidy will be required to launch the effort and sustain it until scaled investment can provide returns to cover the cost of operations.
- Capital Grants: Public and private grants, unencumbered by severe "restrictions", will be necessary to fund the capital "footings" that attract leveraged dollars. In GAAP parlance, "unrestricted fund balance" (or "net worth") on the balance sheet will increase program income and rationalize non-grant investments.
- Top Tier Leverage: Fund scale will demand borrowings. The cost of these borrowings (positively influenced by mission and leverage ratios) will have a significant impact on the fund's ability to self-finance its operations over time. Top tier borrowings will be unsecured and general recourse.
- Subordinate Leverage: We believe it will be necessary to seek investments of a subordinate (or higher risk) nature from foundations and other concerned private parties.

Approach and timing will obviously be dependent on results of business plan. In a perfect world, we estimate you're looking at a minimum of nine months to get initial capital assembled to move forward with start-up. We would hope that some of this activity could actually occur during the business planning process.

Stage Four – Implementation (Estimated Cost: Unknown)

We would be available to aid the implementation team to translate our recommendations into action. The extent and nature of this work is too speculative at this point. It is also highly dependent on precisely who is doing the translation from plan to action. We recommend that once we complete Stages 1-3, we develop a complementary proposal for implementation. Suffice to say that our approach to this kind of work is all about making things real, not theoretical. The answers will not be words on paper, but instead deals on the street that are well crafted, well managed, and recovered per plan and agreement with the investee.

BUDGET SUMMARY

Stage	**Description**	**Cost**
One	Concept Paper	$7,000
Two	Business Planning	$70,000
Three	Capitalization	$50,000
Travel		$10,000
Project Management @20%		$27,400
TOTAL		**$164,400**

CONCLUSION

Please do not hesitate to contact us with any questions or if we can help with more details in this proposal. We applaud your efforts and stand ready to help in a capacity that makes sense to all.

The Ocean Conservancy

e
ENVIRONMENTAL DEFENSE
finding the ways that work

NRDC

COMMONWEAL
Ocean Policy Program

CALIFORNIA COASTKEEPER ALLIANCE

The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

June 1, 2005

California Ocean Protection Council
Sacramento, California 94248

Re: Agenda Item 6, June 10th OPC meeting

Dear Council Members:

For three decades, California has led the nation in developing and implementing innovative coast and ocean protection strategies. With the Ocean Protection Council meeting just two days after World Oceans Day, we urge you to establish a bold vision for California's management of its world-renowned ocean ecosystem.

At your meeting on June 10th, Council members will be asked to establish long-term goals and objectives for funding ocean projects in California. We encourage you to set visionary goals for California that maintain and build our lead in the areas of:

1. **Ecosystem-based Marine Life and Fisheries Management**
   - Support fishery and marine protected area management with sound science,
   - Support the transition of California fisheries and coastal communities to ecological and economic health.

2. **Water Quality Protection**
   - Coordinate and integrate coastal and nearshore water quality monitoring,
   - Reduce polluted runoff and stormwater discharges so that coastal waters meet standards for recreation, habitat and other designated uses,
   - Curtail the introduction of invasive species in nearshore waters.

3. **Integrated Ocean Observing**
   - Integrate information from California's many ocean observing programs, make this information internet-accessible, and apply the information to the state's ocean management priorities,
   - Complete seafloor mapping of high-priority areas in state waters for marine protected area design, water quality management, and addressing beach and coastal erosion.

We suggest the following as the kinds of criteria to apply in deciding which of the many worthwhile candidate projects to fund:

- Does the project contribute to California leadership in at least one of the three long-term objective areas?
- Will the project contribute significantly to an existing state mandate or program (for example, the Marine Life Management Act, the Marine Life Protection Act, water quality legislation, the Water Board-Coastal Commission's "Critical Coastal Area" project, SB 1573's program on invasive species, the Coastal Conservancy's Coastal Ocean Currents Monitoring Program)?
- Will the project benefit a substantial portion of the coast or percent of the state's population?
- Is this an important project that would be difficult to fund through other sources?

The attached memo contains the consensus recommendation of our six organizations on priority projects essential to maintain California's leadership on ocean policy and science and to implement 21st century ecosystem based management for California's ocean waters. We recognize that the Ocean Protection Council does not yet have the structure to consider these specific project recommendations at your June meeting. We believe that these projects would contribute greatly to California's oceans and address priority issues for the state.

We look forward to working with you to protect California's sensitive and spectacular marine habitats, wildlife and resources, with which our lives are intertwined.

Respectfully,

Warner Chabot,
The Ocean Conservancy

Rod Fujita,
Environmental Defense

Linda Sheehan,
California Coastkeeper Alliance

Kate Wing,
Natural Resources
Defense Council

Charles Cook,
The Nature Conservancy

Burr Heneman,
Commonweal

Attachment: Funding the Ocean – A Strategy for Success

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FUNDING THE OCEAN:
A STRATEGY FOR SUCCESS

California has long been a leader in ocean science, conservation, and management. The state should continue its leadership by improving and expanding ocean initiatives in the near term and to creating stable, long-term funding for the future. We offer these recommendations as a strategy for success. May 2, 2005

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NOW IS THE TIME FOR ACTION

California has become the leader in ocean policy, management, science, and governance in recent years. Today, the legacy of prior conservation laws and regulations is combining with new partnerships and emerging critical needs to create an exceptional opportunity for change.

- The state has begun to apply model policies to maintain or improve both the health of our coastal ecosystems and the economic viability and enjoyment of fisheries that depend on those systems.
- The state is continuing to improve coastal water quality for recreational us and for healthier marine life through its leadership on nonpoint source pollution, invasive species, and special protection for the most ecologically important parts of the coast.
- California is making the largest investment of any state in advanced science for understanding the complex patterns of coastal currents. Integrating that understanding with information from other sources will benefit the full range of the state's coastal ocean management concerns.
- California's new Ocean Protection Act and the high-level Ocean Protection Council it created will bring much-needed coordination and streamlining to the state's ocean resource management.
- Even in tough fiscal times the state is developing mechanisms, such as the Ocean Protection Trust Fund and the Fisheries Revolving Loan Fund, to maintain California's leadership in ocean management and create new models for the sustainable financing of ocean management and conservation.

THE PROJECTS

The economic and ecological importance of California's coastal ocean make it imperative that the state retain its leadership in ocean policy, management, and science. The needed policies are largely in place. Implementation of most of those policies through management measures and science programs is off to a strong start, but continued leadership will depend on maintaining our momentum. The following project priority list for the Ocean Protection Trust Fund is designed to maintain that leadership:

1. Ecosystem-based marine life and fisheries management

1A. Strong science to support fishery and marine protected area management.

Increase nearshore monitoring at the new Channel Islands marine protected areas and at high-priority sites within the Marine Life Protection Act central coast study area through the Cooperative Research and Assessment of Nearshore Ecosystems program (CRANE). CRANE, which is coordinated by the Department of Fish and Game, is a multi-agency and institution monitoring partnership to provide essential information for management of both fisheries and marine protected areas. Through the Coastal Conservancy's Coastal Ocean Observing System program (see below), establish a management system for data from CRANE monitoring and begin immediately to apply CRANE information to fishery and marine protected area management.

1B. Sustainable fisheries financing.

As authorized by the California Ocean Protection Act, create a fisheries revolving loan fund to foster sustainable fisheries and manage fishing capacity. A competitive process would provide loans to fishermen for projects that can demonstrate substantial economic and conservation benefits. Projects could include management reforms to increase efficiency of fishing operations within conservation guidelines; much-needed fleet capacity management; and value-added processing, marketing, and purchasing agreements. Loans would be repaid by the fishermen as fisheries are revitalized, allowing the fund to invest in new projects.

2. Coastal water quality/pollution

2A. Water quality monitoring.

Improve coordination and integration of existing coastal and nearshore water quality monitoring by dischargers, agencies and citizens in order to obtain more comprehensive information about the health of nearshore and ocean waters. COPA funds should be used to accelerate efforts at the State Water Board to integrate existing monitoring and to add new monitoring efforts where gaps are evident. This effort shall be coordinated with other marine ecosystem assessment efforts, such as the (see below), through the Coastal Conservancy's Coastal Ocean Observing System program.

2B. Nonpoint source pollution coordination.

Recent studies confirm that polluted runoff significantly harms nearshore marine ecosystems and the marine life that depends on them[1]. COPA funds should be used to implement a pilot project in the Central Coast Regional Water Quality Control Board's

[1] See http://newsservice.stanford.edu/news/2005/march16/gulf-030905.html

jurisdiction to coordinate efforts among federal, state and local agencies and citizens to control polluted runoff. Lack of coordination has significantly impeded progress towards addressing polluted runoff, which numerous agencies have at least some responsibilities to control. This region is ideal because it is coastal, is affected by a wide range of nonpoint pollution sources (timber, agriculture, septic systems, marinas/boating, urban runoff, etc.), and therefore would bring in a significant number of agencies. The area also includes the Marine Life Protection Act study area and is home to the California sea otter, significant mortalities of which have been traced to land-based pathogens in recent years. The Water Board-Coastal Commission's "Critical Coastal Area" project has identified pilot areas and projects along the Central Coast that are in need of funding, and should be the vehicle for moving this coordination effort forward[2].

2C. Invasive species control and prevention.
In a 2005 University of California study, researchers found that hundreds of non-native species inhabiting the country's coastal waters pose a newly emerging threat that brings aquatic ecosystems closer to an "invasional meltdown." The study, which focused on Bodega Bay, forged new ground by clearly showing indirect effects of invasive species in altering ecosystems, and the danger that poses as the number of invasive species in coastal regions increases. COPA funds should be used to complete and implement the plan for addressing aquatic species that was called for by SB 1573 (Karnette), with a focus on coastal areas at particular risk from direct or indirect impacts of invasive species.

3. Integrated coastal ocean observing systems

3A. Complete essential seafloor mapping.
Complete seafloor mapping of high-priority, nearshore state waters, which is needed for fisheries management, marine protected area design, and modeling very nearshore currents that affect beach water quality, sediment transport, and coastal erosion management. High priority areas include beaches with periodic closures related to water quality and the central coast Marine Life Protection Act study area.

3B. Initiate the Coastal Ocean Observing System program.
Initiate the Coastal Conservancy's Coastal Ocean Observing System program (CalCOOS) to ensure integration of information from many sources and application of that information to ocean management concerns. First priorities should be applying CRANE and Coastal Ocean Current Monitoring Program information to oil spill response, coastal water quality, marine protected areas, and fisheries management.

[2] See http://www.coastal.ca.gov/nps/cca-nps.html

BACKGROUND ON CALIFORNIA'S HISTORIC LEADERSHIP

California is increasingly recognized internationally as a leader in many aspects of ocean resource policy, management, and science, including:

1. Ecosystem-based and sustainable marine life and fisheries management
Under the pioneering Marine Life Management Act (1998) and Marine Life Protection Act (1999), California's standards for marine and fisheries management include recognition that fishing, non-consumptive ocean tourism and recreation, education, and science are all priorities for marine life management; allowing only sustainable fishing or other uses of marine life; precautionary fisheries management to reduce the risk of overfishing; and recognition that a system of marine protected areas is an essential tool for fulfilling all of these management objectives.

Implementation – Highlights of the implementation of these progressive policies include a model ecosystem-based fishery management plan for the nearshore fishery, one of the state's most important; designation of 12 marine protected areas totaling 163 square miles at the Channel Islands; initiation this year of a process to develop a system of marine protected areas for the rest of the California coast; and protection for ecologically important species, such as white sharks, the state's top ocean predator, and krill, an important source of food for many fish, whales, and marine birds.

Ecosystem-based science -- The state and several partners have initiated the model Cooperative Research and Assessment of Nearshore Ecosystems program (CRANE) to support ecosystem-based marine life management. Initiated at the Channel Islands, CRANE is intended to provide the ecosystem information for the entire coast needed for both fisheries management and marine protected area evaluation.

2. Coastal water quality and pollution

Non-point source pollution – California is the only state to mandate controls on agricultural and logging runoff, and the state has begun to develop and implement controls on runoff dischargers. Under the Schwarzenegger Administration, the state has assigned dozens of new staff to this critical problem and will be paying for those staff through fees on the dischargers, another first in the nation.

Marine invasive species from ballast water – California was the first state in the nation to mandate controls of ballast water discharges from vessels to protect against the economic and ecological impacts of new marine invasive species. California's law was quickly hailed as a model and adopted by neighboring Washington and Oregon, and is spurring the establishment of stronger controls at the federal level. Under the current Administration, the State Lands Commission has been working with neighboring states to develop consistent regulations on ballast water discharges from vessels traveling along the coast; these regulations are currently out for public review.

Pollution controls for high priority coastal areas – Under the Schwarzenegger Administration, California has taken the lead on ecosystem-based management by beginning to enforce in earnest the state's ban on pollution discharges into 34 of the state's most ecologically important areas in the nearshore environment (Areas of Special Biological Significance (ASBS). The Administration has also supported current efforts to identify "critical coastal areas" that drain to important marine ecosystems such as the 34 ASBSs, and to fund pilot programs to integrate land management in those coastal watersheds with the health of the downstream marine ecosystems.

3. Integrated coastal ocean observing systems

The US Commission on Ocean Policy and the Pew Oceans Commission both urged progress in integrated ocean observing systems (IOOS) that take advantage of both existing monitoring programs and new, cost-effective technologies. The state's many outstanding marine science programs have made California an IOOS leader since launching the California Cooperative Oceanic Fisheries Investigations (CalCOFI) over 50 years ago. We have many other statewide and regional examples of existing biological, physical, and chemical long-term monitoring systems that provide useful information, such as sea surface temperature, beach water quality, wave height, winds, ocean productivity, extent of kelp forest canopy, and annual juvenile rockfish production. Information is gathered from technologies as diverse as satellites, instrumented buoys, and visual surveys by scuba divers. The challenge for the 21st century is to integrate information from these and other observing systems and to ensure that the information is available in usable form for management agencies, industry, and the general public. California is making great progress in expanding the scope and effectiveness of its IOOS infrastructure with these new programs:

Surface current mapping – The Coastal Ocean Current Monitoring Program (COCMP) is the backbone of an eventual statewide integrated coastal ocean observing system designed to fit into a national system. This administration has put more funding into IOOS through COCMP than any state and more into surface current monitoring than the federal government. Coastal current monitoring will eventually be useful for a wide range of state ocean management concerns, including beach water quality, coastal processes such as beach erosion, fisheries management, evaluation and design of marine protected areas, oil spill response, safety for recreational boaters, efficiency of maritime shipping operations, Coast Guard search and rescue, and others.

Tracking nearshore ecosystem health – The Cooperative Research and Assessment of Nearshore Ecosystems program (CRANE) will become the source of basic ecological information to support both fisheries and marine protected area management in the nearshore. Begun at the Channel Islands, CRANE is a partnership between the Department of Fish and Game and University of California, California State University, and other marine scientists.

Making existing information more useful – California Coastal Ocean Observing System (CalCOOS) embodies the state's interests in coordination, funding, data management, and useful applications in regard to the many long-term coastwide or regional observing programs that are useful for management agencies, industry, or the general public.

CalCOOS will be the key for achieving broad, coast and ocean ecosystem-based management by supporting marine life and fisheries management, beach water quality monitoring, coastal erosion studies, oil spill response, marine aquaculture, and other concerns. This administration has charged the State Coastal Conservancy with designing and implementing CalCOOS. The initial high priorities for CalCOOS are to help ensure that information from CRANE and COCMP are accessible and useful.

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June 3, 2005

TO: California Ocean Protection Council

FROM: Peter Douglas, Executive Director

RE: Project for Permanent Funding of Coast and Ocean Conservation

INTRODUCTION/BACKGROUND

The single most important thing California can do to ensure effective, long-term conservation of its coast and ocean resources is to identify, establish and activate a permanent, reliable, and adequate funding program to support implementation of the Marine Life Protection Act, Marine Life Management Act, the California Coastal Act, and the McAteer-Petris and Suisan Marsh Preservation Acts. Legislation introduced this year by Senator Joe Simitian (SB 956), is intended to create such a program by imposition of a per night, per room tax on overnight visitor serving accommodations in the 20 coastal counties of the State. The bill was recently heard and held in the Senate Natural Resources Committee on the understanding the author would do more work to develop a funding approach that has broader support, that can be effectively and efficiently implemented, and that includes a public-private partnership with the California hospitality industry (if the room tax is the ultimate source of funding).

PROPOSAL

Our request is that the Council direct staff to develop a specific project proposal to retain an experienced consultant to design a specific funding program that would result in a permanent source of adequate funding to carry out the coastal and ocean resource protection provisions set forth in the MLPA, MLMA, the California Coastal Act, and the McAteer-Petris and Suisun Marsh Preservation Acts. An RFP for such a project should include the following elements:

1. Description of experience and a demonstrated record of successful innovation in identifying and promoting long-term funding for public interest programs.

2. Require inclusion of a design for a public-private partnership for the funding program that relies on incentives as well as requirements for participation. For example, if a hotel room tax is utilized, design a program that includes incentives for voluntary participation such as tax incentives, promotional benefits for the participating partners, marketing elements, etc., as well as mandatory provisions to ensure equitable participation.

3. Provide background on similar funding programs, if any, in other states or countries that could be looked to as examples of what works.

4. Design the mechanism for the administration of the program such as revenue collection and distribution.

5. Identify a public education initiative that can be used to provide information to the public and those who would be making contributions into the coastal and ocean resource protection fund about the uses to which the fund will be put and the coast and ocean conservation benefits that will accrue to current and future generations as a result of the fund.

6. Identify incentives to stakeholder groups that could result in their support or neutrality relative to the establishment of the funding program.

The work product of this project would be submitted to the Council for consideration and possible recommendation to the Administration and the Legislature. Project suggestions and recommendations could be used in considering enactment of legislation to establish the permanent funding program. The audience for the work product promulgated by the consultant would include the Council, the Administration, the Legislature, state agencies, stakeholders, the general public, and the media.

CONCLUSION

The anticipated results of this undertaking would be the preparation of a specific, realistic and politically viable program proposal, in the form of a project report, for a permanent funding source to support the previously identified coastal and ocean programs. The report would serve as a frame of reference for implementation by the Legislature and the Administration.