Southern California Coastal Ocean Observing System (SCCOOS)

Integrated Ocean Observing System Implementation: Southern California Regional Coastal Ocean Observing System

Submitted in response to Federal Funding Opportunity:
FY2010 Integrated Ocean Observing System Implementation
CFDA 11.473, Coastal Services Center, NOAA
Funding Type: Cooperative Agreement
Funding Requested: $2,519,206
NOAA Partner NMFS/SWFSC: $90,000
July 1, 2010 – June 30, 2011

Eric Terrill, Principal Investigator
SCCOOS Technical Director
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive, Mail Code 0213
La Jolla, CA 92093-0213
(858) 822-3101
eterrill@ucsd.edu

Julie Thomas, Co-Investigator
SCCOOS Executive Director
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive, Mail Code 0214
La Jolla, CA 92093-0214
(858) 534-3034
jot@cdip.ucsd.edu

Anne Footer, Financial Representative
Marine Physical Laboratory (MPL) and
Joint Institute for Marine Observations (JIMO)
Scripps Institution of Oceanography
University of California, San Diego
291 Rosecrans Street
San Diego, CA 92106
(858) 534-1802
afooter@ucsd.edu

TABLE OF CONTENTS

I. PROJECT SUMMARY ii

II. INTRODUCTION 1

III. ECOSYSTEMS AND CLIMATE TRENDS 2

- A. Goal and Objectives 2
- B. Background 2
- C. Audience 3
- D. Approach 3
- E. Benefits 6

IV. WATER QUALITY 6

- A. Goal and Objectives 6
- B. Background 6
- C. Audience 7
- D. Approach 8
- E. Benefits 10

V. MARINE OPERATIONS 10

- A. Goal and Objectives 10
- B. Background 11
- C. Audience 12
- D. Approach 13
- E. Benefits 13

VI. COASTAL HAZARDS 14

- A. Goal and Objectives 14
- B. Background 14
- C. Audience 15
- D. Approach 15
- E. Benefits 16

VII. DATA MANAGEMENT 17

VIII. CONCLUSION 17

IX. MILESTONE SCHEDULE 18

X. PROJECT BUDGET 19

XI. PROJECT BUDGET NARRATIVE 20

XII. APPENDIX

- A. Detailed Budgets
- B. Budget Narratives
- C. Reduced Budget
- D. References
- E. Resumes
- F. National Environmental Policy Act (NEPA)
- G. Letters of Support
- H. SCCOOS Observations Map

I. PROJECT SUMMARY

Project Title: Integrated Ocean Observing System Implementation:
Southern California Coastal Ocean Observing System (SCCOOS)

Principal Investigator: Eric Terrill, Principal Investigator, SCCOOS Technical Director

Primary Contact: Julie Thomas, Co-Investigator, SCCOOS Executive Director
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive, Mail Code 0214
La Jolla, CA 92093
Phone: 858-534-3034; Fax: 858-455-5575; Email: jot@cdip.ucsd.edu

Recipient Institution: Regents of the University of California
Scripps Institution of Oceanography (SIO)
Funding Type: Cooperative Agreement

Proposal Partners: California Polytechnic State University, San Luis Obispo
Scripps Institution of Oceanography (SIO)
University of California, Los Angeles (UCLA)
University of California, Santa Barbara (UCSB)
University of Southern California (USC)

Other Partners:

California Coastal Commission
California Coastal Conservancy
California Cooperative Oceanic Fisheries Investigation (CalCOFI)
California Current Ecosystem Long Term Ecological Reserve (LTER)
California Department of Fish and Game
California Oil Spill Prevention and Response (OSPR)
City of Los Angeles Environmental Monitoring Division
City of Los Angeles Wastewater District
City of San Diego Wastewater District
County Health Agencies (Santa Barbara, Ventura, Los Angeles, Long Beach, Orange and San Diego)
Jet Propulsion Laboratory (JPL)
Los Angeles County Sanitation District
Marine Exchange of Southern California
Naval Air Systems Command (NAVAIR)
NOAA Southwest Fisheries Science Center
NOAA HAZMAT
NOAA National Weather Service (NWS)
The Ocean Institute
Orange County Sanitation District
Sea Grant
Southern California Coastal Water Research Project (SCCWRP)
U.S. Army Corps of Engineers (USACE)
U.S. Coast Guard (USCG)
U.S. Environmental Protection Agency
U.S. Geological Survey (USGS)
U.S. Navy
U.S. Minerals Management Service
University of California, Irvine
Ventura County Wastewater District

As the regional ocean observing system for Southern California, the principal goal of SCCOOS is to work interactively with a diverse audience to provide observations and products that advance our understanding and management of the coastal environment. The delivery of timely informational products, summarizing relevant observations of the coastal ocean, is needed for effective management of ocean resources. As a sustainable ocean observing system, SCCOOS has developed the capabilities to support short-term decision-making and long-term assessment by leveraging unique, long-term biological and physical observations.

SCCOOS has aligned its organizational priorities and objectives with the four focus areas designated by the National Federation of Regional Associations:

Ecosystems and Climate Trends: To monitor climate trends and effects on the Southern California Bight by collecting physical, chemical and biological time series.

Water Quality Management: To provide tracking and prediction tools for water quality caused by harmful algal blooms, outfall and stormwater plumes and surfzone contaminants.

Marine Operations: To advance integrated, customized products that are critical for safe and efficient navigation, search and rescue and oil spill response.

Coastal Hazards: To promote safe recreational use of beaches and provide warnings of wave and tide-induced coastal inundation.

By addressing issues within these focus areas, SCCOOS also provides a foundation for Marine Spatial Planning in Southern California at many levels of its development. SCCOOS works interactively with local, state and federal agencies, resource managers, industry, policy makers, educators, scientists, non-governmental organizations and the general public. As a result, data and informational products are made available in a variety of formats to ensure that they are easily interpretable and understood by different users, while preserving the necessary depth of detail to support the scientific and educational communities. SCCOOS also works closely with the Central and Northern California Ocean Observing System on statewide collaborations. The recently formed Joint Strategic Advisory Committee (JSAC) includes representatives from across the state to create a unified and coordinated approach to ocean observing in California.

II. INTRODUCTION

In FY2004, SCCOOS initiated the development of a regional ocean observing system in Southern California, a region that is unique and important for several reasons. Southern California has a population of 24 million people, representing 25% of the coastal population of the United States. With 175 million beach users spending more than $1.5 billion annually on tourism in the region, clean beaches and coastal waters are integral to the economy, public health and the environment.

Southern California has 21 Publicly Owned Treatment Works (POTWs) that discharge more than 1.2 billion gallons ($4.6 \cdot 10^6$ m^3/day) of treated sewage every day directly into the coastal ocean. The Southern California Bight is also used heavily for military operations and commercial transportation. The Los Angeles/Long Beach port complex accounts for approximately 45% of all container traffic in the U.S. Southern California's high coastal population density raises concerns about how human activities directly affect the coastal ocean environment already impacted by climate change, and how climate change, in turn, affects the economy and increases the risk of coastal hazards.

SCCOOS is working to meet the challenge of informing effective management of the coastal ocean through accurate and comprehensive observations, and the delivery of that data through useful decision-making tools and products. Heightened interest in Marine Spatial Planning by federal and state governments–including California's unique effort to develop a Marine Protected Area (MPA) network–accentuates the importance of these tools in managing human use of a variable environment. As demonstrated in the following focus areas, SCCOOS observations and products represent multi-disciplinary and collaborative efforts that specifically address the needs of the region, the state and the national Integrated Ocean Observing System (IOOS).

III. ECOSYSTEMS AND CLIMATE TRENDS

A. Goal and Objectives

The overarching goal of the SCCOOS Ecosystems and Climate Trends component is to monitor climate trends and effects on the Southern California Bight (SCB) through the ongoing collection of physical, chemical and biological variables. Specific objectives are to:

- Sustain observations of currents, temperature, salinity, phytoplankton and zooplankton throughout the SCB through ongoing operations of an array of glider transects, the SCCOOS high frequency (HF) radar array and automated pier stations.
- Begin observations of dissolved oxygen on glider transects to quantify trends in upwelling induced hypoxia.
- Continue offshore and nearshore ecosystem observations via the California Cooperative Fisheries Investigation (CalCOFI) and maintenance of data from discharger oceanographic stations and the west-coast wide manual shore station program that began in 1916.
- Work with users to cooperatively develop and refine indices relevant to ecosystem and fisheries management and coastal planning. Conduct re-analysis using regional ocean models to assess suitability for future climate-relevant products.

B. Background

The California Current System (CCS) off Southern California consists of the southward flowing, surface intensified California Current, northward flowing Southern California Counter Current, and the northward flowing, subsurface California Undercurrent. Thus, waters from both the north and the south affect the SCB and the resulting mixture of waters has striking effects. The SCB is profoundly influenced by El Niño (Lynn and Bograd, 2002) with southern influences arriving by advection, coastally trapped waves and atmospheric teleconnection. With a moderate to strong El Niño predicted for 2009-2010, there is a possibility that the SCB will see significant changes. For example, previous studies have shown that the most powerful El Niños are characterized by an advective component which

brings distinctly southern water and species into the SCB (Lynn et al., 1998). The physical features of the SCB make it a remarkably productive area of the world's oceans. The flow structures in the SCB are thought to influence retention of organisms, while the vertical fluxes at meso and submesoscales provide nutrients to the euphotic zone. Seasonal upwelling also causes the intrusion of low-oxygen waters onto the shelf, a phenomenon that is becoming more intense, for example off Oregon (Chan et al., 2008).

Southern California is fortunate to have the 60-year CalCOFI with its unique sustained ship surveys. The National Science Foundation-funded California Current Ecosystem Long Term Ecological Research (LTER) programs and the Partnership for Interdisciplinary Studies of Coastal Oceans (PISCO) are focused on the regional effects of climate changes. This combination of efforts gives the SCB an established baseline for further changes and makes the region an ideal site for further development of observational systems. Ongoing observations, including gliders and HF radar, are coordinated with Central and Northern Ocean Observing System (CeNCOOS). Discussions are also underway with the Pacific Coast Ocean Observing System (PaCOOS) concerning future collaborative projects.

C. Audience

Managers responsible for long-range planning and members of the general public concerned about climate change are potential users of the data and indices. Specific users include the NOAA National Marine Fisheries Service, NOAA Southwest Fisheries Science Center (SWFSC), U.S. Environmental Protection Agency, U.S. Geological Survey, U.S. Minerals Management Service, California Department of Fish and Game, Multi-Agency Rocky Intertidal Network (MARINe), non-profit organizations, marine mammal stranding networks, commercial fishermen and the general public.

D. Approach

SCCOOS is focused on the sustained collection of data to provide a reliable climate record. Analyses of these data are intended to produce indices as assessments for ocean and ecosystem health. State-of-the-art models will assimilate these data to produce predictions of ocean state. Underwater gliders are to be used in a network in the SCB. Bight-wide monitoring is accomplished on a series of lines, with a

round-trip section completed once every two to three weeks. Data are transmitted by satellite from each glider dive and posted on a public web site within minutes of collection. Further quality control is performed both automatically and by trained operators. Subsequently, plots of archived data are available on the SCCOOS web site. Experience to date suggests that the procedures are sound, with no major obstacles to continued success. The addition of dissolved oxygen sensors will expand the suite of observed variables relevant to ecosystem health.

SCCOOS proposes to continue the operations and maintenance of the HF radar array composed of twenty-five short and medium range systems and six long range systems. The array provides seamless coverage along the SCB and interfaces with the CeNCOOS and Northwest Association of Networked Ocean Observing Systems (NANOOS) array, covering the entire west coast. Data from the network are broadcast to the National Data Buoy Center (NDBC) using the NOAA IOOS sponsored National Network. SCCOOS proposes to begin the synthesis of time records for purposes of generating indices for climate and ecosystem relevance.

The long-term collection of water properties at shore stations document climate change at the focal points of human use along the coast. Nineteen historical shore stations, consisting of daily temperature and salinity measurements, are maintained on the west coast through a partnership with the California Department of Boating and Waterways (CDBW). Historical analysis of the data has also been used by the California State Water Board to assess climate-scale natural variability of coastal salinity values for analyzing potential impacts of brine discharges from planned desalination plants. It is expected that maintenance of these long term time records will provide data to develop future climate change indices for local MPAs.

The combination of observations will be used to generate maps of seasonal and annual trends of eddy statistics, mean flow fields, and to estimate the connectivity between biologically important regions using trajectories. Maps of these fields have been identified as priorities by NOAA SWFSC biologists examining egg and larvae trends that are used for catch analyses. Estimating biological

connectivity will be critical to this and other Marine Spatial Planning efforts, such as MPA management and assessment.

A goal of the coming year is to develop physical indices relevant to the Pacific sardine (*Sardinops sagax*) and market squid (*Loligo opalescens*) fisheries. The sardine fishery is one of the few that uses a physical index in the determination of harvest guidelines. This physical index, the three-year average SIO pier temperature, is a proxy for physical conditions further offshore that profoundly affect sardine health. Market squid embodies the "grow fast and die young" strategy of loliginid cephalopods and is strongly influenced by environmental variability. This is evidenced by the crash observed in the market squid fishery in El Niño years. Therefore, market squid recruitment is quite likely to be amenable to prediction using physical indices.

SCCOOS will continue to expand the utility of CalCOFI by extending the quarterly sampling cruises to add an alongshore transect near the coast. Along the transect, nine conductivity, temperature, depth (CTD) casts and net tows for zooplankton biomass and the collection of fish and invertebrate larvae are conducted and underway measurements of temperature, salinity, irradiance and fluorescence while the vessel is underway. These data records, now in their fourth year of collection, provide an indication of coastal biological productivity as compared to the offshore (CalCOFI samples offshore to 300 nautical miles) and provide a mechanism to understand how coastal waters change.

Long-term changes in marine ecosystems can be indexed by fluctuations in the life history, abundance or demography of top predators, such as marine birds and mammals. In the CCS, changes in seabird and mammal breeding success, diet and foraging behavior, and abundance have all been shown to be sensitive indicators of ecosystem and food web change, with some responses related to climate change (Sydeman et al. 2001, 2006, 2009). In partnership with the Farallon Institute for Advanced Ecosystem Research, SCCOOS will continue a 22-year record of seabird and marine mammal observations conducted in conjunction with the CalCOFI program. Seabird observations will contribute to scientific and public appreciation of the SCCOOS program.

E. Benefits

Reliable ocean data are essential as society grapples with a response to climate change, both natural and anthropogenic, and as regional governments develop frameworks for Marine Spatial Planning. The central role of SCCOOS is to provide these data as well as improved or new informational products derived from ocean observations. For example, reliable physical indices may be used to set harvesting guidelines, and the documented effects of El Niño will be used by planners throughout Southern California. As model predictability improves, enhanced understanding of advective effects on the ecosystem will aid coastal management, including MPA assessments.

IV. WATER QUALITY

A. Goal and Objectives

The SCCOOS Water Quality component addresses three areas affecting water quality in Southern California: harmful algal blooms (HABs), outfall and stormwater plumes, and surfzone contaminant transport. Specific objectives are to:

- Deliver timely data and informational products describing the occurrence and extent of HABs throughout coastal waters of the SCB using gliders, other autonomous underwater vehicles (AUV) and pier-based observations.
- Develop data products and tools to observe and forecast dispersion of outfall and stormwater plumes using observations and modeling.
- Develop a surfzone contaminant trajectory tool, based on an existing IOOS-funded wave observation-driven surfzone model to help locate point sources of unhealthy water and assist in the real-time response to beach contamination events.

B. Background

Maintaining good water quality is essential for the health of the large coastal population and regional economy in Southern California. Year-round coastal water uses include shipping, recreational boating, swimming, surfing, diving, fishing, aquaculture, military activity and wastewater discharge. These increasing and sometimes conflicting human uses have sparked an interest in Marine Spatial Planning

management efforts in state and federal government. A challenge to maintaining water quality in Southern California is the daily discharge over 1.2 billion gallons of treated sewage directly into the ocean along with additional inputs from river systems that carry treated sewage, untreated stormwater, agricultural runoff, and nuisance urban dry-weather runoff. These discharges contribute bacterial and viral contamination and may influence HAB development. Human uses of the ocean also affect marine ecosystem health including fisheries, marine mammals, and aesthetic values. Delivering timely synthetic data products summarizing critical observations of the coastal ocean off Southern California is imperative for effective management of ocean resources, for mitigating effects of human activities, and for assessing management effectiveness.

The SCCOOS HAB effort complements a state-wide HAB alert network system for researchers, decisions makers, and the general public. This effort was initiated by NOAA, the California Ocean Science Trust (CalOST), and SCCWRP. SCCOOS will partner with CeNCOOS to extend the collaborative HAB network state-wide, ideally incorporating additional regional associations as the network develops and matures.

C. Audience

SCCOOS works directly with various agencies and regulators to provide products that are useful for management and policy affecting the coastal ocean. SCCOOS is working with the California State Water Quality Control Board to develop trajectory maps between coastal nonpoint discharges and Areas of Special Biological Significance (ASBS) and to develop new technology and standards for coastal ocean monitoring by POTWs. The SCCOOS HAB component provides early warning of HAB events to the California Department of Public Health, to marine mammal and bird rescue centers, and to regional agencies. SCCOOS is working directly with local POTW monitoring groups (especially the Orange County Sanitation District) to complement their regional monitoring and provide far-field effluent plume mapping. SCCOOS collaborates directly with the Southern California Coastal Water Research Project (SCCWRP) in the planning, design, and execution of their 5-year regional studies. The water quality

component of this effort focused on harmful algal blooms and nutrient fluxes and incorporates both observational and modeling components of SCCOOS.

D. Approach

Harmful Algal Blooms: The SCCOOS HAB monitoring program, initiated in the summer of 2008, consists of five pier-monitoring sites posting real-time temperature, salinity, water level, and chlorophyll fluorescence data. The pier sites provide indications of fresh water input, upwelling and algae blooms. Weekly bottle samples measure chlorophyll, nutrients, domoic acid and harmful algal species. Data are immediately enumerated, posted to the SCCOOS web site and distributed regionally and nationally via the California HAB Monitoring and Alert Program Listserv. When HABs are detected, opportunistic sampling is performed at additional shore sites and from boats to determine their extent and severity.

Gliders will map the offshore and subsurface evolution of HABs based on chlorophyll fluorescence. This approach proved effective during the spring of 2009 when glider mapping detected an offshore chlorophyll maximum and domoic acid-producing *Psuedo-nitzschia* bloom. Barnacles growing on the glider during its deployment proved excellent bio-accumulators of domoic acid and are now routinely bio-assayed.

Outfall and stormwater plumes: The approach to understanding the environmental effects of outfall and stormwater plumes will use gliders, HF radar, automated pier stations, agency moored and shipboard observations, plume models (EPA Roberts, Snyder and Baumgartner [RSB] model) and high resolution Regional Ocean Modeling System (ROMS). The observations and ROMS have sufficient spatial resolution to resolve outfall plume distributions (Cetinic et al., 2009; Petrenko et al., 1997; Todd et al., 2009). Models will be initialized and tested with glider-derived maps of currents, stratification, temperature, salinity, colored dissolved organic matter (CDOM), chlorophyll and turbidity obtained during a major field experiment at Huntington Beach, CA in 2006 (HB06). Ultimately, gliders will provide the real-time data essential for the outfall plume models and ROMS will predict plume transport and dispersion. The POTWs who discharge into Southern California have identified these nowcasts and

forecasts of plume location as important data products. These partners include the Orange County Sanitation District, the City of Los Angeles and the City of San Diego. Toward this end, SCCOOS has gained valuable experience in running a version of ROMS in real time at 2 km resolution to make predictions regularly posted online and publicly accessible. Validation of the ROMS output against non-assimilated observational records (e.g. moored ADCP and temperature data) is underway to provide guidance for developing future products for the water quality community.

SCCOOS will continue to track river and stormwater plumes using near real-time simulated particle trajectories derived from HF radar observations of surface currents. Stormwater trajectories and plume trajectories will be combined with agency bacterial data to test simulations of shoreline contamination. In collaboration with the County of San Diego Department of Environmental Health and the Imperial Beach marine safety office, this approach was successfully employed recently for the Tijuana River and two outfalls by SCCOOS investigators (Kim et al., 2009). The approach will be extended to other river sites in Southern California for evaluation purposes.

Surfzone Contaminant Transport: Bacterial contamination of beaches through surface surfzone transport processes is a great concern for public health, stormwater management, and regulatory agencies in Southern California. A wave-driven surfzone current prediction system developed by the Coastal Data Information Program (CDIP), a SCCOOS partner, provides real-time estimates of the current direction and mean speed at multiple points along the major beaches in Southern California. This system will be incorporated into a real-time surfzone contaminant trajectory tool to estimate the alongshore extent of water discharged into the surfzone from land sources, or entrained into the surfzone from offshore effluent plumes. These surfzone trajectories will be coupled with the HF radar data outside the surfzone for monitoring storm drain and river discharges. The long-term goal is to combine the proposed surfzone trajectory model with surfzone mixing and bacterial sunlight decay models to make quantitative predictions of contaminant concentrations.

E. Benefits

The HAB component will provide several products beneficial to coastal managers, public health officials and regulators to prepare and respond to bloom events: 1) Real-time detection of the presence of potentially toxic HAB species; 2) future development of forecast models to predict the formation and evolution of blooms; and 3) initiation of a HAB climatology to use in future forecasting of toxic HAB events.

The outfall and stormwater component will provide trajectory data products for estimating the transport of surface discharges such as river runoff. It will also produce data products based on sub-surface observations and high resolution modeling to describe sub-surface movement of outfall plumes. The surfzone component produces a contaminant trajectory tool for use with routine beach water quality monitoring data to assist managers and public health agencies in identifying persistent point sources of unhealthy water. This tool will be used in real-time during spill events to predict which up- or downcoast beaches will likely suffer the greatest impact.

V. MARINE OPERATIONS

A. Goal and Objectives

The goal of the SCCOOS Marine Operations component is to continue to advance previously IOOS-funded and newly proposed projects that are critical for safe and efficient navigation, search and rescue (SAR) and oil spill response. Specific objectives are to:

- Develop and expand integrated, customized products that involve multi-layer views of the observations and nowcast and forecast models including winds, waves and currents, sea surface temperature, bathymetry and navigation charts.
- Deliver ocean current data and surface wind analyses to aid oil spill and Search and Rescue (SAR) real-time recovery and post-analysis trajectories. In collaboration with the Oxnard National Weather Service (NWS), continue to expand the on-demand capability to provide risk assessment in a given area/region and impact assessment following an incident.

- In collaboration with the U.S. Navy at Point Mugu, continue to expand the near real-time, customized wave display with additional parameters such as currents and winds.
- Communicate glider data to the Naval Oceanographic Office for assimilation into the Navy Coastal Model (NCOM), which is published for public distribution by NOAA National Centers for Environmental Protection (NCEP).

B. Background

Maritime transportation plays a major role in Southern California's economy and national defense system. Los Angeles and Long Beach combined comprise the largest port in the U.S. and the fifth largest port in the world; the Port of San Diego includes the largest naval fleet in the world. Port Hueneme is the only deep water port between Los Angeles and San Francisco and the only Navy controlled port between San Diego and the Puget Sound. The Santa Barbara Channel and San Pedro shelf are the locations of several active oil fields with sustained reserves, as well as major shipping channels.

The unique challenge for marine operations in Southern California is to assure that the vast amount of maritime traffic is provided with the highest quality ocean observations and models to assure safe and efficient transit as well as effective event response. SCCOOS has addressed this challenge with the development of a customized Ports and Harbors interactive online display and by further expanding the Google-based observation maps for the entire Southern California region. These maps are consistent with the approach of Marine Spatial Planning as they provide integrated, map-based tools for coastal management. Two programs that are leveraged heavily are the California Ocean Current Monitoring Program (COCMP), funded by the California Coastal Conservancy, and CDIP, cooperatively funded by the CDBW and the U.S. Army Corps of Engineers (USACE). COCMP is the State's contribution to the HF radar system and CDIP maintains a network of offshore wave buoys.

SCCOOS works collaboratively with State and federal partners to integrate and distribute data relevant to marine operations. The U.S. Navy provides the Coupled Ocean/Atmosphere Mesocale

Predictions (COAMPS) from the Marine Meteorology Division of the Naval Research Laboratory. SCCOOS wave and currents data are ingested into the NOAA National Weather Service/National Data Buoy Center for dissemination. A memorandum of understanding between NOAA and USACE will allow SCCOOS/CDIP wave data to be displayed on the NOAA PORTS site. This will serve as a template for further IOOS data integration and displays. The National Aeronautics and Space Administration (NASA) provides MODIS (Moderate Resolution Imaging Spectroradiometer) sea surface temperature to SCCOOS.

In collaboration with CeNCOOS, SCCOOS contributes to regional coordination by participating in maritime transportation meetings throughout the State where there is interest in employing the web template from the Los Angeles/Long Beach site. These two regions also work closely on HF radar and wave buoy maintenance. At the national IOOS level, SCCOOS has presented to the Hydrographic Survey Research Panel and NOAA Science Advisory panel on maritime transportation. Both of these events reinforce the visibility and recognition that SCCOOS is receiving for its marine operation products. SCCOOS has also played a key role in writing both the IOOS National Wave Plan and the IOOS National HF Radar Plan.

C. Audience

Representative stakeholders and users include: Catalina Express Ferry (one million passengers from San Pedro to Catalina since year 2000), Commercial Cargo Vessels, Commercial Fishermen, Harbor Pilots (San Diego, Los Angeles, Long Beach and Port Hueneme), Marine Exchange of Southern California, NWS, NOAA HAZMAT, California Office of Oil Spill Prevention Response (OSPR), USCG, U.S. Navy, Passenger Cruise Ships, recreational beachgoers and boaters. All of these stakeholders are interested in both real-time and forecast customized data which complement their decision-support tools. The audience includes users of different levels of sophistication and technical knowledge. Web-training sessions are scheduled for interested stakeholders such as the USCG.

D. Approach

The previously IOOS-funded infrastructure and methodology used to collect, analyze and disseminate observations in near real-time will continue development. Customized, integrated products include expanding the seamless geo-referenced user tools to all regions within Southern California. Discussions with stakeholders throughout Southern California aid in determining the customization of the site. One example is the USCG recent request for on-demand location referencing within the customized Google maps enabling users to enter specific latitude/longitude for tracking small vessel operations.

An ocean current data and surface wind analyses product will be created for estimating trajectories of floating objects in the coastal ocean including people, debris, and drifting boats. In collaboration with the NWS office, the effects of windage on trajectories using surface wind products will be incorporated. This product will complement the Water Quality discharge task. As requested by the Navy, winds and surface currents will be integrated with the existing operational wave observations/models. As glider data are now being delivered to NCOM, this partnership between SCCOOS, the Navy, and NOAA NCEP will allow SCCOOS to generate and distribute model-based products from the operational model for maritime operations.

E. Benefits

SCCOOS will continue to provide unique customized products that will be readily and routinely available to the maritime community and will inform Marine Spatial Planning efforts. NOAA HAZMAT benefits from real-time surface current measurements integrated in General NOAA Operational Modeling Environment (GNOME) for trajectory analysis. Surface Current data are made available to OSPR in a netCDF/shape file format, a capability that has been tested in both drills and in real spills. Automated messages are sent to the Long Beach harbor pilots during energetic, long period wave events (over 1 meter and 12 seconds). The threshold warning for these long period events is critical to the pilots' operations as the deep draft vessels will start pitching and will lack the under keel clearance

necessary for entering the harbor. The cost estimate is between $100,000-$200,000 per day to retain a vessel offshore. The customization and integration of near real-time products aid decision-making capabilities for the Coast Guard, emergency responders and the general public at large.

VI. COASTAL HAZARDS

A. Goal and Objectives

The goal of the Coastal Hazards component is to decrease the loss of property and life associated with nearshore waves and wave-driven currents in the populous coastal communities of Southern California. Building upon previously SCCOOS funded projects, the specific objective is to:

- Develop and expand integrated, customized products that promote *safe recreational use of beaches* and provide warnings of *wave and tide-induced coastal inundation.*

B. Background

Several Southern California beachgoers drown each year and rescues are common. In 2007, Newport Beach recorded 3865 rescues and during the August 20, 2009 weekend south swell event, there were over 90 rescues on San Diego County beaches. Presently, lifeguards have extensive local knowledge, but are not provided with the best available wave and surfzone currents information in a format tailored to their needs.

Coastal inundation on the U.S. west coast is often caused by the co-occurrence of high tides and energetic ocean waves. The large waves cause both a super-elevation of the mean water level above the tide level and large oscillations about that level. The California Coastal Sediment Management Workgroup report indicates that several beaches and structures are vulnerable to dangerous high surf and coastal flooding conditions (California Beach Restoration Survey 2008) during storms where wave uprushes can reach several meters above tide level. Simple inundation models, where the uprush limit depends only on the tide level and wave height, yield qualitative, general information but not the information most valuable for issuing site specific warnings for highway closures and sand-bagging.

Synergies have developed between the U.S. Geological Services Coastal Hazards Project, the

USACE, CDBW, Coastal Sediment Management Working Group and the American/California Shore and Beach Preservation Association. In 2008, SCCOOS also co-authored the San Diego Foundation Regional Focus 2050 Study, sponsored by the California Energy Commission. The inundation infrastructure served as a basis for the sea level rise projections for year 2050. SCCOOS will partner with the San Diego NWS on their Storm Surge Study. SCCOOS will supply wave and current input to their model and collaborate on model validation. In collaboration with CeNCOOS, the inundation dissemination infrastructure currently developed is transmitting warnings to the Monterey NWS for Central California, Carmel Lagoon. SCCOOS also participates in the IOOS funded inundation discussions which address on-going technical issues.

C. Audience

The audience includes lifeguards, NWS and the Emergency Alert Network, recreational beachgoers, USACE, California Department of Transportation and California Coastal Commission as well as regional city and county governments. Partnership has been established with the City of Encinitas and City of San Diego who will contribute observational validation of the inundation notifications. These users require real-time products indicating coastal conditions. Future web training is scheduled with the lifeguards and emergency managers.

D. Approach

Working co-operatively with NWS and local lifeguards, environmental products tailored to lifeguard needs will be developed, including coastal wave height and direction and the strength of alongshore currents. These alongshore currents and wave predictions are being ingested by the San Diego NWS to help develop a rip current warning capability for specific beaches. These evolving products will be included in “lifeguard” themed webpage for tailored access to critical information.

A site-specific model for tide and wave-driven inundation will be calibrated with field observations of shoreline water level acquired during winter storms. Information describing incoming wave conditions and NOAA tide gages will be used to estimate water level, including the astronomical tides,

storm surge, El Niño and other regional factors. The field observations will show the importance of local details, such as ramps and structures, on shoreline run-up and inundation and allow customization of inundation warnings. Model-based inundation nowcasts and forecasts and special warnings, will be disseminated directly to users via the Internet and/or automated phone call. Users (e.g. highway departments) have indicated a willingness to work cooperatively to improve warnings by providing information on when highways flood during storm events.

Beta-stage operational coastal wave nowcast models (MOPS) includes both remotely generated swell and locally generated seas with high temporal (hourly) and spatial (100m) resolution. The CDIP Spectral Refraction Wave model utilizes measurements from a network of wave buoys and co-located point forecast spectra from the NOAA WaveWatch III global wave model (Tolman, 1997, 1999, NOAA 2006) for offshore boundary conditions. Field testing in Southern California has extensively validated the Spectral Refraction Model. This model provides 10m depth boundary conditions (e.g. wave height, direction and period) immediately offshore of the surfzone for wave-driven inundation models for Coast Highway 101 at Torrey Pines, California and the Navy recreational use facility at Point Mugu.

When the modeled inundation tops Highway 101, automated warning messages are sent to the Engineering Departments at the City of Encinitas and City of San Diego. At this time, the inundation thresholds and wave run-up estimates are both very crude. Along selected MOP profiles, the run-up height will be estimated using recently collected beach profiles in empirical run-up formulations (Ruggiero et al., 2004 and Stockdon et al., 2006). Observations are critically needed to improve model accuracy by including site specific effects. However, as validation proceeds, the 'beta site' demonstrates that the dissemination mechanism and users are in place for developing decision-making products.

E. Benefits

The long-term collection of waves, currents and wind observations is critical for building a historical database for coastal managers. As climate trends and changes become increasingly evident, the value of

these databases will increase. With rising sea levels and El Niño winters, it is critical that a West Coast inundation model be developed for future safety and protection of the coastal community.

VII. DATA MANAGEMENT

SCCOOS aims to improve access to high-quality integrated data and support regional user needs while complying with the standards and protocols for sharing and archiving data that are developed nationally. SCCOOS will continue to integrate a broad suite of observations including: surface currents, satellite imagery, wave conditions and forecasts, meteorological conditions and forecasts, water quality, ocean temperature, salinity, chlorophyll, and density in the form of data products and raw data. Product delivery of observations and nowcast and forecast models will continue. These observations are available in a user-friendly display on the SCCOOS web site.

The primary components of SCCOOS data conform to rigorous quality control (QC) standards. SCCOOS has developed standards and guidelines for waves QC and data processing at a national level through QARTOD (Quality Control of Real-Time Data) and international level through the Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM). SCCOOS participants play an active role in the ongoing effort to develop QC standards for HF radar derived surface currents. All wave and current data have associated XML and FDGC compliant metadata. SCCOOS will participate in the California Water Quality Monitoring Council which defines water quality standards. SCCOOS recently hosted a workshop to develop compliant sensor observation services (SOS) for IOOS core variables as defined by the Data Integration Framework (DIF) and will be implementing SOS within the near future. The data management effort provides scientists, decision makers, and the public access to products and data services that will facilitate a scientific basis for research and management of the Southern California ocean environment.

VIII. CONCLUSION

As demonstrated, SCCOOS maintains coastal ocean assessments to identify trends in the environment and ecosystem variability, supports the beach water quality management community,

informs operational users for marine safety and delivers information to coastal managers and beachgoers critical to safety while distributing ocean information of public interest. SCCOOS is focused on providing critical observations for effective and integrated Marine Spatial Planning and management of ocean resources and the environment in Southern California, but is also committed to contributing to larger ocean observing efforts at the regional, national and international level.

IX. MILESTONE SCHEDULE

ECOSYSTEMS AND CLIMATE TRENDS	
Monthly	Continue offshore glider transects
Monthly	Continue CalCOFI observations
July 1, 2010-June 30, 2011	Develop indices relevant to ecosystem fisheries management and coastal planning
Ongoing	ROMS reanalysis for climate trends and connectivity assessment
Monthly	Continue time series on the distribution and abundance of marine birds and mammals in the Southern California Bight
July 1, 2010-June 30, 2011	Underway conductivity, temperature, depth (CTD)
WATER QUALITY	
Weekly	Conduct sampling at five HAB monitoring sites
Bi-Monthly	Support glider mapping for the detection of potential HABs
July 1, 2010-June 30, 2011	Develop tools to observe and forecast plume dispersion
May 31, 2011	Surfzone contaminant trajectory tool available online
MARINE OPERATIONS	
Ongoing	High frequency (HF) radar operations and maintenance
Ongoing	Develop and expand integrated, customized products with multi-layer views of observations, nowcasts and forecasts
Oil Spill and SAR events	Deliver ocean current data and surface wind analyses to aid oil spill and SAR real-time recovery and post-analysis trajectories
March 31, 2011	Expand the near real-time, customized wave display for Navy to include surface currents and winds
Ongoing	Deliver glider data for assimilation into Navy Coastal Model
COASTAL HAZARDS	
Storm Events	Monitor storm inundation at selected locations
Post-storm conditions	Validate and refine inundation model
Ongoing	Expand development and integration of inundation web site

X. PROJECT BUDGET

Integrated Ocean Observing System Implementation: Southern California Regional Coastal Ocean Observing System

	Goericke Cal-COFI	Rudnick Gliders Fisheries	Terrill HF Radar Data Mgmt. Shore Stations	McGowan HABS	Guza Surfzone Hazards	UC Campuses and Subawards	UCSD/SIO TOTAL	NOAA NMFS (Funded Separately)	PROJECT TOTAL
Salaries & Fringe Benefits	$ 34,162	$ 111,091	$ 221,120	$ 24,299	$131,263		**$ 521,935**		**$ 521,935**
Travel	$ 1,875	$ 8,072	$ 11,916	$ 1,050	$ 1,320		**$ 24,233**		**$ 24,233**
Equipment			$ 11,250				**$ 11,250**		**$ 11,250**
Supply and Materials	$ 8,512	$ 166,742	$ 97,409	$ 3,788	$ 10,953		**$ 287,404**		**$ 287,404**
Contractual:									
Contract / Farallon			$ 25,003				**$ 25,003**	**$ 90,000**	**$ 115,003**
Subawards									
Cal Poly Tech/Moline						$ 169,935	**$ 169,935**		**$ 169,935**
USC/Jones						$ 357,000	**$ 357,000**		**$ 357,000**
Multi-Campus Awards									
UCLA/Chao						$ 100,000	**$ 100,000**		**$ 100,000**
UCLA/McWilliams						$ 289,606	**$ 289,606**		**$ 289,606**
UCLA/Shipe						$ 60,146	**$ 60,146**		**$ 60,146**
UCSB/Washburn						$ 244,534	**$ 244,534**		**$ 244,534**
Other: Ship Time	$ 35,046						**$ 35,046**		**$ 35,046**
Other: Lab Support	$ -	$ -	$ 48,647	$ -	$ -	$ -	**$ 48,647**		**$ 48,647**
Direct Costs	$ 79,595	$ 285,905	$ 415,345	$ 29,137	$143,536	$1,221,221	**$2,174,739**	**$ 90,000**	**$ 2,264,739**
Indirect Costs (54.5% / 16%)	$ 29,886	$ 155,819	$ 64,655	$ 15,880	$ 78,227	$ -	**$ 344,467**	$ -	**$ 344,467**
TOTAL COSTS	$ 109,481	$ 441,724	$ 480,000	$ 45,017	$221,763	$1,221,221	**$2,519,206**	**$ 90,000**	**$ 2,609,206**

XI. PROJECT BUDGET NARRATIVE

Salaries/Benefits: SIO salary recharge rates are used for calculating salaries. The rates include components for employee benefits, provisions for applicable merit increases and range adjustments in accordance with University policy. Fringe benefits are not shown separately, but are included in the salary cost category. Only actual direct hours are charged to the projects.

Travel: Cruise and field experiment travel is included, as well as maintenance of sensors and moorings, organizational, and data management meetings. Travel to conferences to present results of this work to the science community is also included.

Equipment: The purchase of a Seabird SEACAT sensor for measuring Conductivity, Temperature, Depth (CTD) will be purchased as part of the SCCOOS instrumentation. The sensor will be purchased because the vendor, Seabird, does not offer leasing services. UCSD is requesting to retain ownership of the equipment after the project ends.

Supplies: Various project specific supplies and expendable materials are included to perform the work proposed. These include but are not limited to such items as calibration charges, maintenance and repairs, laboratory and cruise supplies chemicals, computer materials and peripherals, networking services, small boat services, technical shop services, sensors, software licenses, and communication costs.

Contractual: Multi-campus awards, subawards, and subcontracts are included in the Appendix and grouped together on the 424A. Detailed budgets and justifications are provided.

As part of this collaborative effort, NOAA Partner NMFS SWFSC is requesting $90,000 in funding to be transferred directly to the Southwest Fisheries Science Center, Fisheries Resources Division, La Jolla. Under a separate proposal sent directly to NOAA Coastal Services Center by Chuck Oliver, funds are being requested to support Dr. Karen Nieto for development of physical indices relevant to fisheries.

Other: UNOLS ship costs and the MPL Support Cost. Ship time is justified in the Appendix (see UCSD/PI Goericke). Other costs for the proposed program consists of Laboratory Support Services that are calculated at 22% of the MPL/JIMO direct salary cost. This direct charge was approved in February 1991 when MPL's indirect cost rate was reduced.

Indirect Costs: Indirect costs are calculated with a base overhead rate of 16% (SIO/MPL) and 54.5% (UCSD/SIO) of total direct costs less tuition remission and equipment. The date of the most recent indirect cost agreement for SIO/MPL was 5/28/04. The cognizant agency for the University is the Department of Health and Human Services. The contact is Helen Fung located at 50 United Nations Plaza, Suite 347, San Francisco, CA 94102-4918. For specific details, see UCSD official website: http://ocga.ucsd.edu/Budgets/Indirect_Cost_Rates.htm - Research.

UNIVERSITY OF CALIFORNIA, SAN DIEGO	**UCSD #**	**20100696**
Scripps Institution of Oceanography		
PI: Ralf Goericke		
Associate Investigator: William O'Reilly		
NOAA - IOOS		
Project Period: July 1, 2010 - June 30, 2011		**Ecosystems**
Principal Investigator		
Ralf Goericke, Research Oceanographer		
(Effort = 0.50mo)	$11,791/mo	5,896
Other Personnel:		
Staff Research Assistant		
Megan Roadman		
(Effort = 3.0mo)	$5,399/mo	16,197
(RLA 140 Effort = 2.20mo)	$5,486/mo	12,069
Total Salary and Fringe		34,162
Material & Supplies		
Laboratory and field supplies		3,500
Laboratory and computer supplies		3,311
IOD Computer Support Costs		1,141
Project Specific supplies, materials and other expenses:		
Including communications, mailing, faxing, copying & telephones		560
Totals Materials & Supplies		8,512
Travel		
Regional Meeting - SD to Seattle (PI) 5 days		
1 trip: $437 airfare, per diem $216/day for 5 days, car rental $200		1,717
Cruise Return one way - SF to San Diego		
2 trips: $79 airfare per one way trip		158
Total Travel		1,875
Other Direct Costs		
Ship Time - New Horizon - Fall 2010		
2 days @ $17,523/day per published rate as of 10/16/09		35,046
Total Other Direct Costs		35,046
Total Direct Costs		79,595
F & A Base (MTDC = Total Direct Costs less equipment, tuition and ship)		
F & A Base		44,549
Ship Time F & A Base (MTDC = Total Ship Time Direct Costs ONLY)		
F & A Base		35,046
Indirect Costs (F & A)		
	54.5%	24,279
	16.0%	5,607
Total Indirect Costs		29,886
Total Project Costs		**109,481**

UNIVERSITY OF CALIFORNIA, SAN DIEGO **Scripps Institution of Oceanography** **PI: Daniel Rudnick/Russ Davis** **NOAA - IOOS** **Project Period: July 1, 2010 - June 30, 2011**		**UCSD # 20100696** **Gliders**	 **Ecosystems**
Principal Investigator			
Daniel Rudnick, Professor			
16.67% effort for 12 months			26,853
SIO Base Monthly Salary $13,424			
Co-Principal Investigator			
Russ E. Davis, Researcher			
0% of Effort			
Other Personnel:			
TBN Technicians			
Project Scientist ($9,652/mo)			
20.83% effort for 12 months			24,126
Postgraduate Researcher ($5,273/mo)			
95% effort over 12 months			60,112
Total Salary and Fringe		0	111,091
Supplies and Other Direct Costs			
Glider Turnarounds			
4 turnarounds @ $10,000 per turnaround		40,000	
Recordable CDs, disks, tapes, etc. in support of research		742	575
Communications, mailing, faxing, copying & telephones		500	700
IDG Engineering Hours			
1,100 hours @ $75 per hour		82,500	
Boat Rental			
4 days @ $1,000 per day		4,000	
Oxygen Sensors			
6 sensors @ $4,100 per sensor		24,600	
Parts for Oxygen Addition		12,000	
Computer Maintenance Charges			1,125
Totals Materials & Supplies		164,342	2,400
Travel			
San Diego, CA/Santa Barbara, CA (RT)			
Airfare: $250 x 8 trips		2,000	
Per Diem: $253 x 3 days x 8 trips)		6,072	
Total Travel		8,072	0
Total Direct Costs		172,414	113,491
IDC Base (MTDC = Total Direct Costs less equipment and tuition)			
IDC Base		172,414	113,491
Indirect Costs	54.5%	93,966	61,853
Total Project Costs		**266,380**	**175,344**

UNIVERSITY OF CALIFORNIA, SAN DIEGO **Scripps Institution of Oceanography** **PI: Eric Terrill** **NOAA - IOOS**			**UCSD # 20100696**	
Project Period: July 1, 2010 - June 30, 2011		**Water Quality**	**Marine Operations**	**Data Management**
Principal Investigator				
Eric Terrill, CORDC Director - No salary requested				
Other Personnel:				
James Scott, Asst. Development Engineer				
SIO Monthly Base Salary: $7,359/month x 2.5 mos. / 1.5 mos.		18,398	11,039	
William Middleton, Asst. Development Engineer				
SIO Monthly Base Salary: $7,275/month x 2 mos.		14,550		
Lisa Hazard, Programmer/Analyst				
SIO Monthly Base Salary: $12,298 x 1.5 mos./1 mo.			18,447	12,298
Thomas Cook, Programmer/Analyst				
SIO Monthly Base Salary: $9,389 x 5 mos.			46,945	
Paul Reuter, Programmer/Analyst				
SIO Monthly Base Salary: $9,673 x 5 mos.				48,365
Joseph Chen, Programmer/Analyst				
SIO Monthly Base Salary: $8,513 x 6 mos.				51,078
Total Salary and Fringe Benefits		32,948	76,431	111,741
MPL Laboratory Support Services		7,249	16,815	24,583
Total MPL Laboratory Support Services		7,249	16,815	24,583
Project Specific Supplies, Materials, and Other Direct Costs				
Project Specific Communications, Mailing/FedEx, Network Costs, & Telephone Toll Charges		700	1,200	1,900
Project Specific Laboratory Supplies		1,278	2,107	2,342
Project Specific Computer Hardware Maintenance and Supplies		650		2,500
Project Specific Computer Software & OS Maintenance & Consortium Costs		3,848	11,544	11,544
Shop Labor for Cage Fabrication		3,120		
Experimental and Field Expendables and Supplies		1,660	10,805	
Diving Gear		2,300		
Networking Service for 4 Shore Stations		2,400		
Calibration Services		10,800		
Seabird Fluorometer		5,220		
HF Radar Data Acquisition System			3,320	
CORDC Whaler Maintenance			3,000	
CORDC Vehicle Maintenance			2,000	
Project Specific Software and Software Licenses				4,745
(i.e. Terascan, Matlab, X-Win32, Office 2007/WINXP/Adobe)				
Domain Hosting				2,400
Data Analysis Computer and Peripherals				3,026
Networking Service for 20 HF Radar Stations				3,000
Farallon Institute				25,003
Total Project Specific Supplies, Material, and Other Direct Costs		31,976	33,976	56,460
Travel				
RT SD/Santa Barbara		3,496		
Airfare: $306 x 4 = $1,224 / Per Diem: $224 x 2 days x 4 trips = $1,792				
Rental Car: $60 x 2 days x 4 trips = $480				
RT SD/Santa Monica, CA		420		
UCSD Vehicle ($105 x 1 day x 4 trips)				
RT SD/Newport Beach, CA		420		
UCSD Vehicle ($105 x 1 day x 4 trips)				
RT SD/Camp Pendleteon			210	
UCSD Vehicle ($105 x 1 day x 2 trips)				
RT SD/Dana Point, CA			210	
UCSD Vehicle ($105 x 1 day x 2 trips)				
RT SD/San Clemente Island			1668	
Airfare: $125 x 4 = $500 / Per Diem: $121 x 2 days x 4 trips = $968				
Ground Transportation: $50/day x 2 days x 4 trips = $200				
RT SD/Washington, DC				5,492
Airfare: $669 x 4 = $2,676 / Per Diem: $289 x 2 days x 4 people = $2,312				
Rental Car: $126 x 2 days x 2 trips = $504				
Total Travel		4,336	2,088	5,492
Equipment (or equivalent and includes sales tax)				
Seabird SEACTplus Sensor		11,250		
Total Equipment		11,250	0	0
Total Direct Costs		**87,759**	**129,310**	**198,276**
F & A Base (MTDC = Total Direct Costs less equipment, tuition and ship)				
F & A Base		76,509	129,310	198,276
Indirect Costs (F & A)				
	16%	**12,241**	**20,690**	**31,724**
Total Project Costs		**100,000**	**150,000**	**230,000**

UNIVERSITY OF CALIFORNIA, SAN DIEGO		**UCSD # 20100696**
Scripps Institution of Oceanography		
PI: John McGowan		
NOAA - IOOS		
Project Period: July 1, 2010 - June 30, 2011		**Water Quality**
Principal Investigator		
John McGowan, Research Professor		
No salary requested		
Other Personnel:		
Staff Research Assistant		
Melissa Carter, Staff Research Associate II		
(Effort = 1.90 mo.)	$5,543/mo	10,532
Mary Hilbern, Staff Research Associate I		
(Effort = 3.0 mo.)	$4,589/mo	13,767
Total Salary and Fringe		24,299
Supplies and Other Direct Costs		
Sampling gear (plankton net bottles)		225
Filtering supplies (GF filters)		300
Chemicals (Acetone)		150
Event based sampling (boat fuel, field supplies)		350
Shipping Cost - samples to collaborators		215
IOD Computer Support Costs		1,774
Communications, mailing, faxing, copying & telephones		774
Totals Materials & Supplies		3,788
Travel		
San Diego, CA to various locations		
UCSD Van Rental		
10 trips @ $105 rental fee per trip		1,050
Total Travel		1,050
Total Direct Costs		29,137
IDC Base (MTDC = Total Direct Costs less equipment and tuition)		
IDC Base		29,137
Indirect Costs	54.5%	15,880
Total Project Costs		**45,017**

UNIVERSITY OF CALIFORNIA, SAN DIEGO **Scripps Institution of Oceanography** **PI: Robert Guza** **Associate Investigator: William O'Reilly** **NOAA - IOOS** **Project Period: July 1, 2010 - June 30, 2011**		**UCSD # 20100696** **Coastal Hazards**	**Water Quality**
Principal Investigator			
Robert Guza, Professor			
No salary requested		-	-
Associate Investigator			
William O'Reilly, Sr. Dev. Engineer			
(Effort = 0.25 mo. Hazards ; 1.70 mo. Surfzone)	$14,557/mo	3,639	24,747
Other Personnel:			
Research Assistant			
Vicki Kellis, Research Project Assistant			
(Effort = 0.15 mo. Hazards; 0.20 mo. Surfzone)	$5,302/mo	795	1,060
Engineers			
Brian Woodward, Sr. Dev. Engineer			
(Effort = 2.50 mos. Hazards)	$11,523/mo	28,808	0
Michelle Okihiro, Associate Engineer			
(Effort = 0.25 mo. Hazards)	$6,114/mo	1,529	0
Technicians			
Dennis Darnell, Dev. Tech. IV			
(Effort = 2.50 mos. Hazards)	$6,803/mo	17,008	0
Programmers/Analysts			
Julianna Thomas			
(Effort = 0.5 mo. Hazards; 0.70 mo. Surfzone)	$14,227/mo	7,114	9,959
Randolf Bucciarelli, Prog. Analyst III			
(Effort = 0.20 mo. Hazards; 0.80 mo. Surfzone)	$7,204/mo	1,441	5,763
Corey Olfe, Prog. Analyst III			
(Effort = 0.25 mo. Hazards; 1.50 mos. Surfzone)	$9,652/mo	2,413	14,478
Darren Wright, Prog. Analyst II			
(Effort = 0.50 mo. Hazards; 1.00 mo. Surfzone)	$8,339/mo	4,170	8,339
Total Salary and Fringe		66,917	64,346
Supplies and Other Direct Costs			
Storage Media		500	1,604
Computer Supplies		600	3,000
Reporting Materials		500	735
IOD Computer Support		1,630	652
Project Specific supplies, materials and other expenses:			
Including communications, mailing, faxing, copying & telephones		788	944
Totals Materials & Supplies		4,018	6,935
Travel			
San Diego, CA to various locations			
100 miles per trip @ $.55/mile (10 trips Hazards; 14 Surfzone)		550	770
Total Travel		550	770
Total Direct Costs		71,485	72,051
IDC Base (MTDC = Total Direct Costs less equipment and tuition)			
IDC Base		71,485	72,051
Indirect Costs	54.5%	38,959	39,268
Total Project Costs		**110,444**	**111,319**

UCLA Budget - IOOS Proposal
July 1, 2010 - June 30, 2011
PI: Yi Chao
Implementation of Integrated Ocean Observing Systems: Southern California Regional Coastal Ocean Observing System

					Year 1
Senior Personnel	Annual Salary	Montly Salary	Yr 1 Mo		07/01/10 to 06/30/11
Y. Chao, Adjunct Professor	176,800	14,733	**1.00**	14,733	14,733
J. Farrara, Researcher	97,200	8,100	**4.20**	8,100	34,020
TBN, Project Assistant	70,000	5,833	**1.36**	5,833	7,933
Total Salaries					56,686
Benefits	Rate				
Chao	6.00%				884
Farrara	41.00%				13,948
Proj Asst	35.00%				2,777
					0
Fringe Benefits					17,609
Total Salary & Benefit					**74,295**
Techology Infrastructure Fee					
Chao	40.75	x 1 mo.			41
Farrara	40.75	x 4.2 mos.			171
Proj Asst	40.75	x 1.36 mos.			55
					267
Travel					
RT Los Angeles-San Diego, CA					
(One person x 2 trips x 3 days)					
Lodging	$450	($150/night x 3 nights)			
Meals	$180	($60/day for 3 days)			
Mileage	$165	($.55/mile x RT 300 miles)			
Parking	$30	($10/day x 3 days)			
Total	$825	/trip	x	2	**1,650**
Other Costs					
Computer Costs					153
Publication					3,000
Total Other Cost					**3,153**
Total Direct Costs					**79,365**
Total Modified Direct Costs					79,365
Total Modified IDC	26%				**20,635**
UCLA Total Requested Cost					**100,000**

Detailed Proposed UCLA Budget for
"IOOS Proposal to NOAA--UCLA Modeling Component "
01 July 2010 - 30 June 2011

			ROMS	Ecosystems Cost	Total
Effort (in months)**:**					
J.C. McWilliams, Prof. a/s, ss, PI			0.00	0.00	**0**
Y. Uchiyama, Asst. Researcher III			2.00	7.00	**9**
M. Buijsman, Postdoc			3.46	8.50	**11.96**
H. Frenzel, Programmer			0.00	4.60	**4.60**
M.J. Molemaker, Assoc Researcher I			0.00	3.00	**3**
Rate:					
Uchiyama			5,750	5,750	
Buijsman			3,925	3,925	
Frenzel			5,213	5,213	
Molemaker			6,392	6,392	
Salaries:					
Uchiyama			11,500	40,250	**51,750**
Buijsman			13,581	33,363	**46,944**
Frenzel			0	23,980	**23,980**
Molemaker			0	19,176	**19,176**
Total Salaries:			**25,081**	**116,769**	***141,850***
Benefits: (actuals ¤)					
Uchiyama @	33.02% of salary		3,797	13,291	**17,088**
Buijsman @	24.72% of salary		3,357	8,247	**11,604**
Frenzel @ 32% of salary			0	7,674	**7,674**
Molemaker @ 34.74% of salary			0	6,662	**6,662**
Total Benefits:			**7,154**	**35,874**	***43,028***
Total Salaries & Benefits:			**32,235**	**152,643**	***184,878***
Expendable Supplies and Services:					
Mandatory Technology Infrastructure Fee (TIF)			222	941	**1,163**
Total Supplies & Services:			**222**	**941**	***1,163***
Travel:					
To attend collaborative meeting at UCSD (ROMS = 1, Ecosystems = 2 trips)					
275 miles RT @ $0.55		151			
		151	151	302	**453**
To attend meeting at UCSC (Ecosystems = 2 trips)					
700 miles RT @ $0.55		385			
	2 RT x x	385	0	770	**770**
1 day per diem	2 people x x	198	0	792	**792**
Total Travel			**151**	**1,864**	***2,015***
Total Direct Costs:			**32,608**	**155,448**	**188,056**
Indirect Costs @ 54.0% of MTDC: ‡			**17,608**	**83,942**	**101,550**
Total Amount Requested:			**50,216**	**239,390**	**289,606**

The University-recommended projected rates have been used on salaries.

¤ These rates include an estimated increase of 4% for restarting the employer paid contribution to the University of California Retirement Program (UCRP), effective July 1, 2009, for eligible employees and is applicable to all university fund sources.

* TIF based on the following: $40.75/mo. x (y) mos.

‡ MTDC is derived TDC less equipment, graduate student fees and subcontracts after the 1st $25K each.

Shipe Budget for IOOS Proposal to NOAA					
Project Title: So Cal Regional Coastal Ocean Observing System					
Grant Period: July 1, 2010 – June 30, 2011					
PERSONNEL					
	effort	*rate*			*YR 01*
PI (R. Shipe) - 2 months	2	$7,661			$15,323
Lab Helper - academic year, 33 weeks	5 hrs/wk	10.28/hr			$1,696
Bens (PI) - 17.5%					$2,681
Bens (student) - 1.3%					$22
PERSONNEL TOTAL					*$19,722*
SUPPLIES					
	cruises	*depths*	*analyses*	*cost ($)*	*YR 01 Total*
HAB monitoring supplies					
Filtration supplies (for chl, counts, nutrients)	54	1	4	2	$432
Analytical supplies	54	1	2	3	$324
shipping supplies for frozen samples	4	1	1	40	$160
Shipping costs - samples to collaborators	4	1	2	50	$400
SMBO mooring station					
Filtration supplies (for chl, counts)	12	6	2	2	$288
Analytical supplies	12	6	1	3	$216
HAB Event response supplies					
Filtration supplies (for chl, counts, nutrients)	2	10	4	2	$160
Analytical supplies	2	10	4	3	$240
SUPPLIES TOTAL					*$2,220*
OTHER	*trips*	*hours*	*miles*	*cost*	
SMBO mooring station					
boat charter (SCMI boat e.g. RV Yellowfin)	*4*	*9*		*310*	*$11,160*
car rental or mileage for sampling trips	12			150	$1,800
HAB monitoring and event response					
boat charter (SCMI boat e.g. RV Yellowfin)	*1*	*9*	*1*	*310*	*$2,790*
travel to piers (mileage)	*54*		*40*	*0.55*	*$1,188*
parking at pier	*54*			*1*	*$54*
General					
Communications (infrastructure charges)					$122
OTHER TOTAL					*$17,114*
Direct Total					*$39,056*
Indirect @ 54%					*$21,090*
TOTAL					***$60,146***

DETAILED BUDGET Washburn/Brzezinski - UCSB

UCSB Record #20100514

	Period/ mos.	% Time	7/1/10-6/30/11	Brzezinski HAB	Washburn HF Radar	Washburn uCTD
SALARIES						
1. Principal Investigator - L. Washburn						
Professor of Oceanography						
a. Summer month @ 1/9 annual rate of						
$11,788 /mo.	1	50%	5,894		5,894	
2. Computer & Network Technologist III - B. Emery						
@ $6,275 /mo.	3	25%	4,706		4,706	
@ $6,495 /mo.	9	25%	14,614		14,614	
3. Senior Development Engineer - C. Johnson						
@ $6,232 /mo.	2	50%	6,232		6,232	
@ $6,450 /mo.	2	50%	6,450		6,450	
4. Assistant Specialist - M. Fewings						
@ $3,700 /mo.	3	25%	2,775		2,775	
@ $3,774 /mo.	9	25%	8,492		8,492	
5. Graduate Student Researcher - J. Goodman						
@ $3,229 /mo. sum (III)	3	49%	4,747	4,747		
@ $3,390 /mo. acad	6	49%	9,967	9,967		
6. Computer & Network Technologist I - To be named						
@ $3,866 /mo.	3	40%	4,639			4,639
@ $3,943 /mo.	9	40%	14,195			14,195
7. Staff Research Associate II - D. Salazar						
@ $3,632 /mo.	3	75%	8,172		8,172	
@ $3,390 /mo.	9	75%	22,883		22,883	
Salaries Subtotal			113,766	14,714	80,218	18,834
FRINGE BENEFITS						
1. Principal Investigator - L. Washburn						
Base sum: $5,894 @ 16.7% (+UCRP)			984		984	
2. Computer & Network Technologist III - B. Emery						
Base sum: $19,320 @ 43.9% (Actual + UCRP)			8,481		8,481	
3. Senior Development Engineer - C. Johnson						
Base sum: $12,682 @ 46.3% (Actual + UCRP)			5,872		5,872	
4. Assistant Specialist - M. Fewings						
Base sum: $11,267 @ 28.9% (Actual + UCRP)			3,256		3,256	
5. Graduate Student Researcher - J. Goodman						
Base sum: $4,747 @ 3.0%			142	142		
$9,967 @ 1.3%			130	130		
6. Computer & Network Technologist I - To be named						
Base sum: $18,834 @ 26.0% (+UCRP)			4,897			4,897
BENEFITS (Cont'd)						
7. Staff Research Associate II - D. Salazar						
Base sum: $31,055 @ 33.0%			10,248		10,248	
8. Registration fees for Graduate Student Researcher*			6,873	6,873		
9. Graduate Student Health Insurance (G-SHIP)*			1,718	1,718		
Benefits Subtotal			42,601	8,863	28,841	4,897

* Resident/Non-Resident Fees, Non-Resident Tuition and GSHIP are estimated to increase by 9.3%/year.

TRAVEL						
1. Field research trips (HF Radar) to Vandenburg Air Force Base						
Four 1-day trips for 1 person						
a. Rental of UCSB Transportation Services Suburban @ $42/day			168		168	
b. Mileage charges for rental vehicle - 140 mi./trip @ $0.54/mi.			302		302	
c. Meals @ $42/day			168		168	
2. Field Research trips SB-Santa Cruz Island						
Two 1-day trips for 3 people						
a. Rental of UCSB Transportation Services Suburban @ $42/day			84		84	
b. Mileage charges for rental vehicle - 80 mi./trip @ $0.54/mi.			86		86	
c. Tickets for Island Packers boat to SCI @ $70/each			420		420	
3. Personal vehicle mileage costs for weekly trips from UCSB to and from						
the HABS sampling site at Stearns Wharf in Santa Barbara						
52 trips, 14 mi./trip @ $.55/mi.			400	400		
Travel Subtotal			1,628	400	1,228	0

DETAILED BUDGET Washburn/Brzezinski - UCSB

UCSB Record #20100514	7/1/10-6/30/11	Brzezinski HAB	Washburn HF Radar	Washburn uCTD
SUPPLIES				
1. HF Radar - Misc. research supplies (cables, antenna hardware, electronic component connectors, etc.)	4,500		4,500	
2. HAB - Consumable supplies	1,000	1,000		
3. spare conductivity sensor for uCTD	2,000			2,000
4. uCTD - Misc. hardware, cables & electronic components	1,888			1,888
Supplies Subtotal	9,388	1,000	4,500	3,888
OTHER DIRECT COSTS				
1. Research-related communication costs**	401		401	
2. HAB - Analytical services (nutrient analyses) - 360 samples @ $11.12/ea. (4 analytes per seawater sample @ $2.78/ea. = $11.12 per sample)	4,003	4,003		
3. HF Radar -UCSB Department of Biological Sciences recharges				
a. Small boat use - 70 hours @ $48/hr.	3,360		3,360	
b. Vehicle rental for towing boat to launch site - 10 days @ $43.83/day	438		438	
c. Mileage fees - 10 round-trips; 14 mi./trip @ $.44/mi.	62		62	
4. uCTD costs				
a. Instrument calibration	3,000			3,000
b. Boat modification for uCTD winch and related hardware	2,000			2,000
c. USC technical services	15,000			15,000
5. HAB Shipping Costs	200	200		
Other Direct Costs Subtotal	28,464	4,203	4,261	20,000
Total Direct Costs	195,847	29,180	119,048	47,619
INDIRECT COSTS				
Off-campus rate*** of Modified Total Direct Costs				
Base sum: $187,256 @ 26.0% (Total direct costs less equipment and GSR tuition/fees)	48,687	5,354	30,952	12,381
TOTAL COSTS	244,534	34,534	150,000	60,000

IDC base $ 187,256
IDC requested $ 48,687

** Due to the collaborative nature of this project, funds are requested to cover research-related telephone tolls, fax, FedEx and mailing costs resulting from the principal investigator's communications with colleagues regarding scientific matters. The PI will identify these expenses as solely related to research, and the Marine Science Institute will maintain detailed records in the financial files for this project.

*** This is the DHHS negotiated, predetermined, off-campus rate for Research Projects covering the period July 1, 2005 through June 30, 2010. The rate thereafter is provisional.

SUMMARY

Washburn

HF Radar	$150,000
uCTD	$60,000
Washburn Total	$210,000

Brzezinski

HAB	$34,534
Brzezinski Total	$34,534
Combined Total	$244,534

Cal Poly State University, San Luis Obispo	**SCCOOS IOOS HAB AND HF RADAR**
Project Period:	**July 1, 2010 - June 30, 2011**
Reference number:	

						Year 1
Personnel*						
M. Moline, Professor (PI)	0%	release time @	$139,476	/AY		$0
	0	months summer@	$15,497	/MO		$0
	0	hrs overload@	$102.56	/HR		$0
Ian Robbins, Research Associate	20%	effort @	$70,099	/CY		$14,020
Brian Zelenke, Research Associate	75%	effort @	$70,099	/CY		$52,574
Undergraduate Students	400	hours @	$10.00	/hr		$4,000
					Subtotal Personnel	**$70,594**
Fringe Benefits						
Faculty release	37.397%					$0
Faculty summer and OC	9.28%					$0
Corporation fulltime (Res. Assoc.)	49.01%					$32,638
Students	6.05%					$242
					Subtotal Fringe Benefits	$32,880
					TOTAL Personnel Services	**$103,474**
Travel						
HAB and HF Radar Meetings, San Diego, CA						
2 RT SLO/San Diego, CA @ $602/trip						$1,204.00
Rental Car (70/day x 2 days x 2 trips)						$280.00
San Diego Per Diem (2 days x $218/day x 2 trips)						$872.00
To and from HAB sites for sampling						
104 trips x 20 miles/RT @ $.55/mile)						$1,144.00
To and from HF sites for maintenance						
30 trips x 55 miles/RT @ $.55/mile)						$908.00
					TOTAL Travel	**$4,408**
Supplies (< $5,000)						
HAB sample counting/lab supplies						$1,500
HF Radar supplies/maintenance costs						$7,000
					TOTAL Supplies	**$8,500**
Other Operating Costs						
Shipping						$2,000
Communications						$3,000
					TOTAL Other Operating Costs	**$5,000**
TOTAL DIRECT COSTS:						$121,382
Indirect Costs	40%	of Modified Total Direct				$48,553
					TOTAL COSTS	**$169,935**

*** Personnel:**
The rates shown are budgetary figures; actual costs may vary. Salaries will be charged at actual rates in effect at the time of service. Faculty salaries include known significant increases per current labor contract.

***Benefits:**
Faculty/Staff benefits include FICA, SUI and Worker's Compensation, retirement, medical, etc. Benefits for ABS/Smr Salary/Student include FICA and Worker's Compensation. The percentages used for this budget are based on historical averages. Individual's actual rates in effect at the time the service is performed will be charged to the project.

*** Indirect Costs: (on-campus)**
Indirect costs are applied at DHHS negotiated rate effective July 1, 2005, of 40% of MTDC (Modified Total Direct Costs) for on-campus. MTDC excludes equipment, capital expenditures, charges for patient care, tuition remission, rental costs of off-site facilities, scholarships, and fellowships, as well as a portion of each subgrant and subcontract in excess of $25,000 (regardless of the period covered).

UNIVERSITY OF SOUTHERN CALIFORNIA

SCCOOS Harmful Algal Bloom Monitoring at the Newport Beach Pier

		HABs 7/1/10 - 6/30/11	HF Radar 7/1/10 - 6/30/11	Coastal Glider 7/1/10 - 6/30/11	Total
Principal Investigator					
Burton Jones, Research Professor					
100% of Effort for 1 month		-	10,146		10,146
100% of Effort for 1.44 month		-		14,610	14,610
USC Base Salary $121,746/12, 2009 - 2010					
Co-Principal Investigator					
David Caron, Professor					
0% of Effort		-	-	-	-
Other Personnel:					
TBN Technicians					
HAB Tech ($49,200/12)					
100% Effort for 2 months		8,200			8,200
HF Radar Tech ($67,600/12)					-
100% Effort for 6 months			33,800		33,800
HF Radar Programmer ($60,000/12)					-
100% Effort for 2.75 months			13,750		13,750
Glider Tech (Maintenance, $67,600/12)					-
100% Effort for 1.5 months				8,450	8,450
Glider Tech (Software/Operations, $60,000/12)					-
100% Effort for 3.5 months				17,500	17,500
Total Salary Subject to FB		8,200	57,696	40,560	106,456
Fringe Benefit	30%				
FY 09 FB & Beyond		2,460	17,309	12,168	31,937
Undergraduate Student Salaries					
HAB Undergraduate Student		1,200			1,200
HF Radar Undergraduate Student			584		584
Total Salary and Fringe		11,860	75,589	52,728	140,177
Material & Supplies					
Reagents, ELISA, etc.		15,000			15,000
Laboratory Supplies for HAB analysis		850			850
HF Radar					
External HD			2,000		2,000
Internal HD			500		500
UPS			3,055		3,055
Router			340		340
Air Conditioner			3,952		3,952
Antenna whips			141		141
Glider Ops:					
Batteries				9,037	9,037
Iridium Communications				16,800	16,800
Totals Materials & Supplies		15,850	9,988	25,837	51,675
Travel					
HABS					
50 RT from USC-Newport Pier (90 miles @ $.55/mile)		2,475			2,475
HF Radar					
Vehicle Costs (12 days @ $105/day)			1,260		1,260
Per Diem (18 days @ $42/day)			756		756
Coastal Glider					-
12 RT from USC-Huntington Harbor (80 miles @ $0.55/mile)			-	528	528
Total Travel		2,475	2,016	528	5,019
Other Direct Costs					
Boat Charter (4/4/6/days @ $1,250/day)		5,000	5,000	7,500	17,500
Maintenance and Calibrations				6,000	6,000
Total Other Direct Costs		5,000	5,000	13,500	23,500
Total Direct Costs		35,185	92,593	92,593	220,371
F & A Base (MTDC = Total Direct Costs less equipment and tuition)					
F & A Base		*35,185*	*92,593*	*92,593*	*220,371*
Indirect Costs (F & A)					
FY 10 and beyond F & A	62%	21,815	57,407	57,407	136,629
Total Project Costs		**57,000**	**150,000**	**150,000**	**357,000**

Notes:

An incremental increase of 3% for salaries is included in future project periods.

The fringe benefit rate for the period July 1, 2008 through June 30, 2009 is 30%
as approved in the Federal Rate Agreement dated May 28, 2008.
For the period beginning 7/1/2008 and future periods, the estimated rate is 30%

The predetermined indirect cost rate in the Federal Rate Agreements dated May 28, 2008 is 63%
for the period beginning 7/1/2008 and ending 6/30/2010.
The predetermined indirect cost rate in the Federal Rate Agreement dated May 28, 2008, is 62%
for the period beginning 7/1/2010 and ending 6/30/2011.
For future periods the provisional rate is 62%.

The University requests that the above salary information not be distributed outside of the Agency.
There may be minor differences in the above calculations due to rounding.

BUDGET JUSTIFICATIONS BY INSTITUTION
UCSD/SIO

Ecosystems:

PI: Ralf Goericke - Egg, larval hydrographic stations nearshore (CalCOFI)

Salaries & Benefits:

Salary is requested for Dr. Ralf Goericke 0.5 months to supervise the effort of this component. Funds are also requested for Staff Research Associate Megan Roadman (3 mos.) to go to sea four times to process data ashore (fall 2010, winter-spring-summer 2011 CalCOFI cruises). Ms. Roadman will be working on this project during the four CalCOFI cruises, processing data, collecting water samples and measurements as discussed in the statement of work.

Project Specific Supplies, Materials & Other Direct Costs:

Funds are requested for laboratory and field supplies such as sampling jars, replacement nets, glass fiber filters, HPLC columns, chemicals and solvents for pigment analysis. Funds are also requested for laboratory computer supplies needed to maintain the computing hardware used to analyze and archive the data. IOD computer support costs are requested for computer software maintenance and consortium costs related to the use of project computers supporting hardware and software development. These costs are allocated based on effort reported by staff in support of the proposed project.

Travel:

Funds are requested for Goericke to travel from San Diego to Seattle, WA to attend a regional meeting on ocean observing systems. Airfare of $437 is based upon Expedia.com and the per diem estimate of $216 is based upon the GSA-published Domestic Per Diem Rates. The car rental estimate of $40 per day is based upon the published UCSD car rental agreements summary. One-way airfare is included for Roadman to return from cruises that terminate in San Francisco. Airfare of $79 is based upon Expedia.com.

Ship Time:

Ship time is requested for one day each on two cruises on the R/V New Horizon in the fall of 2010 and summer of 2011. Estimates are based upon the SIO Ship Scheduling website published rates as of 10/16/10. 2010 New Horizon Ship Time plus technician rate of $17,523 (without overhead) has been published as the projected rate.

PIs: Daniel L. Rudnick, Russ E. Davis -The Southern California glider network

Salaries & Benefits:

PIs Daniel Rudnick and Russ Davis will oversee this component at no cost to the project. **Project Specific Supplies, Materials & Other Direct Costs:**

The budget includes two major tasks. The first task is to maintain continuous glider sampling on line 80, with associated initial data management and dissemination. The second task is to add dissolved oxygen sensors to six gliders. Both tasks will be carried out by the SIO Instrument Development Group (IDG).

Costs associated with the maintenance of continuous glider sampling on line 80 include four glider turnarounds budgeted at a rate of $10,000 per turnaround. This rate includes the refurbishment of one glider (i.e., batteries, routine maintenance items, and labor). Costs for four glider operations off Santa Barbara are budgeted including travel, boat rental, and labor. Additional costs for glider operations include labor for glider piloting and data management. The labor costs for all facets of glider operations is budgeted at 50 hours per turnaround, for a total of 200 hours.

Addition of the oxygen sensor is budgeted and includes the following: six oxygen sensors (SBE 43F) including cabling and electronics, costs for mounting, electronics, and software integration, and IDG engineer hours and parts. The estimate of 900 hours for development and construction is based on past experience with sensor integration.

Project specific costs that include telephone equipment, tolls, voice and data communication charges, photocopying, faxing, and postage, are requested. Supplies costs are included for data analysis (i.e., CDs, disks, tapes, etc.).

PI: Daniel L. Rudnick - Development of physical indices relevant to fisheries

Salaries & Benefits:

This component of the project is an effort to develop indices using SCCOOS observations relevant to the management of the sardine and market squid fisheries. As such, the project involves the analysis, but not the collection of, data. PI Dan Rudnick (2 mos.) will oversee the project, participate in data analysis, and provide supervision. A TBN postdoc will be supported full-time for the year, and will be responsible for the analysis of several SCCOOS datasets including those from gliders and high-frequency radar. A TBN project scientist (2.5 mos.) will take the lead in analysis of remote sensing data.

Project Specific Supplies, Materials & Other Direct Costs:

Project specific costs including telephone equipment, tolls, voice and data communication charges, photocopying, faxing, and postage are requested. Supplies costs are included for data analysis (i.e., CDs, disks, tapes, etc.). Computer maintenance charges are included in the budget. These costs are essential as the majority of the work for this portion of the project involve data storage and analysis and the existing computers need to be maintained in order to perform the tasks for this project.

Marine Operations:

PI: Eric Terrill - Radar network operations and maintenance

This budget component represents costs associated with minimum maintenance of the Scripps Institution of Oceanography supported HF radars within the larger network for the Southern California Coastal Ocean Observing System (SCCOOS).

Salaries & Benefits:

Coastal Observing Research and Development Center (CORDC) Director, Eric Terrill, is budgeted at no cost for overall program management. CORDC Operations Manager, Lisa Hazard, is budgeted to oversee site permissions, HF radar maintenance and communications, and multi-campus coordination. Programmer Analyst, Tom Cook and Development Engineer, Shannon Scott are budgeted to perform site maintenance, system testing and calibration, and to evaluate the HF radar system performance.

Project Specific Supplies, Materials & Other Direct Costs:

Costs have been included which are project specific costs related to communications, and computer software maintenance and consortium costs related to the use of laboratory computers supporting hardware and software development. These costs are allocated based on direct effort reported by staff in support of the proposed project. Funds are also requested for laboratory supplies related to the use of lab instrumentation such as tools, mechanical, and electrical parts necessary for the maintenance of HF Radars. HF radar specific hardware and supplies have been budgeted (e.g., external and internal hard drives, replacement universal power supplies [UPS], routers, air conditioners, antenna whips, etc.), as well as computer software and operating system maintenance to continue operation and maintenance of data management systems. Funds are requested for one replacement data acquisition system. Costs are included to support vehicle maintenance costs for driving to the local sites and whaler costs for travel to Coronado Island, 30 km offshore.

Travel:

Travel funds are requested for two people travel to San Clemente Island (two trips) for conducting beam patterns, conducting repairs as needed to power support systems (circuit breakers, UPS), and follow-up maintenance of the installed hardware. Funds are also requested for travel to local HF radar sites (Camp Pendleton and Dana Point) and include costs for a UCSD vehicle and gasoline.

Data Management:

PI: Eric Terrill: Data management

This budget component represents costs associated with minimum maintenance of the Southern California Coastal Ocean Observing System (SCCOOS) data management component.

Salaries & Benefits:

Coastal Observing Research and Development Center (CORDC) Director, Eric Terrill, is budgeted at no cost for overall program management. CORDC Operations Manager, Lisa Hazard, will serve as the information management lead on this project, overseeing data management activities related to SCCOOS product development, website hosting, data transfer, distribution, archiving, and display. The majority of funds are allocated to programmer salaries. Programmer Analysts Joseph Chen and Paul Reuter will continue supporting data requests, database optimization for improving response time of queries and web display rates, participating in ongoing development of metadata standards, coordinating with SCCOOS consortium members for new data sources, and concentrating on a cross compatible data system infrastructure for accessing data across multiple data sets.

Project Specific Supplies, Materials & Other Direct Costs:

Costs have been included which are project specific costs related to communications, and computer software maintenance and consortium costs related to the use of laboratory computers supporting hardware and software development. These costs are allocated based on direct effort reported by staff in support of the proposed project. Funds are also requested for laboratory supplies that are necessary for the maintenance of SCCOOS servers (i.e., tools for mounting hardware for web servers/computers, dust spray, chem wipes, labels, and other computer-related maintenance items). Computer hardware maintenance such as universal power supplies, replacement hard drives, and networking equipment as well as software licenses for both the PC and data server computers are budgeted for continued operation of products and displays. One desktop computer and peripherals are budgeted for related programming and data management tasks. Monthly costs for domain hosting (sccoos.org) have been budgeted. Networking service for 20 HF radars has been budgeted to ensure continued data flow for near real-time products. The Farallon Institute will participate in gathering and disseminating seabird populations in the Southern California Bight in support of identifying Marine Protected Areas in Southern California. The institute is budgeted to provide this service.

Travel:

Funds are requested for two staff members to travel to Washington, D.C. (two trips) to work with data users, attend data management meetings, and participate in regional/national data coordination efforts. Location of meetings is subject to change.

Water Quality:

PI: John McGowan - Water quality- Harmful algal blooms monitoring program

Salaries & Benefits:

Principal Investigator, Dr. John McGowan is responsible for this component. His salary is at no charge to this project. Funds are requested for Melissa Carter, SRA II, and Mary Hilbern, SRA I, to collect and analyze water and plankton samples.

Project Specific Supplies, Materials & Other Direct Costs:

Funds are requested for sampling gear (e.g., plankton net, bottles, etc.), filtering supplies (e.g., GF filters, cryo vials, etc.), chemicals (e.g., acetone, formaline, etc.), event based sampling (boat fuel and field supplies), and overnight shipping to send samples for analysis to collaborators. IOD network computer support costs are requested for computer software maintenance and consortium costs related to the use of project computers supporting hardware and software development. These costs are allocated based on effort reported by staff in support of the proposed project.

Project specific supplies, materials, and other expenses include telephone equipment, tolls, voice and data communication charges, photocopying, faxing, and postage.

Travel:

Travel funds are requested for a van for event-based sampling. Sampling sites are located from the Imperial Beach to the Los Angeles area. Ten trips are included at one day per trip and include costs for gasoline expenses.

PI: Eric Terrill - Nearshore sampling program – Automated shore stations

This budget component represents costs associated with supporting the operations, maintenance, and calibration of a network of four automated shore stations. The shore stations are located in Southern California at the following locations: Stearns Wharf Pier, Santa Barbara; Santa Monica Pier, Santa Monica; Newport Beach Pier, Newport; and Scripps Institution of Oceanography (SIO) Pier, La Jolla.

Salaries & Benefits:

Coastal Observing Research and Development Center (CORDC) Director, Eric Terrill, is budgeted at no cost for overall program management. Salaries for Assistant Development Engineer James Shannon Scott and Junior Development Engineer William Middleton, the two principal staff members who will maintain the automated shore stations, are budgeted to conduct field operations.

Project Specific Supplies, Materials & Other Direct Costs:

Costs have been included which are project specific costs related to communications, and computer software maintenance and consortium costs related to the use of laboratory computers supporting hardware and software development. These costs are allocated based on direct effort reported by staff in support of the proposed project. Funds are also requested for laboratory supplies related to the use of lab instrumentation such as tools, mechanical and electrical parts necessary for the maintenance of automated shore stations. Computer hardware and supplies are necessary for local data download and backup storage. Monthly networking service for the shore stations is budgeted to continue real-time data telemetry. Field expendables and supplies such as mounting brackets and hardware for maintaining the stations and calibration services of the Conductivity, Temperature, and Depth (CTD) sensors on the automated shore stations have been budgeted. Diving equipment is budgeted enabling staff to service the instrumentation that is mounted on piers at approximately 1-5 meters depth. An additional cage for mounting the instrumentation is budgeted to alleviate long dives on site. Personnel will be able to prep a full station swap with a newly calibrated sensor on the cage cutting dive time from several hours to less than one hour. A new Seabird SEACAT sensor for measuring conductivity, temperature, depth (CTD) and fluorometer sensor are necessary for a full system and will be purchased for this project. Seabird Electronics, Inc. does not offer leasing services; therefore, the sensor will be purchased. Supply and expense items categorized as project specific are for expenses that specifically benefit this project and are reasonable and necessary for the performance of this project.

Travel:

Travel funds are requested for four trips each to Santa Barbara, Santa Monica, and Newport for necessary field equipment and station maintenance. Costs include airfare, per diem, and a rental car for Santa Barbara, and a UCSD vehicle and gasoline expenses for the trips to Santa Monica and Newport.

PI: Robert Guza, Assoc Investigator: W. O'Reilly: Surfzone contaminant trajectory maps

Salaries & Benefits:

Principal Investigator Professor Robert T. Guza's salary is at no charge to this project. Associate Investigator Dr. William O'Reilly will continue to expand and validate the alongshore surfzone current models, and coordinate the implementation of new results into the regional wave modeling framework. Programmers, supervised by Julianna Thomas, will integrate the real-time data and surfzone models into an on-line web display. Specifically, Randy Bucciarelli will focus on integrating the data with GIS maps of the region, Corey Olfe will focus on the validation of the surfzone models and Darren Wright will focus on the real-time data display.
Vicki Kellis will coordinate the data collection and assure that all appropriate metadata are accurate and accessible.

Project Specific Supplies, Materials & Other Direct Costs:

Modeling for the alongshore surfzone currents is computer intensive. Storage media will be necessary for archiving the raw data, computer supplies will be necessary for maintaining the necessary components of the networked system and reporting materials will be necessary for distribution of reports and informational material. IOD computer support costs are requested for computer software maintenance and consortium costs related to the use of project computers supporting hardware and software development. These costs are allocated based on effort reported by staff in support of the proposed project.

Travel:

Funds are requested for mileage to field sampling sites in northern California. It is anticipated that 14 trips will be made, each averaging 100 miles per trip.

Coastal Hazards:

PI: Robert Guza / Assoc Investigator: W. O'Reillly: Coastal hazards

Salaries & Benefits:

Principal Investigator Professor Robert T. Guza's salary is at no charge to this project. Associate Investigator Dr. William O'Reilly will provide customized wave products, and coordinate the implementation of new results into the regional MOP framework. Julianna Thomas will supervise programmers Randolph Cucciarelli, Corey Olfe, and Darren Wright who will integrate model improvements into the appropriate websites. Engineer Brian Woodward will oversee the collection of storm profiles and preliminary data reduction and quality control by Dennis Darnell. Existing survey equipment will be used. Dr. Michele Okihiro will coordinate with stakeholders on data gathering, development of customized products, and dissemination. Vicki Kellis will be coordinating meetings with local Water Quality districts that have a vested interest in learning about particle tracking in the nearshore environment.

Project Specific Supplies, Materials & Other Direct Costs:

Modeling for the alongshore surfzone currents is computer intensive. Storage media will be necessary for archiving the raw data, computer supplies will be necessary for maintaining the necessary components of the networked system and reporting materials will be necessary for distribution of reports and informational material.

Costs have been included which are project specific costs related to communications. Supply and expense items, categorized as project specific, and computer and networking services are for expenses that specifically benefit this project and are reasonable and necessary for the performance of this project. IOD computer support costs are requested for computer software maintenance and consortium costs related to the use of project computers supporting hardware and software development. These costs are allocated based on effort reported by staff in support of the proposed project.

Travel:

Includes mileage to field sampling sites in northern California. It is anticipated that 10 trips will be made, each averaging 100 miles per trip.

For all SIO projects:

The University of California partially supports the salaries of Professors, Associate Professors, Assistant Professors, Researchers, and Associate Researchers, but makes no specific commitment of time or salary to these particular research projects.

Salary recharge rates are charged for actual productive time only (except for non-faculty academic sick leave, which is charged as direct). The rates include components for employee benefits, provisions for applicable merit increases and range adjustments in accordance with University policy. As required to meet project objectives, separate rates for remote location allowance or premium overtime cost will be used when necessary.

Costs have been included which are project specific costs related to communications. Supply and expense items, categorized as project specific, and computer and networking services are for expenses that specifically benefit this project and are reasonable and necessary for the performance of this project.

UCLA

PI: Yi Chao: - Real time modeling

Salaries:

1.00 cal mo/yr is budgeted for PI, Yi Chao, Adjunct Professor. Dr. Chao will maintain the southern California bight wide 1-km ROMS for real-time operations. 4.20 cal mo/yr is budgeted for Researcher, John Farrara. Dr. Farrara will perform a systematic model validation of the 1-km ROMS. 1.36 cal mo/yr is budgeted for TBN, Project Assistant. The TBN Project Assistant will maintain the JIFRESSE infrastructure modeling backbone for JIFRESSE that researchers use to conduct research.

Project Specific Supplies, Materials & Other Direct Costs:

Funds are requested for access, support, and maintenance of high-performing network of computers needed for the project. Publication costs are included for a peer review journal related to this project.

Travel:

Funds are requested for PI Chao to travel to the San Diego, CA (two trips) for research collaboration.

PI: James C. McWilliams: SCCOOS Fine Scale Modeling for NOAA

Salaries:

Prof. James C. McWilliams will advise and oversee this effort at no cost to the project. Funds are requested for 2 months of salary/benefits for Dr. Yusuke Uchiyama and 3.46 months of salary/benefits for Dr. Maarten Buijsman. They will make a numerical simulation with a high-resolution sub-domain encompassing Huntington Beach and Palos Verdes Peninsula using ROMS.

Project Specific Supplies, Materials & Other Direct Costs:

The UCLA infrastructure fee for technological support is requested at a cost of $222.

Travel:

Funds are requested for McWilliams, Uchiyama, and Buijsman to travel to University of California, San Diego for consultation and meetings with other IOOS researchers.

PI: James C. McWilliams - Reanalysis of U.S. West Coast circulation and ecosystem

Salaries:

Prof. James C. McWilliams will advise and oversee this effort at no cost to the project. We request 4.60 months of salary for Hartmut Frenzel, a programmer specializing in biogeochemical modules for the Regional Oceanic Modeling System (ROMS); 3.00 months salary for Dr. M. Jeroen Molemaker, an Associate Researcher specializing in geophysical fluid flows and ROMS modeling; 7 months salary for Dr. Yusuke Uchiyama, an Assistant Researcher specializing in nearshore waves/currents and ROMS modeling; and 8.5 months for Dr. Maarten Buijsman, a postdoctoral researcher specializing in coastal ocean currents and ROMS modeling. Using ROMS they will make the decadal reanalysis with data assimilation for the California Current System and its shoreward extension.

Project Specific Supplies, Materials & Other Direct Costs:

The UCLA infrastructure fee for technological support is requested at a cost of $941.

Travel:

Funds are requested for McWilliams and Uchiyama to travel to University of California, Santa Cruz for consultation and meetings with other IOOS researchers.

PI: Rebecca Shipe - Santa Monica Bay Mooring and HAB Project

Salaries and Benefits:

For PI Shipe to oversee the setup and operation of the project at the piers and moorings, to collect samples from the piers and sustain the quality of phytoplankton taxonomic analyses, two months of salary is requested. In addition, an undergraduate student will assist the PI in water collection and routine analyses. To attract the best student, requested funds will cover approximately half of the work performed, with half being supported by course credit.

Project Specific Supplies, Materials & Other Direct Costs:

Ship charter of the R/V Yellowfin including ship crew and ship fuel are requested for 5 trips per year. The boat charter is $310 per hour and travel and sampling time from the dock is 9 hours. Additional time series cruises will be accomplished using cruises of opportunity.

Water will be sampled at 12 depths between the surface and 300 m depth, with intensive near-surface sampling for HAB parameters. Filtration supplies are calculated based on duplicate chlorophyll a, counts and domoic acid. Silicon analyses require no funding as they are funded by a separate project. Analytical chemical samples have been itemized on a per sample basis, to include chemical reagents and labware, for weekly HAB sampling and monthly sampling at the mooring sites. Shipping costs are included for shipment of frozen samples to HAB project collaborators Mark Brzezinski at UCSB and Dave Caron at USC. Lab supplies including sampling apparatus, filtration apparatus, and microscope are owned by the lab and will not require funding. The UCLA infrastructure fee for technological support for the PI is requested at a cost of $122 per year.

Travel:

Travel to the harbor by the undergraduate student includes car rental and mileage to UCLA to pick up equipment the day prior to the cruise, and between UCLA and the harbor on the day of the cruise. Parking at the Santa Monica pier is $1 per trip. Travel to the piers for HAB sampling

For all UCLA projects:

The University of California partially supports the salaries of Professors, Associate Professors, Assistant Professors, Researchers, and Associate Researchers, but makes no specific commitment of time or salary to thess particular research projects.

Salaries and wages have been calculated on the basis of the University of California Academic Salary Schedule for fiscal year 09-10. Employee benefits have been estimated using the figures agreed upon by the University of California, Systemwide Administration and the DHHS audit agency, the recognized audit agency for the University of California.

A Technology Infrastructure Fee (TIF) is accessed to each project fund number to support the technology infrastructure services that support the entire campus, including the CLA backbone, Commodity Internet, Internet2, BOL services, Connect2, and underground inter-building wiring/cabling and maintenance. Cost is $40.75/month/FTE.

Facilities and Administration (F&A) Costs are based on the Modified Total Direct Cost (MTDC). A copy of agreement can be found at: http://www.research.ucla.edu/ocga/sr2/idcinfo.htm

UCSB

PI: Libe Washburn - Underway CTD

PI Washburn will be responsible for sampling across the San Pedro Channel using an instrument called an underway conductivity-temperature-depth profiler (uCTD). Data will be collected every other week and posted to the web soon after collection. Salary is at no cost to the project.

Salaries:

The project will employ a marine technician, Troy Gunderson, at the Southern California Marine Institute at Terminal Island, CA and funds are requested to do this via a technical services agreement. Twelve months of salary at 40% time is requested for a computer network technologist (to be named) to process and post the data to the web.

Project Specific Supplies, Materials & Other Direct Costs:

Funds are requested for uCTD sensor calibration and modification of the vessel to accommodate the winch used in uCTD field operations. Funds are also requested to purchase hardware necessary for uCTD operations and a spare conductivity sensor for the uCTD to be used in the event of breakage.

PI: Libe Washburn - HF Radar operations:

Washburn will oversee and manage operations and maintenance of the High Frequency (HF) radars extending from Nicholas Canyon in the south to Pt. Sal in the north. This budget component is for costs associated with operating and maintaining the UCSB portion of the high frequency (HF) Radar network for the Southern California Coastal Ocean Observing System (SCCOOS).

Salaries:

Two weeks of summer salary are budgeted for PI Libe Washburn to manage the UCSB HF radar effort and participate in site visits as needed. Twelve months of salary at 25% time is budgeted for Computer and Network Technologist Brian Emery to develop algorithms for evaluating HF radar performance and coordinate activities such as antenna calibrations with HF radar personnel at SIO, USC, and Cal Poly San Luis Obisbo. Four months salary at 50% time is budgeted for emeritus Senior Development Engineer Cyril Johnson to maintain and improve sites, troubleshoot equipment problems, and optimize site design. Twelve months of salary at 25% are requested for Assistant Specialist Melanie Fewings to process data and to produce combined data products using SCCOOS HF radar data and other regional data sources. Fewings will also assist with maintaining site operations. Twelve months of salary

at 75% time is requested for Staff Research Associate David Salazar to maintain the HF radar hardware, communication systems, and other equipment at all HF radar sites.

Project Specific Supplies, Materials & Other Direct Costs:

Funds are requested for costs of operating small boats (i.e., boat use fees, vehicle rental for towing boat, and mileage) to do antenna calibrations. Funds are also requested for electronic components, site hardware, cables, replacement hard drives, tools, etc. These costs are necessary for the maintenance of the remote HF radar sites. Costs have been included which are project-specific costs related to communications such as mailing, faxing, and telephone charges.

Travel:

Funds are requested for Washburn and members of his research group to travel to Vandenberg Air Force Base (four trips) and Santa Cruz Island (two trips) to maintain the HF radar systems.

PI: Mark Brzezinski - Harmful algal blooms

Co-PI Mark Brzezinski will be responsible to the HAB component of the SCCOOS sampling at the Santa Barbara Stearns Warf site at no cost to the project. In addition, Brzezinski's group will be responsible for the analysis of nutrients (ammonium, phosphate, silicic acid, nitrate+nitrite) collected by all HAB groups at each of the five SCCOOS HAB sites.

Salaries:

Jo Goodman, a Ph.D. student of Brzezinski's, has assumed the main responsibility of sampling and phytoplankton enumeration for this project. Funds are requested to support Goodman for 6 months during the academic year and for 3 months during the summer. Goodman will also oversee the analysis of nutrients for the entire project. Those duties will entail coordinating the delivery of samples from other groups to UCSB for analysis, submission of samples for analysis to the analytical laboratory at UCSB's Marine Science Institute, and quality control and organization of the resulting data for submission to the SCCOOS database. She will also be responsible for the data management and data submission of cell count and chlorophyll data generated at UCSB.

Project Specific Supplies, Materials & Other Direct Costs:

Funds are requested for the cost of consumable supplies such as sampling containers, filters, reagents, dry ice for shipping frozen DA samples, microscope supplies, computer supplies and fluorometer supplies.

Analytical services: Brzezinski is responsible for the analysis of nutrient samples for all five SCCOOS sites. Each site will collect samples on a weekly basis for total of 260 samples per year for the proposed monitoring effort. Each sample will be analyzed for the concentration of ammonium, silicic acid, phosphate, and (nitrite & nitrate) at a cost of $2.78 per nutrient analyzed for a total cost of $11.12 per sample. We have also budgeted for an additional 100 samples from expanded sampling efforts made in response to HAB events at each SCCOOS site. Our other direct costs include the cost of renting a vehicle to for travel to and from the sampling site, the cost of shipping frozen domoic acid samples to David Caron at USC for analysis and small boat costs that will be used for UCSB's response sampling to HAB events.

SUBAWARDS - CalPoly & USC

PI: Mark Moline, Cal Poly Tech - Central California High-Frequency (HF) Radar ocean Surface Current Mapping (SCM) and harmful algal bloom components

Salaries:

Dr. Mark Moline will oversee this component at no charge to the project. Salary funds are requested for Brian Zelenke (75% effort) to oversee the HF RADAR program activities including the function, maintenance, data QA/QC, and product development for the existing 8 sites within the node. Additionally, supervision of student participants and coordination with PI and SCCOOS group will be part of these responsibilities. Salary funds are requested for Ian Robbins (20% effort) to oversee the HAB program field activities and includes HAB sampling, instrument maintenance, data QA/QC, supervision of student participants and coordination with PI and SCCOOS group. Undergraduate student support is also included as they will participate in the sampling effort. Along with the salary are the fringe benefits.

Project Specific Supplies, Materials & Other Direct Costs:

Funds are requested for the HF Radar component and include consumable supplies related to the maintenance and potential repair of HF Radar sites (i.e., supplies to support the antennae, replacement cables, protective fencing, and tools related to this effort.) IT hardware and software are also included under this category. Other operating costs include shipping of faulted equipment to the manufacturer for repair and satellite/mobile phone communication costs for data telemetry from each HF Radar site.

Funds are requested for the HAB component and include consumable supplies related to routine water sampling, taxonomic identification and related laboratory supplies to conduct these tasks, such as counting chambers and filters.

Travel:

Travel funds are requested for supporting the two components of the program. Funds are budgeted for costs incurred for travel to and from each HF Radar site. Each site will be visited monthly on average. Cal Poly has two dedicated vans for this effort, so the travel funds are for mileage costs. Funds are requested for PI Moline to travel to San Diego for research collaboration for this component of the project. Costs include air travel, per diem, lodging, and vehicle transportation.

Travel funds are requested to travel to and from the coastal site for HAB sampling. Sampling will be conducted bi-monthly with more intensive efforts during bloom events. Cal Poly has dedicated vans for this effort, so the travel funds are for mileage. Travel funds are also requested for PI Moline to travel to San Diego for research collaboration for this component of the project.

Indirect Costs:

Indirect Costs are negotiated at a rate of 40% of modified total direct costs for this project.

PIs: Burton Jones, David Caron, USC - Harmful Algal Bloom (HAB) surveillance

The budgets within this component apply to two project tasks for the period of July 1, 2010 – June 30, 2011. These two tasks include: 1) Harmful algal bloom monitoring (HAB), and 2) Surface current mapping using High Frequency (HF) radars.

Salaries & Benefits:

One month of salary is requested for PI Jones to oversee the HF radar component of the project and 1.44 months for the coastal glider component. Jones is also part of the SCCOOS leadership team and chairs the SCCOOS Executive Steering Committee.

Two months of TBN biological technician time are requested for the harmful algal bloom monitoring – one month is for the sample processing from the Newport Pier, and the other month is for

processing domoic acid samples from all five SCCOOS HAB monitoring sites. An undergraduate student is requested to assist with the HAB laboratory processing for approximately 120 hours at a rate of $10 per hour with no fringe benefit costs applied to student wages.

High Frequency (HF) radar technician time (6 mos.) is requested for maintenance and operation of the HF radar sites. We are requesting 2.75 months of a HF Radar computer programmer for data management, data processing, and data analysis. An undergraduate student is requested to assist with the HF radar operations for approximately 58.4 hours at a rate of $10/hour with no fringe benefit costs applied to student wages.

For the glider operations, a TBN engineering technician (1.5 months) is requested for servicing and maintaining the gliders between deployments. A TBN software and operations technician is requested for 3.5 months to oversee the glider flight and to process and perform quality checks on the data coming from the glider. This includes both processing and distributing the data for ROMS data assimilation, and for directing opportunistic sampling in conjunction with the HAB monitoring.

The federally negotiated fringe benefit rate for USC is 30% of total salaries. USC does not charge any fringe benefit rate to student wages.

Project Specific Supplies, Materials & Other Direct Costs:

For the harmful algal bloom monitoring, $15,000 is requested for ELISA kits for measurement of domoic acid concentration. This will provide for analysis of 450 samples at a cost of ~$33.33/kit. The analysis of samples will focus on samples where there is a high likelihood for the presence of domoic acid based on the detection of Pseudo-nitzschia in the phytoplankton taxonomic samples. Boat costs are included for extra sampling to determine spatial distributions of HAB species and domoic acid when there are HAB events. Supplies for chlorophyll analysis, shipping of samples to UCSB for nutrient analysis, preservative for sample counts, and sample containers are included for $850.

HF Radar maintenance will require the replacement of various components to maintain continuous, reliable operations of the surface current mapping system. Our oldest units have now been in service for about 3 years. Twenty external hard drives for data storage and backup, are requested at $100/external driver. Two internal drives are requested at $250/drive. Two replacement UPS units for the HF Radar sites are requested at $1,527.50/unit. Two replacement routers are requested at $170/router. Two environmental cabinet air conditioners are requested at a cost of $1,976/unit. Replacement antenna whips are requested for four sites at a cost of $35.50 per site.

For the six glider deployments (~150 days), the battery costs are $9,037, and the Iridium communications $16,800. The Iridium costs support data transfer so that the glider data can be processed, displayed and partially analyzed in near real-time to guide opportunistic sampling from boats.

Boat charter days are requested for HAB monitoring (4 days), HF Radar beam patterns (4 days), and Glider deployment and recovery (6 days). The per day charter costs are $1,500 but on average we use about 0.8 days per trip. The budgeted amount reflects that with a $1,250/day charge.

Travel:

Travel funds are requested for the harmful algal plume monitoring. The HAB monitoring site requires a round trip of 90 miles from USC to the Newport Pier. The budget of $2,475 is for 50 round trips of 90 miles each at $0.55/mile reimbursement rate.

Travel to and from HF radar sites is requested for maintenance and repair. Vehicle costs to visit each site are included. Per diem is included at $42/day. Eighteen days are requested because 50% of the time there will be two people participating in a site visit.

For glider deployments 12 round trips to from USC to Huntington Harbor are requested for glider deployment and recovery. The round trip distance is 80 miles and the mileage rate is $0.55 per mile.

Indirect Costs:

The federally negotiated overhead rate is 62% of total direct costs less the costs of permanent equipment

REDUCED BUDGET
FROM $2.6M TO $1.5M

		$2.5M	$1.5M	Ecosystems and Climate Trends	Water Quality	Marine Operations	Coastal Hazards
ECOSYSTEMS AND CLIMATE TRENDS							
Offshore glider surveys	UCSD - RUDNICK/DAVIS	$ 266,380	$ 200,000	✓	✓		
Underway conductivity, temperature, depth (CTD)	UCSB - WASHBURN	$ 60,000	-	✓	✓		
Egg, larval hydrographic stations nearshore - CalCOFI	UCSD - GOERICKE	$ 109,481	$ 75,000	✓			
Ocean data synthesis through development of climatology and climate relevant indices; hindcast reanalyses for indices with sardine and squid catch	UCSD - RUDNICK SWFSC - MCCLATCHIE	$175,344 $90,000	-	✓			
Regional Ocean Modeling System (ROMS) reanalysis for climate trends and connectivity assessment	UCLA - MCWILLIAMS	$ 239,390	-	✓	✓		
WATER QUALITY							
Harmful Algal Bloom (HAB) surveillance	CAL POLY - MOLINE UCSB - BRZEZINSKI USC - JONES/CARON UCLA - SHIPE UCSD - MCGOWAN	$ 235,914	$ 220,000	✓	✓		
Automated shore stations at four piers (San Diego, Orange County, Los Angeles, Santa Barbara)	UCSD - TERRILL	$ 100,000	$ 75,000	✓	✓		
HAB glider operations	USC - JONES	$ 150,000	-	✓	✓		
ROMS - model evaluation with Huntington Beach 2006 (HB06) data set ($100K real-time, $50K fine resolution. Model implementation)	UCLA - MCWILLIAMS/CHAO	$ 150,216	$ 150,000	✓	✓		
Shoreline/surfzone currents toolset	UCSD - GUZA/O'REILLY	$ 111,319	-		✓	✓	✓
MARINE OPERATIONS							
HF Radar operations and maintenance	CAL POLY - MOLINE	$ 130,718	$ 125,000	✓	✓	✓	✓
	UCSB - WASHBURN	$ 150,000	$ 125,000				
	USC - JONES	$ 150,000	$ 125,000				
	UCSD - TERRILL	$ 150,000	$ 125,000				
COASTAL HAZARDS							
Shoreline inundation forecast tool and National Weather Service (NWS) rip current forecast validation	UCSD - GUZA/O'REILLY	$ 110,444	$ 100,000			✓	✓
DATA MANAGEMENT							
Manage SCCOOS data feeds and outside data integration, data delivery (users/feds), online products, IOOS DMAC, www.sccoos.org	UCSD - TERRILL	$ 230,000	$ 180,000	✓	✓	✓	✓
TOTALS		**$ 2,609,206**	**$ 1,500,000**				

If less funding is available than requested in the proposal, the SCCOOS workplan will be reduced in several areas.
The following tasks would be eliminated:

- Underway Conductivity, Temperature, Depth (CTD)
- Ocean data synthesis through development of climatology and climate relevant indices; hindcast reanalyses for indices with sardine and squid catch
- ROMS reanalysis for Climate Trends and Connectivity Assessment
- Harmful Algal Bloom Glider Operations
- Surfzone transport toolset

Additional reductions would be made to: Egg, larval Hydrographic Stations nearshore for CalCOFI; Automated Shore Stations at four piers (San Diego, Orange County, Los Angeles, Santa Barbara); and HF Radar Operations and Maintenance. SCCOOS data management would also be reduced, including data acquisition, interoperability and integration as well as data delivery (users/feds) and online products.

REFERENCES

Ecosystems and Climate Trends

Chan, F., J. A. Barth, J. Lubchenco, A. Kirincich, H. Weeks, W. T. Peterson, and B. A. Menge1, 2008. Emergence of Anoxia in the California Current Large Marine Ecosystem. Science, 319(5865):920.

Lynn, R.J., T. Baumgartner, C.A. Collins, J. Garcia, T.L. Hayward, K.D. Hyrenbach, A.W. Mantyla, T. Murphree, A. Shankle, F.B. Schwing, K.M. Sakuma and M. Tegner, 1998. The State of the California Current, 1997-1998: Transition to El Niño Conditions. CalCOFI Reports, 39:25-49.

Lynn, R.J. and S.J. Bograd, 2002. Dynamic Evolution of the 1997-99 El Niño-La Niña Cycle in the Southern California Current System. Progress in Oceanography, 54(1-4):59-75.

Sydeman, W.J., M. M. Hester, J. A. Thayer, F. Gress, P. Martin, and J. Buffa. 2001. Climate change, reproductive performance, and diet composition of marine birds of the southern California Current, Progress in Oceanography, 49:209-329.

Sydeman, W.J., R.W. Bradley, P. Warzybok, C.L. Abraham, J. Jahncke, K.D. Hyrenbach, V. Kousky, J.M. Hipfner, and M.D. Ohman. 2006. Planktivorous auklet *Ptychoramphus aleuticus* responses to o cean climate, 2005: Unusual atmospheric blocking? Geophysical Research Letters, 33, L22S09. doi:10.1029/2006GL026736.

Sydeman, W.J. and S.A. Thompson. The California Current integrated ecosystem assessment: trends and variability in system state. Progress in Oceanography (in prep.)

Water Quality

Cetinic, I., B.H., Jones, M.A., Moline, O., Schofield, 2009. Resolving urban plumes using autonomous gliders in the coastal ocean. Journal of Geophysical Research, in review.

Kim, S. Y., B. D. Cornuelle, and E. J. Terrill, 2009. Assessing coastal plumes in a region of multiple discharges: the U.S.-Mexico border. Environmental Science & Technology. Accepted.

Petrenko, A.A., B.H., Jones, T.D., Dickey, M., LeHaitre, and C., Moore, 1997. Effects of a sewage plume on the biology, optical characteristics and particle size distributions of coastal waters. Journal of Geophysical Research-Oceans, 102 (C11), 25061-25071.

Roberts, P.J.W., 1999. Modeling Mamala Bay outfall plumes. I: Near field. Journal of Hydraulic Engineering-Asce, 125 (6), 564-573.

Roberts, P.J.W., W.H., Snyder, and D.J., Baumgartner, 1989. Ocean Outfalls .1. Submerged Wastefield Formation. Journal of Hydraulic Engineering-Asce, 115 (1), 1-25.

Todd, R. E., D. L. Rudnick, and R. E. Davis, 2009. Monitoring the greater San Pedro Bay region using autonomous underwater gliders during fall of 2006. Journal of Geophysical Research, 114, doi:10. 1029/2008JC005086.

U.S. Environmental Protection Agency, 1999. Review of potential modeling tools and approaches to support the BEACH program. 823-R-99-002. U.S. EPA Office of Science and Technology, Washington, D.C.

Marine Operations

National Oceanic and Atmospheric Administration (NOAA), 2006. WaveWatch III Model, Center of Operational Products and Services, http://polar.ncep.noaa.gov/waves/wavewatch/wavewatch.html

National Operational Wave Observation Plan, 2009. http://ioos.gov/library/wave_plan_final_03122009.pdf

National Surface Current Mapping Plan, v1.0, 2009. http://ioos.gov/library/surfacecurrentplan9_3lowres.pdf

Coastal Hazards

Draft California Beach Restoration Survey 2008, 21. http://www.dbw.ca.gov/pdf/DraftCBReS_2008_12052008.pdf

San Diego Foundation Regional Focus 2050 Study http://www.sdfoundation.org/news/pdf/Focus2050glossySDF-ClimateReport.pdf

Ruggiero, P., Holman, R.A. and Beach, R.A., 2004. Wave run-up on a high-energy dissipative beach. Journal Of Geophysical Research- Oceans, 109(C6).

Stockdon, H.F., Holman, R.A., Howd, P.A. and Sallenger, A.H., 2006. Empirical parameterization of setup, swash, and runup. Coastal Engineering, 53(7): 573-588.

Tolman, H. L., 1997. User manual and system documentation of WAVEWATCH-III version 1.15. NOAA / NWS / NCEP / OMB Technical Note 151, 97.

Tolman, H. L., 1999. User manual and system documentation of WAVEWATCH-III version 1.18. NOAA / NWS / NCEP / OMB Technical Note 166, 110.

RESUMES

MARK A. BRZEZINSKI

Professor, Department of Ecology Evolution and Marine Biology,
University of California, Santa Barbara, CA, 805-893-8605, brzezins@lifesci.ucsb.edu

Education

Ph.D., Biological Oceanography, Oregon State University, 1987
B.S. Biology/Marine Science, Southampton College of Long Island University

Appointments

Acting Director of the Marine Science Institute, UCSB, 2007-present
Professor, Ecology Evolution and Marine Biology, 1999-present
Chair, Interdepartmental Graduate Program in Marine Science, UCSB, 2004-2009
Deputy Director of the Marine Science Institute, UCSB, 2001-2007
Associate Professor, Ecology Evolution and Marine Biology, 1995-1999
Assistant Professor, Biological Sciences, UCSB, 1989-1995
Guest Investigator, Woods Hole Oceanographic Institution, 1989

Selected Publications

Anderson, C. R., D. A. Siegel, R. M. Kudela, and M. A. Brzezinski, 2009. Empirical models of toxigenic Pseudo-nitzschia blooms: potential use as a remote detection tool in the Santa Barbara Channel. Harmful Algae 8: 478-492.

Anderson, C. R., D. A. Siegel, M. A. Brzezinski, and N. Guillocheau, 2008. Controls on temporal patterns in phytoplankton community structure in the Santa Barbara Channel, California. J. Geophys. Res.-Oceans 113: C04038.

Brzezinski, M. A., C. Dumousseaud, J. W. Krause, C. I. Measures, and D. M. Nelson, 2008. Iron and silicic acid concentrations together regulate Si uptake in the equatorial Pacific Ocean. Limnol. Oceanogr. 53: 875-889.

Anderson, C. R., M. A. Brzezinski, L. Washburn, and R. Kudela, 2006. Circulation and environmental conditions during a toxigenic Pseudo-nitzschia australis bloom in the Santa Barbara Channel, California. Mar. Ecol. Prog. Ser. 327: 119-133.

DAVID A. CARON

Professor, Department of Biological Sciences,
University of Southern California, Los Angeles, CA, 213-740-0203, dcaron@usc.edu

Education

B.S., University of Rhode Island, Microbiology, 1975
M.S., University of Rhode Island, Oceanography, 1977
Ph.D., Massachusetts Institute of Technology and Woods Hole Oceanographic Institution, Biological Oceanography, 1984

Current Position: Professor, University of Southern California, 1999-present

Recent Awards and Honors: Fellow, American Academy of Microbiology, 2007

Selected Publications

Caron, D.A., P.D. Countway, P. Savai, R.J. Gast, A. Schnetzer, S.D. Moorthi, M.R. Dennett, D.M. Moran and A.C. Jones, 2009. Defining DNA-based operational taxonomic units for microbial eukaryote ecology. Applied and Environmental Microbiology 75: 5797-5808.

Sekula-Wood, E., A. Schnetzer, C.R. Benitez-Nelson, C. Anderson, W. Berelson, M. Brzezinksi, J. Burns, D.A. Caron, I. Cetinic, J. Ferry, E. Fitzpatrick, B. Jones, P.E. Miller, S.L. Morton, R. Schaffner, D. Siegel and R. Thunell, 2009. Rapid downward transport of the neurotoxin domoic acid in coastal waters. Nature Geoscience. In press.

Caron, D.A, 2009. New approaches and accomplishments for assessing protistan diversity and ecology in natural ecosystems. Bioscience 59: 287-299.

Caron, D.A. and R.J. Gast, 2008. The diversity of free-living protists: seen and unseen, cultured and uncultured In: Zengler, K. Accessing uncultivated microorganisms: From the environment to organisms and genomes and back. ASM Press, Washington, DC.

Schnetzer, A., P.E. Miller, R.A. Schaffner, B. Stauffer, B. Jones, S.B. Weisberg, P.M. DiGiacomo, W. Berelson and D.A. Caron, 2007. Blooms of *Pseudo-nitzschia* and domoic acid in the San Pedro Channel and Los Angeles Harbor areas of the Southern California Bight 2003-2004. Harmful Algae 6: 372-387.

YI CHAO

Adjunct Professor, Department of Atmospheric and Oceanic Sciences,
University of California, Los Angeles, CA, 310-794-9832, ychao@jifresse.ucla.edu

Education

Ph.D., Atmospheric and Oceanic Science (AOS) Program, Princeton University, 1990
M.A., Geophysical Fluid Dynamics (GFD) Program, Princeton University, 1987
B.Sc., Atmospheric Physics, University of Science and Technology of China, 1985

Professional Experience

Adjunct Professor, Department of Atmospheric and Oceanic Sciences, UCLA, 2006-present
Scientist, Research Scientist, Principal Scientist, Jet Propulsion Laboratory (JPL), 1993-present
Deputy Manager & Manager, Climate, Oceans and Solid Earth Section, JPL, 2006-2009
Supervisor, Ocean-Atmosphere Interaction Group, JPL, 2005-2006
Post-doctoral Scholar, University of California at Los Angeles, 1990-1992

Selected Publications

Wang, X., Y. Chao, C. Dong, J. Farrara, Z. Li, J. C. McWilliams, J. D. Paduan, and L. K. Rosenfeld, 2009. Modeling tides in Monterey Bay, California. Deep-Sea Research II, doi:10.1016/j.dsr2.2008.08.012.

Li, Z., Y. Chao, J.C. McWilliams, and K. Ide, 2009. A Three-Dimensional Variational Data Assimilation Scheme for the Regional Ocean Modeling System. Journal of Atmospheric and Oceanic Technology, 25, 2074-2090.

Chao, Y., Z. Li, J. Farrara, J. C. McWilliams, J. Bellingham, X. Capet, F. Chavez, J.-K. Choi, R. Davis, J. Doyle, D. Frantaoni, P. P. Li, P. Marchesiello, M. A. Moline, J. Paduan, and S. Ramp, 2008. Development, implementation and evaluation of a data-assimilative ocean forecasting system off the central California coast. Deep-Sea Research II, doi:10.1016/j.dsr2.2008.08.011.

Chao, Y., Z. Li, J. D. Farrara, M. A. Moline, O. M. E. Schofield, and S. J. Majumdar, 2008. Synergistic applications of autonomous underwater vehicles and the regional ocean modeling system in coastal ocean forecasting. Limnol. Oceanogr. 53: 2251-2263.

Li, Z., Y. Chao, J. C. McWilliams, and K. Ide, 2008. A three-dimensional variational data assimilation scheme for the Regional Ocean Modeling System: Implementation and basic experiments, J. Geophys. Res., 113, C05002, doi:10.1029/2006JC004042.

RUSS E. DAVIS

Research Professor, Scripps Institution of Oceanography,
University of California, San Diego, CA, 858-534-4415, redavis@ucsd.edu

Education

Ph.D. and M.S. Chemical Engineering, Stanford University, 1967
B.S. Chemical Engineering, University of California, Berkeley, 1963

Appointments

Research Professor, Scripps Institution of Oceanography, 2007-present
Research Oceanographer, Scripps Institution of Oceanography, 2000-2007
Professor of Oceanography, Scripps Institution of Oceanography, 1977-2000
Assistant/Associate Professor, Scripps Institution of Oceanography, 1968-1977
Assistant Research Geophysicist, University of California San Diego, 1967-1968

Awards and Honors

Member, National Academy of Science; Fellow, American Geophysical Union; Fellow, American Academy of Arts and Sciences; Fellow, American Meteorological Society; A.G. Huntsman Award (1997); Henry Stommel Medal, WHOI (2000); David Packard Distinguished Lecturer (2006); Albert I Medal, IAPSO (2007)

Selected Publications

Davis, R.E., M.D. Ohman, B. Hodges, D.L. Rudnick, J.T. Sherman, 2008. Glider surveillance of physics and biology in the southern California Current. Limnol. Oceanogr. 53, 2151-2168.

Checkley, D.M., Jr., R.E. Davis, A.W. Herman, G.A. Jackson, B. Beanlands, L.A. Regier, 2008. Assessing plankton and other particles in situ with the SOLOPC. Limnol. Oceanogr. 53, 2123-2136.

Sherman, J., R.E. Davis, W.B. Owens and J. Valdes, 2001. The autonomous underwater glider 'Spray.' IEEE Oceanic Eng., 26, 437-446.

Davis, R.E., J.T. Sherman and J. Dufour, 2001. Profiling ALACEs and other advances in autonomous subsurface floats. J. Atm. Oceanic Tech., 18, 982-993.

RALF GOERICKE

Research Oceanographer, Scripps Institution of Oceanography
University of California, San Diego, CA, 858-534-7970, rgoericke@ucsd.edu

Education

Vordiplom, Biology, Kiel University, 1981
M.A., Ecology, Indiana University, 1983
Ph.D., Biological Oceanography, Harvard University, 1989
Post Doc, Chemical Oceanography, Woods Hole Oceanographic Institution, 1990-1993

Appointments

Research Oceanographer, Scripps Institution of Oceanography, 2004-present
Associate Research Oceanographer, Scripps Institution of Oceanography, 2001-2004
Assistant Research Oceanographer, Scripps Institution of Oceanography, 1993-2001

Selected Publications

Roth, M., M. Latz, D. Dehyn, and R. Goericke, 2009. Green fluorescent protein regulation in the coral Acroporo yongei during photoadaptation, subm. J. Experimental Biology.

Hereu, C.M, B. Lavaniegos, and R. Goericke, 2009. Grazing impact of salp (Tunicata, Thaliacea) assemblages in the eastern tropical North Pacific, in press J. Plankton Res.

S. McClatchie, R. Goericke, R. Cosgrove, and R. Vetter, Submitted 2009. Oxygen in the Southern California Bight: multidecadal trends, impact of El Niño, and implications for demersal fisheries. Subm. L&O.

M. R. Landry, M. D. Ohman, R. Goericke, M. R. Stukel, and K. Tsyrklevich, 2009. Lagrangian studies of phytoplankton growth and grazing relationships in a coastal upwelling ecosystem off Southern California. Progress in Oceanography, doi:10.1016/j.pocean.2009.07.026.

Goericke R, Venrick E, Koslow T, et al., 2007. The state of the California Current, 2006-2007: Regional and local processes dominate. CalCOFI Reports, 48: 33-66.

ROBERT T. GUZA

Professor, Scripps Institution of Oceanography,
University of California, San Diego, CA, 858-534-0585, rguza@ucsd.edu

Education

B.A., Johns Hopkins University, Maryland
M.S., Scripps Institution of Oceanography, UCSD, 1971
Ph.D., Scripps Institution of Oceanography, UCSD, 1974

Appointments

Professor, Scripps Institution of Oceanography, 1975-present
Center for Coastal Studies/Integrative Oceanography Division, Co-Director, 1994-2009

Selected Professional Activities

Outstanding Journal Paper Award (Amer. Soc. Civil Eng., Ocean Division, 1991); AGU Fellow (l993); California Shore & Beach Preservation Association 2001 award for outstanding contributions to coastal engineering (with Pawka and O'Reilly); AGU Outstanding Student Paper (junior author w/ student Okihiro 1991, Schmidt 2002, Omand 2006 & Apotsos 2006)

Selected Publications

Omand, M., F. Feddersen, D.B. Clark, P.J.S. Franks, J. J. Leichter, and R.T. Guza, The Influence of Bubbles and Sand on Chlorophyll-a Fluorescence Measurements in the Surfzone, Limnology and Oceanography: Methods, accepted subject to revision.

Apotsos, A., B. Raubenheimer, S. Elgar, and R.T. Guza, 2008. Wave-Driven Setup and Alongshore Flows Observed Onshore of a Submarine Canyon, J. Geophys. Res, 113, C07025, doi:10.1029/2007JC004514.

Apotsos, A., B. Raubenheimer, S. Elgar, and R.T. Guza, 2007. Testing and Calibrating Parametric Wave Transformation Models On Natural Beaches, Coastal Engineering, 55(3), 224-235.

O'Reilly, W. and R.T. Guza, 1998. Assimilating coastal wave observations into regional swell predictions. Part I: Inverse Methods. Journal of Physical Oceanography, 28(4): 679-691.

O'Reilly, W. and R.T. Guza, 1993. A comparison of spectral wave models in the Southern California Bight, Coastal Engineering. Coastal Engineering, 19(3): 263-282.

BURTON H. JONES

Professor, Department of Biological Sciences and Wrigley Institute for Environmental Studies,
University of Southern California, Los Angeles, CA, 213-740-5765, bjones@usc.edu

Education

B.S., Biological Engineering, Rose-Hulman Institute of Technology, 1971
Ph.D., Zoology (Biological Oceanography), Duke University, 1977
Post-Doc, Biological Oceanography, Bigelow Laboratory for Ocean Sciences, 1977-1980

Current Position: Professor (Research), Department of Biological Sciences, USC, 2008-present

Selected Publications

Caron, D. A., M.-E. Garneau, E. Seubert, M. D. A. Howard, L. Darjany, A. Schnetzer, I. Cetinic, G. Filteau, P. Lauri, B. Jones, and S. Trussell, 2009. Harmful algae and their potential impacts on desalination operations off southern California. Water Research 43.

Noble, M., B. Jones, P. Hamilton, J. Xu, G. Robertson, L. Rosenfeld, and J. Largier, 2009. Cross-shelf transport into nearshore waters due to shoaling internal tides in San Pedro Bay, CA. Continental Shelf Research 29:1768-1785.

Reifel, K. M., S. C. Johnson, P. M. DiGiacomo, M. J. Mengel, N. P. Nezlin, J. A. Warrick, and B. H. Jones, 2009. Impacts of Stormwater Runoff Contaminants in the Southern California

Bight: Relationships among Plume Constituents. Continental Shelf Research 29:1821-1835.
Cetinic, I., G. Toro-Farmer, M. Ragan, C. Oberg, and B. H. Jones, 2009. Calibration procedure for Slocum glider deployed optical instruments. Optics Express 17:15420-15430.
Jones, B. H., M. A. Noble, and T. D. Dickey, 2002. Hydrographic and particle distributions over the Palos Verdes Continental Shelf: spatial, seasonal and daily variability. Continental Shelf Research 22:945-965.

JOHN A. MCGOWAN

Research Professor of Oceanography, Emeritus, Scripps Institution of Oceanography, University of California, San Diego, CA, 858-534-2074, jmcgowan@ucsd.edu

Education

B.S., M.S., Oregon State University
Ph.D., Scripps Institution of Oceanography, UCSD

Research Interests

Multiple stable states in the community of the North and South Pacific central water masses; Large scale patterns in space and time and the Californian El Niños; Diversity maintenance; Biogeography; Timeseries in coastal California; Climate and pelagic ecology.

Selected Publications

McGowan, J. A. and M. Williamson. In press. The copepod communities of the North and South Pacific gyres and the form of species abundance distributions. Journal of Plankton Research.
Kim, H.-J., A. Miller, J. A. McGowan, and M. L. Carter, 2009. Coastal phytoplankton blooms in the Southern California Bight. Progress in Oceanography doi:10.1016/jpocean.2009.05.002.
McGowan, J. A., D. R. Cayan and L. M. Dorman, 1998. Climate-Ocean variability and ecosystem response in the Northeast Pacific. Science 281, 210-217.
Rommich, D., and J. A. McGowan, 1995. Climatic Warming and the Decline of Zooplankton in the California Current. Science 267, 1324-1326.
McGowan, J.A., D.G. Martinson, et al., 1995. Temporal change in marine ecosystems. Natural Climate Variability on Decade-to-Century Time Scales. Eds, National Academy Press, 555-570.

JAMES C. MCWILLIAMS

Professor, Institute of Geophysics and Planetary Physics and Dept. of Atmospheric and Oceanic Sciences, University of California, Los Angeles, CA, 310-206-2829, jcm@atmos.ucla.edu

Education

B.S., Honors, Engineering and Applied Mathematics, California Institute of Technology, 1968
M.S., Applied Mathematics, Harvard University, 1969
Ph.D., Applied Mathematics, Harvard University, 1971
Research Fellow in Geophysical Fluid Dynamics, Harvard University, 1971-74

Appointments

Louis B. Slichter Professor of Earth Sciences in the Institute of Geophysics and Planetary Physics and Department of Atmospheric Sciences, UCLA, Los Angeles, CA, 1994-present; Chair, 2007-present
Research Scientist at the National Center for Atmospheric Research, Boulder, CO, 1974-2005

Honors and Committees

Fellow of the American Geophysical Union (2001); Member of the National Academy of Sciences (2002); Jet Propulsion Laboratory Earth Science Advisory Council (1997-present); Visiting Committee for the Division of Geological and Planetary Sciences, California Institute of Technology (1999-present); Scientific Committee for the Département Terre Atmosphère Océan,

École Normale Supérieure (2003-present); Fluid Envelope Sub-Section Head, National Academy of Sciences (2007-present)

Recent Publications

Dong, C., E.Y. Idica, and J.C. McWilliams, 2009. Circulation and multiple-scale variability in the Southern California Bight. Prog. Oceanography, in press.

Mitarai, S., D.A. Siegel, J.R. Watson, C. Dong, and J.C. McWilliams, 2009. Quantifying connectivity in the coastal ocean with application to the Southern California Bight. J. Geophys. Res., in press.

Gruber, N., H. Frenzel, S.C. Doney, P. Marchesiello, J.C. McWilliams, J.R. Moisan, J. Oram, G.K. Plattner, and K.D. Stolzenbach, 2006. Eddy-resolving simulations of plankton ecosystem dynamics in the California Current System: Part I: Model description, evaluation, and ecosystem structure. Deep Sea Res. I. 53, 1483-1516.

Shchepetkin, A.F., and J.C. McWilliams, 2005. The regional oceanic modeling system (ROMS): A split-explicit, free-surface, topography-following-coordinate oceanic model. Ocean Modelling 9, 347-404.

Marchesiello, P., J.C. McWilliams, and A. Shchepetkin, 2003. Equilibrium structure and dynamics of the California Current System. J. Phys. Ocean. 33, 753-783.

MARK ALAN MOLINE

Director, Center for Coastal Marine Sciences and Biological Sciences Department, California Polytechnic State University, San Luis Obispo, CA, 805-756-2948, moline@marine.calpoly.edu

Education

Ph.D. Biology, University of California, Santa Barbara, 1991-1996
B.A. Biology, St. Olaf College, 1987

Appointments

Director, Center for Coastal Marine Science, 2004-present
Professor, California Polytechnic State University, 2007
Associate Professor, California Polytechnic State University, 2003-2007
Adjunct Professor, UC Santa Barbara, 2000-2004
Assistant Professor, California Polytechnic State University, 1998-2002
Postdoctoral Associate, Rutgers University, 1996-1997

Recent Awards and Honors

Fellow, California Council on Science and Technology (2008); Distinguished Scholarship Award, Cal Poly State University (2007); Editors' Citation for Excellence in Refereeing, American Geophysical Union (2005); Earth Systems Scholar, NASA (2004); Frontiers Scientist, National Academy of Science (2002); National Research Distinction Award, Cal Poly State University (2002); Presidential Early Career Award for Scientists and Engineers (2002); Young Investigator Award, Office of Naval Research (2000); New Investigator Program Award, NASA

Selected Publications

Moline, M. A., and O. M. Schofield, 2009. Remote real-time video-enabled docking for underwater autonomous platforms. J. Atmos. Oceanic. Technol., doi:10.1175/2009JTECHO666.1.

Benoit-Bird, K. J., M. A. Moline, C. M. Waluk, and I. C. Robbins, 2009. Integrated measurements of acoustical and optical thin layers I: Vertical scales of association. Continental Shelf Research, doi:10.1016/j.csr.2009.08.001.

Moline, M. A., K. J. Benoit-Bird, I. C. Robbins, M. Schroth-Miller, C. M. Waluk, B. Zelenke. 2009. Integrated measurements of acoustical and optical thin layers II: Horizontal length scales. Continental Shelf Research, doi:10.1016/j.csr.2009.08.004.

WILLIAM C. O'REILLY

Senior Development Engineer, Scripps Institution of Oceanography,
University of California, San Diego, CA, 858-534-6258, bor@cdip.ucsd.edu

Education

B.A., University of Michigan, Env. Eng.,1983
B.A., University of Michigan, Civil Eng.,1983
M.S., Ph.D., Scripps Institution of Oceanography, Oceanography, 1985, 1991
Post-Doctoral Researcher, Scripps Institution of Oceanography, 1991-1993

Appointments

Senior Development Engineer, Scripps Institution of Oceanography, 1993-present
Research Assistant Professor (25% time), US Naval Postgraduate School, 1996-2001
Visiting Scholar, College of Engineering, U.C. Berkeley, 1999-2001

Selected Publications

Ardhuin, F, W.C. O'Reilly, T.H.C. Herbers, and P.F. Jessen, 2003. Swell transformation across the continental shelf. Part I. Attenuation and diretional broadening. J. Phys. Oceanogr., 33, 1921-1939.

Elgar, S., R. T. Guza, W. C. O'Reilly, B. Raubenheimer, and T.H.C. Herbers, 2001. Wave energy and direction observed near a pier, J. Waterway, Port, Coastal, and Ocean Engineering, 127, 2-6.

Ardhuin, F, Herbers, T.H.C., and W.C. O'Reilly, 2001. A hybrid Eulerian-Lagrangian model for wave spectra evolution with application to bottom dissipation on the continental shelf, J. Phys. Oceanogr., 106.

Herbers, T.H.C., Hendrickson, E.J., and W.C. O'Reilly, 2000. Propagation of swell across a wide continental shelf, J. Geophys. Res. 105, 19729–19737.

DANIEL L. RUDNICK

Professor, Scripps Institution of Oceanography,
University of California, San Diego, CA, 858-534-7669, drudnick@ucsd.edu

Education

B.A. Cum Laude, University of California, San Diego, Physics, 1981
Ph.D., Scripps Institution of Oceanography, UCSD, Oceanography, 1987
Postdoc, Woods Hole Oceanographic Institution, 1987-1989

Appointments

Professor, Scripps Institution of Oceanography, UCSD, 2001-present
Deputy Director of Education, Scripps Institution of Oceanography, UCSD, 2005-2008
Associate Professor, Scripps Institution of Oceanography, UCSD, 1997-2001
Assistant Professor, Scripps Institution of Oceanography, UCSD, 1993-1997
Assistant Professor, School of Oceanography, University of Washington, 1989-1993

Selected Publications

Todd, R. E., D. L. Rudnick, and R. E. Davis, 2009. Monitoring the greater San Pedro Bay region using autonomous underwater gliders during fall of 2006. Journal of Geophysical Research, 114, doi:10.1029/2008JC005086.

Davis, R. E., M. D. Ohman, D. L. Rudnick, J. T. Sherman, and B. Hodges, 2008. Glider surveillance of physics and biology in the southern California Current system. Limnology and Oceanography, 53, 2151-2168.

Rudnick, D. L., R. E. Davis, C. C. Eriksen, D. M. Fratantoni, and M. J. Perry, 2004. Underwater gliders for ocean research. Marine Technology Society Journal, 38, 73-84.

REBECCA SHIPE

Assistant Professor, Institute of the Environment and Department of Ecology and Evolutionary Biology, University of California, Los Angeles, CA, 310-794-4903, rshipe@ucla.edu

Education

B.S., The Pennsylvania State University, 1995 (Biology)
Ph.D., University of California, Santa Barbara, 2000 (Marine Science)

Appointments

Assistant Professor, Institute of the Environment and Department of Ecology and Evolutionary Biology, UCLA, 2003-present
Postdoctoral Researcher, Biological Sciences Department, USC, Los Angeles, 2001-2002

Selected Publications

Shipe, R.F., A. Leinweber, and N. Gruber, 2008. Abiotic controls of potentially harmful algal blooms in Santa Monica Bay, California. Continental Shelf Research, 28, 2584-2593.

Shipe R.F., Carpenter E.J., Govil S., Capone D.G, 2007. Limitation of phytoplankton production by Si and N in the western Atlantic Ocean. Marine Ecology Progress Series. 338:33-45.

Shipe, R. F., Curtaz, J.,Capone, D. G. and Carpenter, E. J, 2006. Diatom biomass and productivity in oceanic and plume-influenced waters of the western tropical Atlantic Ocean, Deep Sea Research I. 53,1320-1334.

Shipe, R. F., and M. A. Brzezinski, 2003. Siliceous plankton dominate primary and new productivity during onset of El Nino conditions in the Santa Barbara Basin, California. Journal of Marine Systems. 42, 127-143.

Shipe, R. F., Passow, U., Brzezinski, M.A., Graham, M. A., Pak, D. K. Siegel, D. A. Alldredge, A. L, 2002. Effects of the 1997-98 El Niño on seasonal variations in suspended and sinking particles in the Santa Barbara Basin. Progress in Oceanography. 54, 105-127.

WILLIAM J. SYDEMAN

President/Senior Scientist, Farallon Institute for Advanced Ecosystem Research, Petaluma, CA, 707-478-1381, wsydeman@faralloninstitute.org

Education

Ph.D., Ecology, University of California, Davis, CA, 1999
M.Sc., Biology, Northern Arizona University, Flagstaff, AZ, 1985
B.S., Biology, Lewis and Clark College, Portland, OR, 1979

Appointments

Research Associate, Bodega Marine Laboratory, UC Davis, 2008-present
President/Senior Scientist, Farallon Institute, Petaluma, CA, 2007-present
Research Associate, Integrative Oceanography, UCSD, La Jolla, CA, 2000-present
Director of Marine Ecology, PRBO Conservation Science, Petaluma, CA, 1992-2007

Professional Activities

NCEAS working group, Marine Climate Impacts (June 2009-present); Science Advisory Team, California Ocean Protection Council (2008-present); Co-Chair, Advisory Panel for Marine Birds and Mammals, PICES (2003-present)

Selected Publications

Sydeman, W.J. and S.A. Thompson. The California Current integrated ecosystem assessment: trends and variability in system state. Progress in Oceanography (in prep.)

Sydeman, W.J., J.F. Piatt, and H. Browman (Editors), 2007. Seabirds as indicators of marine ecosystems. Special Volume. Marine Ecology Progress Series 352.

Thayer, J.A. and W.J. Sydeman, 2007. Spatio-temporal variability in prey harvest and

reproductive ecology piscivorous seabird, Cerorhinca monocerata, in an upwelling system. Marine Ecology Progress Series 329:253-265.
Sydeman, W.J., M. M. Hester, J. A. Thayer, F. Gress, P. Martin, and J. Buffa, 2001. Climate change, reproductive performance, and diet composition of marine birds of the southern California Current, Progress in Oceanography 49:209-329.

ERIC J. TERRILL

Technical Director, Southern California Coastal Ocean Observing System
Director, Coastal Observing Research and Development Center, Scripps Institution of Oceanography, University of California, San Diego, CA 858-822-3101, eterrill@ucsd.edu

Education

Ph.D., Physical Oceanography - Applied Ocean Sciences, Scripps Institution of Oceanography, University of California, San Diego, 1998
B.S., Applied Mechanics and Engineering Science (*magna cum laude*), University of California, San Diego, 1993

Research Interests

Applied ocean sciences and technology development: ocean measurement systems, naval hydrodynamics, sensor development, EM (radar) and EO (lidar, imaging) sensing of the air-sea interface, ocean measurement platforms (HF radar, moorings, buoys, autonomous and towed vehicles, fixed platforms), coastal and ocean engineering.

Project Experience

Technical Director of the Southern California Coastal Ocean Observing System (SCCOOS) and founder and director of the Coastal Observing R&D Center (CORDC) at Marine Physical Laboratory, Scripps Institution of Oceanography

Selected Publications

Kim, S. Y., B. D. Cornuelle, and E. J. Terrill, 2009. Assessing coastal plumes in a region of multiple discharges: the U.S.-Mexico border. Environmental Science & Technology. Accepted.
Kim, S., E.J. Terrill. A statistical model for water quality predictions from a river discharge using coastal observations. Eos Trans. AGU, 88(52), Fall Meeting, Supplement.
Kim, S. Y., E. J. Terrill, and B. D. Cornuelle, 2008. Mapping surface currents from HF radar radial velocity measurements using optimal interpolation, J. Geophys. Res., 113, C10023, doi:10.1029/2007JC004244.

JULIANNA O. THOMAS

Executive Director, Southern California Coastal Ocean Observing System
Program Manager, Coastal Data Information Program, Scripps Institution of Oceanography, University of California, San Diego, 858-534-3034, jot@cdip.ucsd.edu

Research Interests

As Program Manager of CDIP, priority is to maintain standards for collecting and disseminating high resolution wave data throughout the marine community. As Executive Director of SCCOOS, priority is the development of the Ocean Observing Systems at regional, state and national levels, promoting inter-agency collaboration, data interoperability and data standards.

Appointments

Executive Director, Southern California Coastal Ocean Observing System, 2008-present
Program Manager, Coastal Data Information Program (CDIP) and Southern California Beach Processes Study (SCBPS), 2001-present
Data Manager, CDIP, 1984-2001

Selected Publications

Swail, V., J. Thomas, S. Gulev, J. Turton, M. P. Etala de Aso, B. Lee, R. Jensen, D. Meldrum, and V. Cardone, Enhanced Global Wave Observation Network, OceanObs 09, in print.

Thomas, J., E. Terrill, R. Guza, and W. O'Reilly, Long Beach/Los Angeles Harbor IOOS Demonstration Project, Regional Integrated Ocean Observing System, CFDA 11.473 Coastal Services Center, NOAA, 2007.

LIBE WASHBURN

Professor, Department of Geography and Institute for Computational Earth Systems Science, University of California, Santa Barbara, CA, 805-893-7367, washburn@icess.ucsb.edu

Education

Ph.D. Engineering Science, University of California, San Diego, 1982
M.S. Engineering Science, University of California, San Diego, 1978
B.S. Mechanical Engineering, University of Arizona, 1974

Appointments

Professor, Department of Geography, UCSB, 1998-present
Associate Professor, Department of Geography, UCSB, 1993-1998
Assistant Professor, Department of Geography, UCSB, 1991-1993
Research Assistant Professor of Physical Oceanography, Center for Earth Sciences, USC, Los Angeles, 1985-1990
Postgraduate Research Oceanographer, Scripps Institution of Oceanography, 1982-1985
Research Assistant and Teaching Assistant, Dept. of Applied Mechanics and Engineering Sciences, UCSD, 1977-1982
Aeroballistics Engineer, General Dynamics, Convair Division, San Diego, CA, 1975-1977

Selected Publications

Melton, C., L. Washburn, and C. Gotschalk, 2009, Wind relaxations and poleward flow events in a coastal upwelling system on the central California coast, in press, J. Geophys. Oceans.

Ohlmann, C., P. White, L. Washburn, E. Terrill, B.M. Emery, and M. Otero, 2007, Interpretation of coastal HF radar derived surface currents with high resolution drifter data, J. of Atmospheric and Oceanic Tech., 24, 4, 666–680.

Cudaback, C., L. Washburn, and E.P. Dever, 2005, Inner-shelf circulation near Pt. Conception California, 110, C10007, doi:10.1029/2004JC002608.

Bassin, C.J., L. Washburn, M.A. Brzezinski, and E.E. McPhee-Shaw, 2005, Sub-mesoscale coastal eddies observed by high frequency radar: A new mechanism for delivering nutrients to kelp forests in the Southern California Bight, Geophys. Res. Let., 32, L12604, doi:10.1029/2005GL023017.

Beckenbach, E.H., and L. Washburn 2004, "Low frequency waves in the Santa Barbara Channel observed by high frequency radar", J. Geophys. Res., 109, doi:10.1029/2003JC00199.

FY 2010 Integrated Ocean Observing System Implementation
Southern California Coastal Ocean Observing System (SCCOOS)

Responses to National Environmental Policy Act (NEPA) Questions

Question C1. Is the proposed activity going to be conducted in partnership with NOAA or would the proposed activity require NOAA's direct involvement, activity, or oversight? If yes, describe NOAA's involvement, activity, or oversight, including the name of the office or program that is involved.

NOAA representatives from the offices of the Coastal Services Center, National Marine Sanctuaries, National Weather Service, Sea Grant, Southwest Fisheries Science Center, and Tijuana River National Estuarine Research Reserve participate in the SCCOOS and CeNCOOS Joint Strategic Advisory Committee.

Question C2. Would the proposed activity involve any other federal agency(ies) partnership, direct involvement, activity, or oversight? If yes, provide the name(s) of the agency(ies) and describe its involvement, activity, or oversight.

The proposed activity would involve the participation of federal agencies on the SCCOOS and CeNCOOS Joint Strategic Advisory Committee including U.S. Army Corps of Engineers, U.S. Coast Guard, U.S. Geological Survey and U.S. Minerals Management Service.

Question D1. Provide a brief description of the location of the proposed activity.

The proposed activity is located in the Southern California Coastal Ocean region. The Categorical Exclusion for the Southern California Coastal Ocean Observing System (SCCOOS) Project is available upon request.

Question E1. List any federal, state, or local permits, authorizations, or waivers that would be required to complete the proposed activity. Provide the date the permit, authorization, or waiver was obtained or will be obtained. Provide copies of the permit, authorization, or waiver as appropriate. Was a NEPA analysis prepared for the permit, authorization, or waiver? If yes, state the title of the NEPA analysis and provide copies of the NEPA analysis. NO.

Question F1. Is there the potential for the proposed activity to cause changes that would be different from normal ambient conditions (e.g., temperature, light, turbidity, noise, other human activity levels, etc.)? If yes, describe the changes and the circumstances that would cause these changes. NO.

Tijuana River National Estuarine Research Reserve

"A Wetland of International Importance" *International Ramsar Convention, 2005*

301 Caspian Way
Imperial Beach, CA 91932
Office (619) 575 3613 x.333
Fax (619) 575 6913
jcrooks@tijuanaestuary.org

28 September 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive #0213
La Jolla, CA 92093

Dear Dr. Terrill,

It is my pleasure to write you this letter of support for your proposal to the FY 2010 Implementation of Regional Integrated Ocean Observing Systems. The Southern California Coastal Ocean Observing System (SCCOOS) continues to be a very valuable resource for wide audiences interested in the southern California's marine environment, including those of us at NOAA's Tijuana River National Estuarine Research Reserve (TRNERR). We therefore strongly encourage further support of your program.

The SCCOOS effort is vital in helping us fulfill the TRNERR's mission in several different ways. One of our core programs at the TRNERR is monitoring of water quality, weather, and biotic indicators within the Tijuana River Estuary, conducted as part of the NERR System-Wide Monitoring Program (SWMP). Of course, one of our goals is better understand the role of the outflow of the often-polluted Tijuana River in the near-shore marine environment, and SCCOOS provides this critical larger context for the information we generate. More broadly, because SCCOOS offers a wealth of other data in an easily accessible format, I often rely on it when I need to provide researchers, decision-makers, and the general public with information on our coastal ocean. I especially appreciate the degree to which SCCOOS has been responsive to the needs and ideas voiced by myself and others.

Again, I would like to strongly support the SCCOOS effort, and I look forward to continued partnership with this excellent program.

Sincerely,

Dr. Jeff Crooks

CITY OF LOS ANGELES
CALIFORNIA

BOARD OF
PUBLIC WORKS
COMMISSIONERS

CYNTHIA M. RUIZ
PRESIDENT

JULIE B. GUTMAN
VICE PRESIDENT

PAULA A. DANIELS
PRESIDENT PRO-TEMPORE

VALERIE LYNNE SHAW

ANDREA ALARCON

ANTONIO R. VILLARAIGOSA
MAYOR

DEPARTMENT OF
PUBLIC WORKS
BUREAU OF SANITATION

ENRIQUE C. ZALDIVAR
DIRECTOR

TRACI J. MINAMIDE
CHIEF OPERATING OFFICER

VAROUJ S. ABKIAN
ADEL H. HAGEKHALIL
ALEXANDER E. HELOU
ASSISTANT DIRECTORS

ENVIRONMENTAL MONITORING DIVISION
12000 VISTA DEL MAR, SUITE 504
PLAYA DEL REY, CA 90293
TEL: (310) 648-5610
FAX: (310) 648-5731

September 11, 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093

Dear Dr. Terrill:

LETTER OF SUPPORT FOR THE SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM (SCCOOS AND THE REGIONAL COASTAL OCEAN OBSERVING SYSTEM)

The City of Los Angeles, Bureau of Sanitation's Environmental Monitoring Division (EMD) is supportive of the Southern California Coastal Ocean Observing System efforts to develop the Regional Coastal Ocean Observing System (RCOOS) for Southern California. SCCOOS provides badly needed coastal and ocean observations and generates extremely useful products for environmental managers, regulators, and nongovernmental agencies (e.g., environmental groups). The City conducts extensive monitoring in the coastal ocean of Southern California, primarily in Santa Monica Bay. A significant portion of this effort involves tracking the Hyperion Treatment Plant's effluent plume as it is discharged from the 5-Mile Outfall pipe into Santa Monica Bay and estimating bacterial concentrations at ankle depth in the surfzone due to the potential for pathogens to adversely impact public health. The effluent plume has the potential for traveling considerable distances and depositing organic particles, metals, and organic pollutants into the sediment within the Bay. Storm drains are the major source of bacteria and other pollutants to these waters, and they mostly discharge into the surfzone.

Southern California beaches and near-shore waters are world famous, and nearly 80 million people engage in water contact recreational activities at Los Angeles and Orange County beaches every year. This is not only an important component of the Southern California life style, but also an important economic engine for the region. Unfortunately, it has been estimated that between 627,800 and 1,479,200 "excess" cases of gastrointestinal illness occur at these beaches each year with estimated healthcare costs of $21 million to $414 million annually; therefore, ensuring good, safe water quality along our coast is an extremely high priority. In addition, the deposition of pollutants and their subsequent accumulation have adverse impacts on the benthic macrofaunal and demersal fish and invertebrate communities. Some of the seafood, e.g., white croakers, have been issued fish advisory notices and may not be safe for consumption.

Knowledge of circulation patterns in the coastal region is meager, especially from a regional perspective. A better understanding of circulation in the shallow and near-shore regions could be extremely valuable because it holds the potential to forecast the fate of surfzone and near-shore pollutants, which would increase our ability to protect public health and the environment.

The work conducted by SCCOOS is important because it is focused on improving our understanding and potential for modeling dispersion within a few hundred meters of the shoreline, which is where most water-contact recreation occurs, as well as the near-shore waters. This information will be useful in studying stormwater dispersion and fate, as well as discharges from wastewater treatment plants. I believe this will greatly benefit monitoring efforts aimed at protecting public health and the environment.

The City of Los Angeles' Hyperion Treatment Plant recently diverted the flow of its wastewater from a pipe with an outfall that is five miles from the shoreline to one that is only one mile from the shoreline in order to inspect the 5-mile pipe. The diversion lasted approximately three days and about 800 million gallons of secondary-treated effluent was discharged through the 1-mile pipe. EMD in conjunction with other researchers conducted an extensive monitoring effort during this diversion. Our monitoring effort greatly benefited from surface current information provided through the Southern California Coastal Ocean Observing System (SCCOOS). The real-time current information provided by SCCOOS enabled us to adaptively modify our sampling grid to better track the discharge plume and to predict the dispersion of the surface plume by the use of a trajectory model developed by SCCOOS researchers using high frequency radar data. If the winds had blown onshore, EMD would have utilized the surfzone model developed by Scripps Institution of Oceanography through SCCOOS to predict the dispersion of the effluent in the surfzone. We believe improved understanding of dispersion in the surfzone may similarly benefit our monitoring efforts in the future, as well as those of other monitoring agencies in southern California, for example the Los Angeles County Sanitation Districts (LACSD), Orange County Sanitation Districts, and the Southern California Coastal Water Research Project, among several others. Both Los Angeles County and the City of Los Angeles are very interested in the near-shore current data and surfzone model of SCCOOS to help shed light on the dispersion of legacy pollutants, i.e., DDT and PCBs that were discharged from the LACSD outfall at White's Point and onto the Palos Verdes shelf.

Also, within the next few years, the Hyperion Treatment Plant in Playa del Rey will need to repair the portion of the 5-mile outfall pipe that was identified as problematic during its internal outfall inspection in November 2006. During this repair period, the City of Los Angeles' Bureau of Sanitation will call upon and work closely with SCCOOS scientists to design and conduct a monitoring program tailored for the diversion of the secondary-treated effluent from the 5-mile to the 1-mile outfall as the City did in 2006.

In summary, the City of Los Angeles shares an interest in better understanding the dynamics of water transport in the surfzone and near-shore waters, which may increase our understanding of the fate of flow from storm drains and other sources into the surfzone as well as the flow from offshore sources into near-shore waters. Because of this, the City believes it will continue to directly benefit from the ocean observing activities proposed by SCCOOS; the City wholeheartedly endorses the proposal and recommends it be funded.

Sincerely,

Masahiro Dojiri, PhD
Division Manager

emdinfo/Corres/SCCOOS
REGIONAL COASTAL OCEAN OBSERVING SYSTEM 2009

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
P.O. BOX 129261, SAN DIEGO, CA 92112-9261
Phone: (619) 338-2222 FAX (619) 338-2088
1 (800) 253-9933
www.sdcdeh.org

JACK MILLER
ASSISTANT DIRECTOR

September 18, 2009

Eric Terrill, Ph.D.
Southern California Coastal Ocean Observing System
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive #0213
La Jolla, CA 92093

Dear Dr. Terrill:

SUPPORT FOR INTEGRATED OCEAN OBSERVING SYSTEMS TO PROVIDE REAL TIME COASTAL WATER QUALITY DATA

The Department of Environmental Health (DEH) Recreational Water Quality Program acts as a clearing house for beach water quality monitoring data in San Diego County and notifies the public when water quality standards are not met at recreational beaches (ocean and bays). The Recreational Water Program coordinates water sampling and posting of signs warning of contaminated water at beaches affected by sewage spills, when monitoring indicates bacteria levels exceed State standards, or during other events that may pose a threat to public health. The warnings (Advisory or Closure), issued by DEH for contaminated waters, allow beach-goers to make informed decisions on where to swim and surf to reduce their risk of illness from water contact.

Since 2003, DEH has used real time data provided by the Southern California Coastal Ocean Observing System (SCCOOS) as a tool to assist in making more accurate and timely decisions for issuing water contact warnings to protect public health. Specifically, the Tijuana River plume trajectory model, a product of the SCCOOS real time monitoring data, has provided greater confidence for decisions to issue water contact closures for south county beaches.

DEH understands that the SCCOOS is funded by grants from the National Oceanic and Atmospheric Administration and the State of California, and encourages continued support for SCCOOS to maintain, operate, and improve the regional observing system. If you have any questions concerning this letter, please contact Mark McPherson, Chief of the Land and Water Quality Division at (858) 495-5572.

Sincerely,

GARY W. ERBECK, Director

GWE/MM:fs

cc: Mark McPherson, Chief, Land and Water Division

Environmental and public health through leadership, partnership and science"

COUNTY OF LOS ANGELES
FIRE DEPARTMENT
1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294
(323) 881-2401

P. MICHAEL FREEMAN
FIRE CHIEF
FORESTER & FIRE WARDEN

October 6, 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive 0213
La Jolla, CA 92093

Dear Dr. Terrill,

As you know our agency is responsible for providing protection for lives, property and the environment along seventy-two miles of coastline in the County of Los Angeles, and over thirty miles of beach. Southern California Coastal Ocean Observing System measurements, models and wave forecasts along the US West Coast have been invaluable to us over the years. Timely and accurate surf information is essential when making staffing decisions and anticipating ocean conditions such as big surf and rip currents.

SCCOOS is an important part of our award winning Coastal Monitoring Network (www.watchthewater.org). Data from SCCOOS is used to update our system with accurate nowcasting and forecasting of swell size and period. watchthewater.org functions as an "electronic tide board" and is viewed by the public over 600,000 times each month.

Thank you for your continued contribution to our public safety mission.

Very truly yours,

Mike Frazer
Chief Lifeguard

SERVING THE UNINCORPORATED AREAS OF LOS ANGELES COUNTY AND THE CITIES OF:

AGOURA HILLS	CALABASAS	DIAMOND BAR	HIDDEN HILLS	LA MIRADA	MALIBU	POMONA	SIGNAL HILL
ARTESIA	CARSON	DUARTE	HUNTINGTON PARK	LA PUENTE	MAYWOOD	RANCHO PALOS VERDES	SOUTH EL MONTE
AZUSA	CERRITOS	EL MONTE	INDUSTRY	LAKEWOOD	NORWALK	ROLLING HILLS	SOUTH GATE
BALDWIN PARK	CLAREMONT	GARDENA	INGLEWOOD	LANCASTER	PALMDALE	ROLLING HILLS ESTATES	TEMPLE CITY
BELL	COMMERCE	GLENDORA	IRWINDALE	LAWNDALE	PALOS VERDES ESTATES	ROSEMEAD	WALNUT
BELL GARDENS	COVINA	HAWAIIAN GARDENS	LA CANADA-FLINTRIDGE	LOMITA	PARAMOUNT	SAN DIMAS	WEST HOLLYWOOD
BELLFLOWER	CUDAHY	HAWTHORNE	LA HABRA	LYNWOOD	PICO RIVERA	SANTA CLARITA	WESTLAKE VILLAGE
BRADBURY							WHITTIER

Heal the Bay
1444 9th Street
Santa Monica CA 90401
ph 310 451 1550
fax 310 496 1902
info@healthebay.org
www.healthebay.org

September 10, 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive 0213
La Jolla, CA 92093

Re: Support for Southern California Coastal Ocean Observing System Proposal (SCCOOS)

Heal the Bay, a non-profit organization with over 13,000 members dedicated to making southern California coastal waters and watersheds safe, healthy and clean, supports the proposal being submitted to NOAA by SCCOOS to develop the Regional Coastal Ocean Observing System (RCOOS) for Southern California as part of IOOS. Heal the Bay has supported SCCOOS since its inception to provide coastal and ocean observations and monitoring for the Southern California Bight. SCCOOS and Heal the Bay have collaborated in efforts to address monitoring of coastal water quality in an effort to improve real-time management of and decision making about our vital coastal resources.

SCCOOS has been developing an ongoing stakeholder-driven, end-to-end ocean observing system that serves local and regional needs for information and data critical to public health and water quality issues. Data services and products developed by SCCOOS are being used to track and monitor stormwater runoff events, sewage outfall plumes, harmful algal blooms and other similar water quality issues. These data are used to provide three-dimensional maps of water quality properties that are made readily available to the public through the SCCOOS web site in near real-time. SCCOOS ongoing operations aid in identifying the source of contamination and predicting the fate and transport of contaminants that impair the beneficial uses of coastal ocean waters. SCCOOS also provided valuable environmental data services to the important monitoring effort of the November 2006 Hyperion Discharge Diversion event by the City of Los Angeles and set the stage for the approach to rapid response by SCCOOS for our region.

Once again, Heal the Bay strongly supports SCCOOS's proposal to continue its development of the Regional Coastal Ocean Observing System for Southern California. The continuation and further development of SCCOOS important programs will provide important scientific information to the public and decision makers that will facilitate protection of southern California's marine and coastal resources.

Sincerely,

Mark Gold, D. Env.
President

COUNTY OF ORANGE
HEALTH CARE AGENCY

PUBLIC HEALTH SERVICES
ENVIRONMENTAL HEALTH

DAVID L. RILEY
DIRECTOR

DAVID M. SOULELES, MPH
DEPUTY AGENCY DIRECTOR

RICHARD SANCHEZ, REHS, MPH
DIRECTOR
ENVIRONMENTAL HEALTH

MAILING ADDRESS:
1241 E. DYER RD., #120
SANTA ANA, CA 92705-5611

TELEPHONE: (714) 433-6000
FAX: (714) 754-1732
E-MAIL: ehealth@ochca.com

Excellence
Integrity
Service

September 25, 2009

Dr. Eric Terrill, COO
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive, #0213
La Jolla, CA 92093

Dear Eric,

As a representative of a Southern California public health agency and beach water quality manager, I would like to take this opportunity to voice our continued support for the Southern California Coastal Ocean Observing System (www.sccoos.org). SCCOOS has evolved into a comprehensive and accurate observing system providing partners, stakeholders and the public with an extensive array of useful ocean observation data and products, much of it real time.

We continue to support SCCOOS by providing shoreline bacteriological water quality monitoring data to SCCOOS on a regular basis. The user-friendly web site provides consumers with recent and historical monitoring site data, GIS reference maps, and compliance analysis with state marine bathing water standards. Site navigation is extremely easy and intuitive. In addition to water quality data, SCCOOS has coordinated the development of a high frequency radar current monitoring system. This real time surface current monitoring system has allowed the San Diego County Environmental Health Agency to predict when contaminated water from the Tijuana River will impact the southern beaches of San Diego County. They are able to preemptively prevent swimmers from being exposed to contaminated ocean waters. This system can also be used to predict where sewage spills or urban runoff will impact when they reach ocean receiving waters.

The use of predictive models, coupled with existing and enhanced water quality monitoring methodologies and real or near real time ocean observing systems, will allow better prediction of potential public health risks associated with the recreational use of California's marine waters. It is important that SCCOOS continues to be an integral part of the solution to these challenges. We strongly support your efforts and look forward to continued and future collaborations with SCCOOS.

If you have any questions, please feel free to call me at (714) 433-6015.

Very truly yours,

Larry Honeybourne
Program Manager
County of Orange, Health Care Agency
Environmental Health

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE

Weather Forecast Office
520 North Elevar St.
Oxnard, CA 93030

October 6, 2009

Julie Thomas
SCCOOS Executive Director
Scripps Institution of Oceanography
University of California at San Diego
9500 Gilman Drive, Mail Code 0214
La Jolla, CA 92093-0214

RE: Federal Funding Opportunity – FY2010 Integrated Ocean Observing System Implementation

Dear Julie,

I strongly endorse this SCCOOS project as proposed to NOAA and greatly look forward to coordinating with your group.

As you are aware, we serve a very complex – and highly traveled – marine area that requires specific and accurate marine observation and prediction information to best serve the marine community. The results of this project can directly benefit multiple areas of our marine services program, plus through the project's goal of building a long term data collection of waves, currents and wind observations, it can benefit NOAA's role in better understanding and communicating climate change and its impacts across our coastal communities.

This project can have tremendous benefits on our overall marine program responsibility to help better ensure safe and efficient marine transportation across our waters. More specifically, the work to develop detailed ocean current data and surface wind analyses will benefit our support of oil spill response, and marine area search and rescue efforts. We also look forward to working with you in integrating coastal wave height and alongshore current information for an improved rip current warning and advisory program. This, along with the proposed web page designed to provide important rip current information for lifeguards, will ultimately help mitigate a hazard that can impact a very large population of beachgoers across southern California.

I am committed to help ensure the success of this SCCOOS project and look forward to future project collaborations that can benefit our marine and climate services.

Sincerely,

Mark E. Jackson

Meteorologist in Charge
WFO Los Angeles/Oxnard

United States Department of the Interior

U. S. GEOLOGICAL SURVEY

Western Coastal and Marine Geology Team
400 Natural Bridges Drive
Santa Cruz, CA 95060
(831-427-4746); sjohnson@usgs.gov

September 4, 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography
9500 Gilman Drive, 0214
La Jolla, CA 92093

Dear Dr. Terrill,

I am writing to provide a letter of support for the proposal submitted by the Southern California Coastal Ocean Observing System (SCCOOS) for the NOAA funding opportunity: FY 2010 Implementation of Regional Integrated Ocean Observing System. I am a Research Geologist for the U.S. Geological Survey's Western Coastal and Marine Geology Team (WCMG), also Chair of the USGS Western Region Ocean Science Coordination (WROC) group. WCMG works across the western U.S. with a focus on coastal geologic hazards (e.g., erosion, tsunamis, earthquakes), seafloor and habitat mapping, environmental quality and monitoring, natural resources, and communication/outreach on these topics. The WROC attempts to coordinate and integrate multidisciplinary (geology, biology, geography, hydrology) ocean science conducted across ten science centers in the western U.S., including Alaska and Hawaii. I also serve as a member of the SCCOOS Science Advisory Committee. Through these roles, I've become familiar with the history and development of SCCOOS. I've been continually impressed with the range of data products and services provided by SCCOOS and with their commitment to provide these to the public through an excellent, easy-to-use web portal.

WCMG hosts one large effort, the "California Urban Ocean Project" that focuses largely on sediment "source-to-sink" issues in southern California. Project members commonly rely on SCCOOS for real time and archived information on wave climate, surface currents, and other ocean conditions to provide the framework for understanding sediment and contaminant budgets and transport. As one example, we're presently conducting an important ecosystem restoration and sediment transport experiment ("fate and transport of fines") for the Tijuana Estuary and offshore area that has relevance for much of the urban California coast and involves numerous important stakeholders (e.g., California Coastal Conservancy, California State Parks, National Estuary Research Reserve, Southern California Wetlands Recovery Project, California Sediment Management Workgroup). SCCOOS "plume tracking" data offshore of the Tijuana River was important to the design of this investigation and is being relied on as an important data set as work continues and analysis begins. As another example, we are using SCCOOS data for our work in the USGS Southern California Multihazards Demonstration Project, building an inundation and physical effects scenario for a large (i.e., 100 yr) winter storm – this work also has obvious importance for evaluating sea level rise impacts. More generally, SCCOOS data are and will continue to be essential for monitoring both short- and long-term environmental change, a critical regional need during this highly dynamic period of changing climate.

My understanding is that SCCOOS is funded entirely by grants from NOAA National Ocean Service and by the State of California. I think continued support of SCCOOS from these sources is very important to the regional ocean science community. There is a clear continuing need to operate, maintain, and improve the regional observing system. I hope this letter will be helpful in obtaining continuing support for SCCOOS. Please do not hesitate to contact me directly if you need additional information.

Sincerely,

Samuel Y. Johnson
Research Geologist
Western Region Oceans Coordinator

CeNCOOS

Central and Northern California Ocean Observing System

October 12, 2009

Julie Thomas, Executive Director
Southern California Coastal Ocean Observing System
Scripps Institution of Oceanography, University of California San Diego
9500 Gilman Drive, 0214
La Jolla, CA 92093-0214

Dear Ms. Thomas:

Please accept this letter of support from the Central and Northern California Ocean Observing System (CeNCOOS) for your proposal to NOAA, "Implementation of Regional Integrated Ocean Observing Systems: The Southern California Coastal Ocean Observing Systems (SCCOOS)."

Due to shared ocean issues and initiatives in California and along the West Coast, it is imperative that the two Regional Associations (RAs), SCCOOS and CeNCOOS, work collaboratively and seamlessly to respond to state and regional needs. Additionally, a more cohesive partnership allows the RAs to effectively represent the National Integrated Ocean Observing System, its goals and its values, at local levels.

It is critical that regional ocean governance structures such as the California Ocean Protection Council and the West Coast Governors Agreement on Ocean Health, as well as all of our partners and stakeholders, perceive each RA as effective, collaborative, capable, and equal. This perception and our ability to operate effectively will be greatly enhanced if the proposed activities are realized.

CeNCOOS needs SCCOOS to operate and vice-versa. We already share a Joint Strategic Advisory Committee, an underway effort to meet the state's Harmful Algal Bloom Monitoring and Prediction requirements, data management and modeling strategies, and an array of partners that operate state-wide. Many of the successful applications and products created for one region are simply being transferred and tailored to the other. Our effective efforts to collaborate, reduce redundancy, identify priorities, and create local, state and regional products are recognized by our users. Examples of our success can be found in our collaborative responses to Marine Spatial Planning initiatives and to priorities such as Ecosystem and Climate Trends, Water Quality, Marine Operations, and Coastal Hazards.

SCCOOS is a success and an ideal model for an IOOS Regional Association. They respond to user needs rapidly and operate a highly functioning program. Please consider their proposal and its value not only to Southern California, but also to joint efforts with CeNCOOS for all of California, and to IOOS as a whole.

Sincerely,

Heather Kerkering

Heather Kerkering
CeNCOOS Coordinator

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
SAN DIEGO BORDER LIAISON OFFICE
610 West Ash Street
Suite 905
San Diego, CA 92101

September 24, 2009

Eric J. Terrill, Ph.D.
Director, Coastal Observing Research and Development Center
Marine Physical Laboratory
Scripps Institution of Oceanography
La Jolla, CA 92093-0213

Dear Dr. Terrill:

EPA wishes to thank you for the work you performed for us using the Southern California Coastal Ocean Observing System (www.sccoos.org). The products you generated for us in the past are currently being used to assess the impact of the effluent from the Mexican wastewater treatment plant on U.S. coastal waters. Such an assessment is required by the National Environmental Policy Act (NEPA) in order to document the environmental impacts resulting from the proposed Tijuana wastewater infrastructure projects that EPA hopes to help finance through the Border Environmental Infrastructure Fund.

EPA also anticipates using past and future SCCOOS data to determine if there is a correlation between ocean-current direction and beach water quality in Tijuana and Rosarito as a means of predicting exceedances in water quality standards for bacteria. Such forecasting would allow Mexican authorities to post beach warnings and thereby protect public without having to wait for results from weekly (or monthly) water quality sampling. We look forward to your help in this effort as well.

Thank you again for your assistance.

Sincerely,

Doug Liden

Doug Liden
U.S.-Mexico Border Coordinator
Water Division, USEPA Region 9

California Regional Water Quality Control Board
Los Angeles Region

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: http://www.waterboards.ca.gov/losangeles

Linda S. Adams
Cal/EPA Secretary

Arnold Schwarzenegger
Governor

September 14, 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive, #0213
La Jolla, CA 92093

PROPOSAL TO THE NATIONAL OCEANOGRAPHIC AND ATMOSPHERIC ADMINISTRATION FOR 100S FUNDING TO PROVIDE OPERATIONALFUNDS FOR SCCOOS MONITORING SYSTEM

Dear Dr. Terrill:

I am writing to express my support for a grant proposal submitted for consideration for funding by the National Oceanographic and Atmospheric Administration. The proposal would provide operational funds for the SCCOOS monitoring system. The SCCOOS monitoring would place an emphasis on two areas: 1) monitoring for harmful algal blooms; and 2) tracking and modeling of discharge plumes, although it includes other very useful components.

The Los Angeles Regional Water Quality Control Board, the United States Environmental Protection Agency and many other interested stakeholders are concerned about the apparently increasing frequency and severity of harmful algal blooms in our coastal waters. In order to protect public health and assess ecological risks associated with such events, regulatory agencies such as mine need better tools to track the occurrence of bloom events. We also need to understand the mechanisms that trigger such events, particularly if blooms are caused or stimulated by anthropogenic inputs such as stormwater runoff or wastewater treatment plant discharges.

The SCCOOS proposal would include several monitoring elements designed to track harmful algal blooms and monitor for bloom forming conditions. This type of monitoring should greatly enhance our understanding of the factors that trigger blooms and document the spatial and temporal extent of blooms. The harmful algae and red tide regional maps and other related information presented on the SCOOS website have proven to be quite valuable to my agency and others as we implement our management plans to protect water quality and ensure that beneficial

uses of the ocean are maintained. We want to ensure that this type of information continues to be available to water quality professionals and interested members of the public.

The Los Angeles Regional Board believes that the need to track and model the extent of discharge plumes is critical to our mission. Although we have a general understanding of the spatial distribution of the major wastewater plumes discharged into Santa Monica Bay (City of Los Angeles' Hyperion Treatment Plant) and on the Palos Verdes Shelf (Los Angeles County Sanitation Districts Joint Water Pollution Control Plant), we do not have the ability to track these plumes or predict their location on a day-to-day basis. We have much less information about the extent of stormwater plumes discharged by the major river systems in our region (e.g., San Gabriel River, Los Angeles River, Ballona Creek, Santa Clara/Ventura Rivers). We need a better understanding of plume dispersion from these sources so that we can assess and predict effects on water quality (including sediment quality impacts) and marine organisms.

The SCCOOS proposal would include several monitoring elements designed to improve our understanding of the fate of discharge plumes within the Southern California Bight. This monitoring also will allow validation of how well current models describe and predict the movement of plumes away from their sources. The many maps of SCOOS observations available on the web site are improving the Los Angeles Regional Board's ability to assess likely impacts to water quality and beneficial uses. We would like to ensure that this type of information continues to be available as well.

We look forward to making use of remote sensing techniques to improve our understanding of coastal systems and integrating these methods with more traditional in-situ monitoring efforts. Since this is such an important issue to the Los Angeles Regional Board and many of our local stakeholders, I would encourage you to give strong consideration to approving this proposal for funding.

If you have any questions, please contact me at (213)-576-6718.

Sincerely,

J. Michael Lyons
Manager, Surface Water Ambient Monitoring Program, Los Angeles Region

California Environmental Protection Agency

Recycled Paper

Our mission is to preserve and enhance the quality of California's water resources for the benefit of present and future generations.

MX 86 Years 1923-2009

MARINE EXCHANGE SOUTHERN CALIFORNIA VTS

Post Office Box 1949
San Pedro, CA 90733
Phone: 310.519.3134
24-Hr. 310.832.6411
FAX: 310.241.0300
info@mxsocal.org
www.mxsocal.org

A non-profit organization providing Vessel Traffic Service (VTS) and Maritime Information for Southern California

Dr. Eric Terrill
COO
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography University of California, San Diego
9500 Gilman Drive #0213 La Jolla, CA 92093

30 September, 2009

Dear Dr. Terrill:

As a participant in the Southern California Coastal Ocean Observing System (SCOOS), I wanted to affirm your ongoing efforts in our behalf. With CDIP as the keystone, we have benefited greatly from your present products and your ongoing initiatives.

In the busy Port Complex of Los Angeles-Long Beach Harbor, CDIP has proven itself as a useful tool to many of the commercial waterways operators. Wave model predictions are helpful for trip planning of ferries engaged in the open ocean transits between the Harbor and Catalina Island, particularly during the winter months. Both Ports' pilot organizations board arriving ships outside the Harbor breakwater and must be aware of the expected height and direction of swell. The knowledge it provides of conditions at the breakwater entrances can also be of value to them. The San Pedro Vessel Traffic Service also uses it as a forecaster of conditions in the outer anchorages to guard against dragging and to promote general anchorage safety.

The recent introduction by SCCOOS of an high frequency radar at Point Fermin is providing a real time picture of surface currents in the San Pedro Bay, an additional positive element to the Coast Guard's search and rescue posture. Detracting from its utility is its presentation on a separate website. I look at your effort to combine this with CDIP as a start towards the ultimate goal of integration all oceanographic products into a comprehensive, one site portrayal of oceanographic and atmospheric conditions in a given area of interest. As you know, we sponsored a workshop in September toward that purpose, and we are looking forward to the results of that effort with Ms. Julie Thomas' presentation before our Harbor Safety Committee next week.

I wish you success in your efforts and look forward to the new product. Please let me know if we may help in this unique and exciting project.

Sincerely,

Captain R.B. McKenna
Executive Director
Marine Exchange of Southern California.

CITY OF SOLANA BEACH FAX (858) 792-6513 / (858) 755-1782
635 SOUTH HIGHWAY 101 • SOLANA BEACH • CALIFORNIA 92075-2215 • (858) 720-2400

October 8, 2009

Ms. Julie Thomas
Executive Director, Scripps Institution of Oceanography
Southern California Coastal Ocean Observing System
University of California San Diego
9500 Gilman Drive #0214
San Diego, CA 92093

Re: Implementation of Regional Integrated Ocean Observing Systems -
The Southern California Coastal Ocean Observing System (SCCOOS)

Dear Ms. Thomas:

On behalf of the City of Solana Beach, I would like to express our support for the Southern California Coastal Ocean Observing System (SCCOOS).

Funding for this program is of critical importance to Solana Beach and other coastal cities in the San Diego region. Currently we are in the planning stages for several beach restoration programs and are participating with SANDAG and other cities to implement a second Regional Beach Sand Project (RBSP) in 2012. This project is intended to be similar in size and scope to the successful 2001 RBSP which placed more than 2 million cubic yards of sand on beaches through the County. The City of Solana Beach also participates in a Regional Shoreline Monitoring Program which has been ongoing since 1996 which is essential for understanding the health of the local shoreline and management of local beach nourishment programs. Solana Beach will be able to utilize SCCOOS data to implement and monitor future efforts to replenish our beaches and will be used by SANDAG to manage the region's shoreline. We are especially interested in obtaining information that will improve coastal hazard planning and management tools and other data products made available by SCCOOS, especially those related to inundation and shoreline change.

If El Nino materializes as projected, energetic sea conditions this winter will challenge coastal management efforts and threaten the safety of coastal residents. Detailed wave, current, and inundation information for our coast will be invaluable. Given the importance of the information SCCOOS provides, additional funding is needed.

I appreciate your attention to this request. If you have any questions, please contact me at (858) 720-2400.

Sincerely,

David Ott
City Manager

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
Pacific OCS Region
770 Paseo Camarillo
Camarillo, California 93010-6064

IN REPLY REFER TO:

September 10, 2009

Sirs,

I write this letter in support of the Southern California Coastal Ocean Observing System (SCCOOS) program receiving further funds from the National Oceanic and Atmospheric Administration (NOAA). The Minerals Management Service (MMS) understands that SCCOOS is funded by grants from NOAA and the State of California, and we strongly encourage continued support for SCCOOS to maintain, operate, and improve the regional observing system. It is important that SCCOOS retain the ability to generate information and maintain the ability to disseminate it to the public, academia, and government agencies. As we discuss below, the information and data gathered during the grant period will assist MMS in our mission. We strongly endorse SCCOOS's overall efforts and, in particular, this proposal.

The MMS regulates Federal oil and gas operations on the outer continental shelf. In order to fulfill our mission to secure ocean energy in a safe and environmentally sound manner, we use information about the marine environment in making management decisions and during day-to-day operations. Off the Pacific coast, offshore oil and gas operations are concentrated in the Southern California Bight. The SCCOOS provides a valued source of detailed information that improves our ability to perform our mission.

In addition, we anticipate that the Renewable Energy program will become an increasingly important part of our mission. We have developed renewable energy/alternative use regulations and guidance according to the requirements of the Energy Policy Act of 2005 (see 30 CFR 285). The SCCOOS and the Central California Coastal Ocean Observing System (CenCOOS), as well as the Pacific Ocean Observing System, data will be highly valuable since this program will be active over the entire west coast of the U.S.

We are pleased that SCCOOS can provide timely and accurate oceanographic information and data products that are useful to us, including current direction and speed, meteorological data, river plume locations, pollutant sources, and other marine information. We have used SCCOOS data as listed below:

- Response to oil spills – We use near-shore oceanic currents on a small scale as well as wind speeds and directions. The SCCOOS data products such as the Coastal Ocean Dynamics Applications Radar (CODAR), buoy information, and related links greatly enhances our ability to determine spilled oil trajectories. It is also a valuable training tool for drills.
- River plume and pollutant tracking – The use of SCCOOS data products, such as CODAR and buoy information, enable us to follow these episodic events.
- Sea surface temperature and chlorophyll from satellites – The SCCOOS provides a continuous series of information on these critical oceanographic parameters.

- Fish and fisheries – The SCCOOS oceanographic data (current speed and direction) is used to help elucidate patterns of larval fish transport. The MMS will use this kind of information to understand the contribution of offshore structures (such as oil platforms) to fish populations at a regional scale.

It is evident that SCCOOS is providing a one-stop shopping venue through its website and publications. This is unprecedented and is highly beneficial in that MMS scientists can go to one location (the website) and gather either mission-critical data or gain access to web links that provide this information.

Sincerely,

David E. Panzer

BIRCH AQUARIUM
AT SCRIPPS
Scripps Institution of Oceanography
University of California, San Diego

October 1, 2009

Dr. Eric Terrill
Scripps Institution of Oceanography
University of California San Diego
9500 Gilman Drive La Jolla CA 92093

Dear Eric:

I am delighted to write this letter in support of your proposal, *Southern California Regional Coastal Ocean Observing System*. As the SIO Director of the *Center for Ocean Sciences Education Excellence-California* (COSEE-CA) and a Program Scientist at the Birch Aquarium at Scripps (BAS), I am pleased to use the resources and partnerships of both organizations to support education and outreach for your ocean observatory program and to promote the use of SCCOOS data and resources by science educators and students throughout California and the nation. COSEE-CA is part of a National Science Foundation network created to foster scientists' involvement in ocean science education (www.cosee.net). Now in its second five-year funding cycle, COSEE CA includes a new initiative to reach middle school students with online ocean science educational resources. We are working with the San Diego Unified School District's Enhancing Science Education Through Technology program to pilot the educational modules and are delighted to have SCCOOS as a partner in that endeavor. The ability to engage students in using observatory data is one of the goals of our center and the participation of SCCOOS staff, including programmers is essential. This effort is in fact a natural extension of the long-term SCCOOS education and outreach effort conducted in collaboration with the Ocean Institute and will allow us to capitalize on those continuing efforts to reach students first locally and then throughout the nation.

The *Center for Ocean Sciences Education Excellence-California* and the Birch Aquarium at Scripps offer you their full and unqualified support for this innovative proposal. We look forward to hearing that your project has been funded.

Sincerely,

Cheryl Peach
SIO Director, COSEE-CA
Scripps Institution of Oceanography

Stephen Birch Aquarium-Museum
Scripps Institution of Oceanography
University of California, San Diego

Mailing Address
9500 Gilman Drive, Dept. 0207
La Jolla, CA 92093-0207

Location Address
2300 Expedition Way
La Jolla, CA 92093

Telephone (858) 534-FISH
Fax (858) 534-7114
Web Site aquarium.ucsd.edu

George Robertson
20112 Riverside Drive
Santa Ana Heights, CA 92707

Dr. Eric Terrill
Southern California Coastal Ocean Observing System
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive #0213
La Jolla, CA 92093

September 24, 2009

Subject: SCCOOS 2010 NOAA Proposal – Letter of Support

This letter is to support your request to the National Oceanographic and Atmospheric Administration (NOAA) for operational funding for the Southern California Coastal Ocean Observing System (SCCOOS). With over 20 years of professional experience in coastal monitoring and research off Orange County, I believe that the four program components laid out in the SCCOOS 2010 funding request are relevant to better management of this heavily utilized resource.

In particular, information provided by SCCOOS on large-scale spatial and long-term temporal patterns has enhanced my evaluations of potential impacts from a submerged discharge plume on the San Pedro Shelf. Currently the work being done under Ecosystem and Climate Trends allows me to look at local results in the context of regional changes. The Water Quality element, especially the glider work, would allow me to evaluate adopting this technology for routine monitoring work as well as begin to validate the use of models in my analyses (e.g., a coupled initial dilution/ROMS model). I currently use wave data from the CDIP program for my survey work and envision using some of the new products when they are developed, such as the near-real time integration of winds, surface currents and wave models. Finally, the knowledge of extreme events, such as large waves, is important to our ability to sample in shallow water along the open coast.

While local dischargers have mandated long-term monitoring programs, these are usually limited in space and time. Overlaying regional monitoring information, such as that generated and maintained by SCCOOS, on-top of these established programs allows scientists, managers and regulators to place individual discharge findings into the larger environmental context of the Southern California Bight. NOAA's funding will help ensure that the work SCCOOS has begun continues and improves. In closing, I provide my strong support for this funding proposal and for NOAA's continued funding. If you have any questions, please do not hesitate to contact me.

Sincerely,

George L. Robertson, QEP, CSE

Tel: (714) 557-4604
E-mail: g_robertson@roadrunner.com

State of California – The Resources Agency **ARNOLD SCHWARZENEGGER, Governor**

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
1416 Ninth Street
Sacramento, CA 95814

Dr. Eric Terrill
Southern California Coastal Ocean Observing System
Scripps Institution of Oceanography
University Of California, San Diego
9500 Gilman Drive
La Jolla, CA 92093-0219

Dear Dr. Terrill Sept. 18, 2009

This letter is in support of the SCCOOS proposal to NOAA for Regional Coastal Ocean Observing Systems funding for additional ship time for CalCOFI's sampling in 9 additional nearshore stations augmenting the CalCOFI grid.

The State of California's, Department of Fish and Game, Marine Region is responsible for the management of the nearshore marine environment. The nearshore is home to thousands of fished invertebrates and fishes. In 2007, commercial fisheries landed more than 172,000 mtons of fishes and invertebrates in California. Top grossing fisheries were market squid, Dungeness crab, chinook salmon, spiny lobster and red sea urchin. The nearshore live fish fishery is worth more than 2 million dollars having grown quickly since its inception in 1993. While many of the stocks in the nearshore are exploited by both commercial and recreational fisheries, little is known about the reproductive capacity of these stocks. CalCOFI with its ability to quantify larval production in space and time is an invaluable partner in managing state fisheries. CalCOFI tows are able to sample larval fishes from rocky substrates such as cabezon and sheephead, and lingcod as well as from sandy substrate such as California halibut, English sole and rex sole. Both cabezon and sheephead are nearshore species. Trends in production can be used to set fishing limits and quantify the impacts of no-fishing reserve areas. Larval production estimates in and around Marine Protected Areas are critical for assessing their effectiveness, productivity and utility. The expansion of CalCOFI sampling methodology into the nearshore combined with sampling of invertebrate larvae will greatly increase our ability to manage and conserve fished and protected resources.

The nearshore CalCOFI Oceanographic sampling program has already enhanced our knowledge of species that are managed by the State of California. In the past 4 years, funding from NOAA fisheries via SCCOOS to CalCOFI has conducted plankton tows in the nearshore capturing a suite of species previously not sampled. Cluster analyses of the larval fishes from these samples reveal that nearshore SCCOOS stations and nearshore CalCOFI stations are substantially different from the offshore CalCOFI stations (R. Goericke pers. comm.). The differences in larval fishes does not appear to be related to physical or chemical parameters such as temperature, salinity or nitrate (R. Goericke pers. comm.). The nearshore stations are able to sample the high production zone as measured by the chlorophyll a concentrations. Therefore, continued funding of CalCOFI sampling in the nearshore is needed to better understand how physical forcing influences the dynamics of the nearshore fishes and invertebrates managed by the State of California.

Sincerely,

Laura Rogers-Bennett, Ph.D.
Senior Biologist Specialist Marine/Fisheries
CalCOFI Representative, California Department of Fish and Game

Conserving California's Wildlife Since 1870

401 B Street, Suite 800
San Diego, CA 92101-4231
(619) 699-1900
Fax (619) 699-1905
www.sandag.org

October 2, 2009 3200200

Julie Thomas
Southern California Coastal Ocean Observing System,
Executive Director, Scripps Institution of Oceanography
University of California San Diego
9500 Gilman Drive, #0214
San Diego, CA 92093

Dear Ms. Thomas:

SUBJECT: Implementation of Regional Integrated Ocean Observing Systems: The Southern California Coastal Ocean Observing System (SCCOOS)

On behalf of the San Diego Association of Governments (SANDAG), I would like to express our support for the Southern California Coastal Ocean Observing System (SCCOOS).

Funding for this program is of critical importance to California coastal constituents, specifically those in the San Diego region. In 2001, SANDAG managed the Regional Beach Sand Project (RBSP), which placed 2.1 million cubic yards of sand on the region's beaches. SANDAG's Regional Shoreline Monitoring Program, which was initiated in 1996 and continues today, was essential to the design and evaluation of the RBSP. SANDAG can utilize SCCOOS data to implement and monitor future efforts to replenish beaches and manage the region's shoreline. In fact, SANDAG has begun the planning phase for the RBSP II, scheduled for completion by 2012, and will continue to make use of improved coastal hazards data products made available by SCCOOS, especially those related to inundation and shoreline change.

If El Nino materializes as projected, energetic sea conditions this winter will challenge coastal management efforts and threaten the safety of coastal residents. Detailed wave, current, and inundation information for our coast will be invaluable. Given the importance of the information SCCOOS provides, additional funding is needed.

I appreciate your attention to this request. If you have any questions, please contact me at (619) 699-6949 or rru@sandag.org.

Sincerely,

ROB RUNDLE
Principal Regional Planner

AQUARIUM OF THE PACIFIC
A non-profit institution

September 17, 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive #0213
La Jolla, CA 92093

Dear Dr. Terrill:

I am writing in support of the SCCOOS proposal for continued funding from NOAA. It is very clear that the entire IOOS system—the backbone and the regional programs—is a critically important addition to the nation's ocean infrastructure. In some areas, such as Southern California, the regional ocean observing system takes on special importance because of the intensity of societal pressures on the ocean, the multiplicity of uses, and economic and public health implications of those uses, and the complex oceanographic processes on a variety of spatial and temporal scales.

The Southern California Bight is surrounded by a population of more than 20 million people—more than the population of the entire State of New York. It is home to the Nation's two largest ports, through which enter more than one-third of all imports to the U.S. It receives more than 1.3 bgd of partially treated wastewater. It is a major recreational outlet for millions of people with some of the nations, and the worlds, most beautiful and popular beaches. It has the potential to be home to a significant offshore aquaculture industry, and the availability of critical oceanographic data will be important in determining whether, or not, this happens. It soon will become the next segment of the California coast for establishment of a series of Marine Protected Areas. The list goes on, and one thing is clear and that is that we need diverse and high quality oceanographic data to generate the kinds of information that are needed to manage this enormously valuable resource for maximum benefit to society while protecting the natural ecosystem.

The next phase in the evolution of SCCOOS, and indeed of all of the regional systems, will be to forge more and stronger partnerships with a diverse set of potential end-users of the data and to work with them to develop an array of informational products. These informational products must be tailored to meet the needs and opportunities of the end users and be delivered on schedules that are sensitive to their needs. SCCOOS is well positioned to grow its customer base and meet the need for tailored and timely products. We also need to make the public more aware of the importance of SCCOOS and other components of IOOS so they will be supportive of the public investments that are needed to sustain this important network.

The Aquarium of the Pacific is the only large aquarium in all of Southern California with an attendance that now exceeds 1.5 million visitors per year, and that has grown in each of the past seven years. We are very interested in strengthening our partnership with SCCOOS to make the public more aware of the power and the promise of ocean observing. We also are very interested in working with SCCOOS to convene groups of potential stakeholders to help shape the portfolio of informational products to serve a variety of end-user needs.

In summary, I, and the Aquarium of the Pacific, are very supportive of SCCOOS efforts and applaud the progress SCCOOS has made in building regional observing capabilities for Southern California. We urge NOAA to support SCCOOS's proposal to continue development of this valuable and needed regional observing system.

Sincerely,

Jerry R. Schubel
President and CEO

100 Aquarium Way, Long Beach, CA 90802
Telephone 562 590 3100 Facsimile 562 590 3109
www.aquariumofpacific.org

SOUTHERN CALIFORNIA COASTAL WATER RESEARCH PROJECT
A Public Agency for Environmental Research

September 8, 2009

Dr. Eric Terrill
Southern California Coastal Ocean Observing System (SCCOOS)
Scripps Institution of Oceanography
University of California, San Diego
9500 Gilman Drive #0213
La Jolla, CA 92093

Dear Dr. Terrill,

The Southern California Coastal Water Research Project (SCCWRP) wishes to indicate our support for the continued development and operation of the Southern California Coastal Ocean Observation System (SCCOOS) under the National Oceanic and Atmospheric Administration (NOAA). With NOAA funding, we understand you will develop new information products and decision support tools, while continuing to provide timely data and critical observations of the coastal ocean.

The Southern California Coastal Water Research Project (SCCWRP) is a research institute focusing on the coastal ecosystems of southern California, from watersheds to the ocean. SCCWRP was formed in 1969 as a joint powers agency, and our mission is to provide a scientific foundation for the management decisions of our member agencies. In a similar capacity, SCCOOS is actively engaged in identifying needs of the water quality management community in southern California by obtaining and synthesizing coastal observations.

SCCWRP is in a unique position to assist your work by serving as a member of the SCCOOS Board of Governors. We are also able to provide a forum representing various sectors of the water quality management community in Southern California, via the SCCWRP Commission. SCCWRP will continue collaborations with SCCOOS to support coastal water quality monitoring and facilitate communication among scientists and water quality managers.

We look forward to working with you in continued partnership.

Sincerely,

Stephen Weisberg, Ph.D.
Executive Director

3535 Harbor Blvd. Suite 110, Costa Mesa, CA 92626-1437
(714) 755-3200 *fax* (714) 755-3299

City of Encinitas

October 12, 2009

Julie Thomas
Southern California Coastal Ocean Observing System
Executive Director, Scripps Institution of Oceanography
University of California San Diego
9500 Gilman Drive #0214
San Diego, CA 92093

Dear Ms. Thomas,

SUBJECT: Implementation of Regional Integrated Ocean Observing Systems: The Southern California Coastal Ocean Observing System (SCCOOS)

On behalf of the City of Encinitas, I would like to express our support for the Southern California Coastal Ocean Observing System (SCCOOS).

Funding for this program is of critical importance to California coastal constituents, specifically those in the San Diego region. The City of Encinitas utilizes this data on a daily basis for program planning, monitoring, sea level rise and monitoring the affects from El Nino. Every key project along the coast relies on this data for baseline project planning for sediment transport modeling and nearshore habitat assessments. The wave and buoy data is critical for wave forecasting during program planning. The City utilizes the monitoring data for critical analysis on beach width changes due to seasonal and storm changes and predictions how waves will impact our beaches in the future. The data has been utilized by consultants to predict sea level rise over the next 50 years and how it affects the US Army Corps of Engineers studies in Encinitas and Solana Beach. The wave data is critical while analyzing the affect from the El Nino and how our beaches change and by how much. The City is also participating in the inundation and shoreline change project which will be very helpful in prediction of overtopping the Coast Hwy 101 and how that will affect traffic and public resources during high surf advisory.

If El Nino materializes as projected, energetic sea conditions this winter will challenge coastal management efforts and threaten the safety of coastal residents. Detailed wave, current, and inundation information for our coast will be invaluable. Given the importance of the information SCCOOS provides, additional funding is needed.

I appreciate your attention to this request. If you have any questions, please contact me at (760) 633-2632 or kweldon@ci.encinitas.ca.us.

Sincerely,

Katherine Weldon
Coastal Program Manager

Tel 760/633-2600 FAX 760/633-2627, 505 South Vulcan Avenue, Encinitas, CA 92024 TDD 760/633-2700

SCCOOS OBSERVATIONS MAP