THE COASTAL SERVICES CENTER MID-YEAR GRANT REPORT
NOVEMBER, 2005

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM (SCCOOS) ORGANIZATION REPORT

SUBMITTED TO:
REBECCA SMYTH
PROGRAM MANAGER
REBECCA.SMYTH@NOAA.GOV
(415) 904-5251

NOAA Regional Association Development Report
Submitted: November 2005

Table of Contents

LIST OF ACRONYMS & ABBREVIATIONS

CDIP	Coastal Data Information Program
CEQA	California Environmental Quality Act
CeNCOOS	Central and Northern California Ocean Observing System
CTAG	Cultural Technical Advisory Group
DMAC	Data Management and Communications
HF	High Frequency
JPL	Jet Propulsion Laboratory
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
RA	Regional Association
SCCOOS	Southern California Coastal Ocean Observation System
SIO	Scripps Institution of Oceanography
SCCWRP	Southern California Coastal Water Research Project

THE CSC MID-YEAR GRANT REPORT
NOVEMBER, 2005

1.0 PROGRESS ON REGIONAL ASSOCIATION DEVELOPMENT

In the fall of 2002, the Southern California Coastal Ocean Observing System (SCCOOS) began the initial design and development of a stakeholder-driven organizational development strategy to enhance and promote the organization, implementation, and application of a regional coastal ocean observing system in Southern California. While significant State and local funds have been invested in the initial organization of SCCOOS, these efforts have been enhanced through regional coordination funds administered by NOAA with the goals to:

- formally engage recognized bodies of regional associations and agency end-users as advisors;
- actively participate with end-users to develop new customers, products, services, and partnering opportunities, including the engagement of market sectors which may be unique to Southern California;
- integrate marine observations acquired by a broad range of data provider user groups;
- develop a viable business plan for the regional observation system that allows for sustainable operation through the engagement of local, regional, state, and federal partners and delivery of useful products to end users; and
- create a sensible governance structure that is consistent with the business plan and meets criteria for certifying the regional association.

SCCOOS is a consortium of scientists, universities and science institutions that is a component of the nationwide Integrated Ocean Observation System (IOOS) administered Ocean.US and supported by NOAA and several other state and federal agencies (http://www.ocean.us./). Potential stakeholders, identified at the onset of this program, have been contacted to outline the integrated goals of SCCOOS and IOOS with a particular focus on identifying short/long term SCCOOS user needs, and to help determine what relationship between SCCOOS and the stakeholder would best encourage long-term interaction. Particular headway has been made in establishing stakeholders in the sanitation districts and local monitoring networks that are interested in either incorporating their data into the SCCOOS data management system, or in having SCCOOS develop data products for their use. SCCOOS has become a recognized organization among State legislators, State appointed environmental working groups and councils, and local interest groups and non-governmental organizations working to improve coastal conditions.

1.1 SPECIFIC ACTIVITIES

To date, SCCOOS has been actively involved in organizing activities for developing and formalizing Southern California's Regional Association. Particular efforts have focused on acquiring data users, raising stakeholders' familiarity with SCCOOS, applying diverse set of

stakeholder interests, communicating the goals of the U.S. Integrated Ocean Observing System to stakeholders and partners, integrating SCCOOS with existing and similar programs, developing regionally supported programs, and further developing the day-to-day operations of the organization. The following past activities represent collective efforts for SCCOOS' growth, and were pursued to incite meaningful discussion, resolution, or action for furthering the SCCOOS mission. These activities can be broadly defined as involving stakeholders (See Section A), developing business and governance procedures (See Section B), or improving data management and communications (See Section C).

A. Specific Activities Taken to Identify and Engage Stakeholders, Including Activities to Establish Education and Outreach Activities

(Per calendar year)

2005

November - The Annual Report and 2006 Annual Work Plan for the Coastal Ocean Currents Monitoring Program (COCMP), sponsored by the State Conservancy, was made available to the public on the SCCOOS website. A stakeholder review panel was assembled by the State and provided a 2 day review of efforts underway within both SCCOOS and CENCOOS to build COCMP was conducted.

November - Key data providers to the SCCOOS data system, including local municipal agencies with monitoring programs, attended the Quality Assurance of Real-Time Ocean Data (qartod) that was held at Scripps Institution of Oceanography.

October - SCCOOS co-sponsored and had an information booth at the annual American Shoreline & Beach Preservation Association (ASBPA) conference in San Francisco on October 10-12, 2005. "The American Shore & Beach Preservation Association recognizes that the shores, beaches and other coastal resources of America provide important quality-of-life assets within the reach of the largest possible number of people in accordance with the ideals of a democratic nation. This Association is dedicated to preserving, protecting and enhancing the beaches, shores and other coastal resources of America."

Supervisor Pam Slater-Price represented San Diego, with a presentation on "A Regional Perspective on Managing Beach Water Quality." Additional attendees included City Officials from SANDAG, Carlsbad and Oceanside.

October- The Tijuana NERR has put in a request to SCCOOS to assist in the creation of LIDAR overflights to characterize the changing sediment volumes and entrance dynamics. This request has been passed to CDIP to see if opportunity exists to piggy-backed these observations onto already funded Army Corp of Engineers data gathering flights that take place 2x/year.

October - At the Estuarine Research Federation (ERF) Conference, Michelle Cordrey from the Tijuana Estuary Preserve presented a poster on the status of coastal ocean and

coastal terrestrial observing systems and provide an environment for discussion of the roles of sustained observing systems in support of coastal and estuarine science and management. NOAA and IOOS organizers held the "Observing Systems Room" for presenting a comprehensive overview of IOOS, Regional Association, and GEOSS.

October - San Diego Union Tribune, “Sifting County's Shifting Sands”: UCSD scientists have completed two studies showing that cliff erosion produces far more sand for local beaches than previously estimated. A six-year study by engineering professor Scott Ashford and graduate student Adam Young found that bluff erosion accounted for 68 percent of the fresh sand that nature provides to the county's eroding beaches. The results of this research are stimulating discussions of how to integrate coastal observations within the framework of the California Sediment Master Plan.

October- SCCOOS participated in a roundtable discussion, and provided a 1 hour briefing, on coastal observing efforts spanning local applications within a West Coast framework at the Official Meeting of the National and Governmental Advisory Committees to the U.S. Representative to the Commission for Environmental Cooperation. This high level commission, established as part of NAFTA, is represented in the U.S. by the Environmental Protection Agency and their counterparts within Mexico and Canada. While the Commissions mission documents refer to their support of GEOSS, committee members requested context of what is the Integrated Ocean Observing System and how that initiative would improve decision making.

September - The Wrigley Marine Science Center, located at Two Harbors on Catalina Island, celebrated its 40th anniversary on Saturday, 27 August 2005. Over 800 guests, including members of the Wrigley family, were on hand to celebrate the occasion. The event included demonstrations, presentations by researchers and displays representing the various efforts of USC and the Wrigley Institute in Marine Sciences. Burt Jones and Matthew Ragan (USC) manned the SCCOOS information booth.

September- SCCOOS meets with the Pacific Gas and Electric (PG&E) power company at their Diablo Canyon nuclear power plant facilities in San Luis Obisbo County. PG&E is interested to a) provide its meteorological data to SCCOOS for data management and integration b) provide a coastal site for a surface current mapping radio antenna c) use data from SCCOOS to better manage plant operations and their cooling water intake system.

August - California Department of Boating and Waterways (CDBW) and California Resource Agency personnel visited SIO. David Pierce and Robert Guza (SIO) presented SCCOOS to the group, followed by a tour of the Coastal Data Information Program (CDIP) facility.

August - SCCOOS exhibited at "The Wave of the Future: Shoreline Preservation Technologies and Strategies Board Conference," hosted by San Diego County Chairwoman Pam Slater-Price, and co-sponsored by SANDAG and CalCoast.

July - SCCOOS met with the Santa Monica Bay Restoration Commission to discuss collaboration with the Technical Advisory Committee (TAC). The Commission is a state entity charged with assessing, monitoring, and restoring the ecological health of Santa Monica Bay. Libe Washburn (UCSB), Keith Stolzenbach (UCLA), and Eric Terrill and Debbie Duckworth (SIO) were at the 6 July meeting. The Restoration Commission is developing a 5 year monitoring program for Santa Monica Bay, and will be collaborating with SCCOOS to ensure a program that is well integrated.

July - SCCOOS Members attended the California Oceans Regional Meeting held by the California Biodiversity Council in Long Beach. The meeting focused on progress of the Southern California Wetlands Recovery Project, as well as recent California ocean economy studies sponsored by the National Ocean Economics Program. Researchers confirmed that California's ocean economy leads the nation, and that this economy is undergoing growth. Judith Kildrow (CSU Monterey Bay), Charles Colgan (University of Southern Maine), Linwood Pendleton (UCLA) and Philip King (SFSU) were among the presenters.

July - John Orcutt (SIO) and SCCOOS outreach and communication coordinator Carolyn Keen attended a meeting at the Aquarium of the Pacific's administrative offices in Long Beach to discuss plans for the Third Southern California Marine Monitoring Conference, to be hosted by the Aquarium of the Pacific, the Wrigley Institute for Environmental Studies, the Catalina Conservancy Divers, and SCCOOS in the spring of 2006. The conference brought together volunteer and organized data collectors in Southern California interested in integrating data into collaborative data management and delivery systems, including SCCOOS.

July - The San Diego Regional Water Quality Control Board held a summit for Project Clean Water (a project funded by Prop. 50) to discuss San Diego watershed protection progress, watershed protection approaches, solutions to water quality issues, and a proposed Statewide General Industrial NPDES permit that would change industry regulations. SCCOOS representatives attended and provided materials outlining the SCCOOS' mission, capabilities and accomplishments.

June - "Watch the Water," the real-time Los Angeles County Coastal Monitoring Network led by Michael Bateman and supported by SCCOOS sought input to their "Stakeholder Project Experience Report;"" this brief survey of 11 questions was designed not only for users of the current system, but for anyone who would like to see similar sites developed for their own communities. SCCOOS provides data management, sensor networking, and data feeds to Watch the Water, which serves coastal information to millions of public beach users.

June - The Consortium for Oceanographic Research and Education sponsored a workshop with the Aquarium of the Pacific on Ocean Literacy. SCCOOS funding partner California COSEE representative Cheryl Peach attended the workshop. Goals of the program were to identify general ocean information topics that should be part of the general public's literacy.

June - SCCOOS Chief Operating Officer, Eric Terrill, presented SCCOOS to the San Diego Area Committee, which is tasked with creating the Southern California Oil Spill Response & Recovery Plan. This plan is mandated under the National Response Plan in accordance with the 1990 Federal Water Pollution Control Act (33 USC 1321, Sect. 311). The Area Committee and SCCOOS are collaborating to define products which may use real-time HF Radar data to monitor and predict surface transport of oil in the event of a spill. The US Coast Guard participants within the Area Group envision eventual use of these products by shipboard personnel via shipboard computers with high-speed internet access. Attendees included members of the Coast Guard, State Department of Fish & Game, California Coastal Commission, NOAA, Chevron/Texaco, Orange County Coastkeeper, and SD County Agency Representatives. The Area Group has offered to host SCCOOS on a regular basis to facilitate communication and provide feedback. All operators have offered in-kind services in support of SCCOOS.

June - Serge Dedina, Executive Director of Wildcoast, a non-profit conservation team based in Imperial Beach, California, organized a roundtable discussion with SCCOOS scientists and operators, and members of an informal South San Diego/Border Water Quality Monitoring Team (composed of NGOs, federal, city, and county officials) The roundtable focused on articulation of first steps toward development of a Comprehensive Border Water Quality Community Action Plan for the US-Mexico border region. Input from this group has provided guidance on developing products using the comprehensive set of observations that already exist within the San Diego Coastal Ocean Observing System.

June - A meeting of SCCOOS scientists and collaborating stakeholders was held at the Orange County Sanitation District in Orange County to seek stakeholder input for planning observations in the Huntington Beach area. This site was selected by stakeholders and SCCOOS scientists because of its chronic water quality problems, combined with the existence of datasets from past observations. A targeted pilot program of observations will be conducted in summer/early fall of 2006 and will be supported by the State of California. Objectives of the effort are to provide data sets useful for validation and calibration of models, and to improve understanding of the mixing and dispersal of pollutants in the inner shelf and surf zone. The details of the pilot design and timing are not finalized, and input and participation from stakeholders, as well as from scientists and engineers not presently associated with SCCOOS, are underway. Attendees included

SCCOOS scientists, USGS personnel, and Los Angeles and Orange County Sanitation District engineers.

May - Bob Guza presented "Surfzone Currents & Beach Water Quality" to the State Water Resources Control Board at the Beach Water Quality Workgroup.

.

May - Radiowave Oceanography Working Group (ROW -5) meeting was held in Costanoa, CA. SCCOOS HF radar working group members attended to present the results of existing surface current mapping efforts in Southern California, discuss applications being developed for search and rescue, marine life resource management, and beach water quality management, and to exchange ideas with the international HF radar community.

April - Data managers from SIO visited NOAA's NDBC to discuss development of a national HF radar data management program for IOOS. The project is expected to build off successes from the NSF sponsored ROADNet program, and will build from an IT infrastructure that has been designed for the State of California sponsored Coastal Ocean Currents Monitoring Program. Meeting participants included principals within both NOAA NOS and NOAA NDBC. As a result of the visit, JIMO is funded to develop the national architecture for a HF radar array as well as establish qa/qc protocols for HF radar.

April - SCCOOS delegates attended the Coast and California's Watersheds: Sacramento Symposium. Organized by the Southern California Wetlands Recovery Project, the California Watershed Network and CalCoast. SCCOOS staff met with key Watershed managers in Southern California to discuss the interplay between coastal and estuarine observatories and areas for potential collaboration.

April - Drs. Bob Guza and Burt Jones organized an Orange County Stakeholders Meeting for April 12, 2005 to discuss and coordinate the Summer 2006 San Pedro Bay Experiment. Please see the attached outreach materials, referenced as **Appendix A**, which describe the work being done in San Pedro. This flier serves as an example of brochures and printed materials for public attending SCCOOS outreach activities.

April - SCCOOS participated in outreach at a California Coastal Coalition Conference attended by appointed and elected State government officials in Sacramento to raise the awareness of IOOS and SCCOOS in Sacramento (www.coastalconference.org).

March - SCCOOS presented at the Orange County Coastal Coalition, which was co-chaired by County Supervisors Tom Wilson (5th District and Vice Chairman of the Board) and Jim Silva (2nd District). The audience included elected city and special district officials, local government staff, non-governmental organization representatives, private consultants, and interested members of the public.

March - SCCOOS sent delegates Steve Aceti and Debbie Duckworth to the first California Ocean Protection Counsel Meeting, and urged the Counsel to include SCCOOS' efforts in the State's inventory of valuable research and monitoring for informed ocean management.

March - SCCOOS delegates served on a panel convened by the Ocean Studies Board to discuss west coast observing efforts. The Board was established by the National Research Council to advise the federal government on issues of ocean science, engineering, and policy. The Ocean Studies Board explores the science, policies, and infrastructure needed to understand and protect coastal and marine environments and resources.

March - Russ Davis, SCCOOS PI and Executive Steering Committee Chair, attended PACOOS' board of governors meeting, and provided an update/review of coordinating SCCOOS with PACOOS. An outcome of the meeting was the placement of representatives of the developing Regional Associations onto the PACOOS Board of Governors.

March – A meeting was convened to develop the SCCOOS web components for an eight-week Weather and Ocean Monitoring Program under development by the Ocean Institute in Dana Point, California. The goal of this effort is to develop SCCOOS science outreach components to meet California 5th grade Earth Science standards. The curriculum under development will focus on both the water cycle and ocean weather. The program will be piloted in three Orange County school districts.

February - SCCOOS provided a briefing to the Southern California Beach Water Quality Working Group (BWQW) to begin dialogue on user input for products within the region. The BWQW is a coalition of Federal, State, and local governmental agencies, environmental advocacy groups, environmental consultants, and scientific researchers. Their mission is to achieve continuous and immediate improvement in water quality at beaches throughout California.

January - SCCOOS was invited to submit a paper for the Spring American Geophysical Union Meeting (23-17 May in New Orleans) Special Session entitled "Regional & Coastal Ocean Observing Systems along the USA Southern Border."

January SCCOOS co-hosted a NOAA information booth at the American Meteorological Society Meeting to provide broad public visibility of IOOS and regional based coastal observing.

2004

December - The Commissioners Technical Advisory Group (CTAG) of the Southern California Coastal Water Research Program (SCCWRP) convened a special 1 day meeting with presentations provided by SCCOOS, NPDES permit holders,

Regional and State Water Resources Control Board members, EPA representatives, and SCCWRP director Steve Weisberg. Discussions focused on a) needs of the ocean discharge community b) planned/funded activities of SCCOOS which directly project onto their monitoring programs c) establishing a process for data sharing, and d) retention of CTAG in both a participatory and advisory function.

November - SCCOOS provided an invited talk to the EPA Beaches Conference to outline how regional coastal observing efforts can meet beach water quality manager needs. Specific examples are provided from existing observing system infrastructure based in the San Diego region.

October - SCCOOS provided an invited talk to the 2004 Headwaters to Oceans (H20) conference in Long Beach, California. "Developing Coastal Observation Systems to Address Water Quality Needs" was presented to an audience of legislative representatives, non-governmental organizations, industry and city/county staff.

October - SCCOOS manned an information booth at the H20 conference in Long Beach, California to provide materials/visibility for efforts related to IOOS.

October Representative Pam Slater-Price (District 3, County of San Diego), gave a keynote address at the H2O conference on coastal observations and SCCOOS.

October A two-day SCCOOS Planning Meeting was held at the Ocean Institute in Dana Point, California. Day one was devoted to stakeholder engagement, including presentations by and to representatives of stakeholder groups in Southern California.

September - SCOOOS maintained an exhibit at the American Association of Port Authorities 93rd Annual Exhibition, 27-30 September 2004, in Long Beach, California. The information booth provided examples of observatory products of direct interest/impact to the maritime and navigation community.

September - A SCCOOS flyer listing pending observations and products was made available on the SCCOOS website and for distribution at outreach events.

September - SCCOOS maintained an exhibit on SCCOOS at the State Lands Commission Prevention First Symposium in Long Beach, California. The Symposium focused on prevention and management of petroleum oil spills, and was well attended by USCG, USN, EPA, NOAA, State personnel, and oil industry representatives.

August - SCCOOS PI's Paul DiGiacomo, Mark Moline, and Eric Terrill attended the IOOS Implementation Conference held in Arlington, Virginia. Recommendations from the IOOS implementation conference were posted on the SCCOOS website.

August – A SCCOOS representative presented SCCOOS/COCMP overview at SCCOOS CTAG meeting hosted by Southern California Coastal Water Research Project Authority (SCCWRP). The outcome of the effort was the scheduling of a special 1-day meeting with involved parties to allow for detailed further discussion.

August - SCCOOS representative presented an overview of SCCOOS to CDR Jon Mosier, US Navy, Anti-Terrorism Force Protection Operations during his visit to SIO.

August - Dr. Burt Jones, Director of USC's Upper Ocean Process Group, presented aspects of SCCOOS at the National Water Research Institute's Urban Runoff Roundtable.

May – Dr. Burt Jones, USC, presented SCCOOS & discharger relationships at the EPA Environmental Monitoring and Assessment Program (EMAP) Symposium in response to an invitation.

March - SCCOOS representatives attended Ocean.US organizational meeting to review criteria for Regional Association certification and the establishment of the National Federation of Regional Associations.

March - SCCOOS members Libe Washburn and Eric Terrill attended the ACT meeting for the Surface Current Mapping Initiative in Florida. California efforts to establish a wide-scale HF radar array were presented.

2003

September - A two-day, SCCOOS Strategic Science Planning Meeting was held at the NRC Beckman Center in Irvine.

2002

September - Legislative workshop held at SIO focusing on the need to bring an Integrated Coastal Ocean Observation System to Southern California. 62 participants.

To provide an example of the depth of information given at each presentation, a presentation that has been made to Orange County City Officials is provided here as **Appendix B**.

B. SPECIFIC ACTIVITIES TAKEN TO PREPARE BUSINESS AND GOVERNANCE PLANS IN ACCORDANCE WITH OCEAN.US GUIDELINES

2005

October - SCCOOS hosted a working group meeting for data providers and users at the 2005 H20 Conference in Huntington Beach. The meeting provided an overview

of SCCOOS and moderated discussion on optimal monitoring activities and data products, as well as an individual question and answer session with SCCOOS data managers. Working group themes were: water quality, marine life resources, and coastal hazards. Forum such as these are helping with the development of the SCCOOS strategic plan.

August - Debbie Duckworth began writing the Business Plan for SCCOOS. She collected technical objectives, operating procedures, funding avenues, and potentially collaborative programs either in progress or in development within State and Federal efforts. She worked with CENCOOS to develop a similar approach for their Business Plan. The goal is to produce a living document that accurately describes the objectives and means of the consortium with enough detail to act as guidance and testimony to the current and past efforts to date.

July - SCCOOS and its Northern California partner, CeNCOOS, received notice that the Resources Legacy Foundation will fund a proposal to support research and writing of business and development plans for the two Regional Associations. The resources will be split between the two organizations to support efforts toward this goal.

June - The National Federation of Regional Associations continues its activities to gain support from the federal government for the Regional Associations. This month NFRA sent letters to Congressman Gilchrest (MD) and Senator Snowe (ME). The recommendations formally adopted at the NFRA Governing Committee meeting in Washington, D.C. in May were recently sent to the Chair of the Ocean.US Executive Committee.

June - The Renewable Natural Resources Foundation released their report "Building Capacity for Coastal Solutions," which identifies areas of high priority as: governance, citing a need for collaboration and support for regional councils; information technology and science, and community empowerment.

June - Charlie Kennel, Director of SIO, presented SCCOOS in his briefing on SIO to the President's Ocean Research Advisory Panel (ORAP meeting at SIO), which, under the President's Ocean Action Plan, advises the Interagency Committee on Ocean Science and Resource Management Integration. See http://www.coreocean.org/Dev2Go.web?id=207773 for more information.

May - The Joint Institute for Marine Observations (JIMO) underwent its five-year review by NOAA. JIMO is the vehicle by which NOAA resources are transferred to SCCOOS, with the MPL-JIMO business office serving the corporate functions of SCCOOS including the acceptance and dispersal of funds to private and public entitities. Eric Terrill presented SCCOOS progress to date to the review committee. NOAA's resultant review considers SCCOOS as an observing system that "could position JIMO and the region as a true leader in the

Earth system research and observations field." The cooperative agreement between SIO and NOAA to operate as JIMO was renewed for five more years.

May - Cheryl Peach (CA COSEE), Julie Thomas and Debbie Duckworth (SCCOOS) participated in the 2nd Annual IOOS Conference. Four SCCOOS delegates representing the organization development team, operations, data management, and SCCOOS E&O provided Southern California representation at the meeting. Co-chair of the IOOS Interoperability demonstration program, Julie Thomas, provided leadership from the CDIP program in guiding IOOS toward the development of sensible data products. Others in attendance from California included Leslie Ewing from the State Coastal Commission.

May - SCCOOS has submitted a proposal to the Resource Legacy Fund Foundation for support in Business Plan Development of two Regional Associations, SCCOOS and CENCOOS. If funded, SCCOOS and CENCOOS will be closer to NFRA accreditation.

May - SCCOOS signed the NFRA Terms of Reference and voted on officers at the NFRA meeting at the Consortium of Oceanographic Research and Education (CORE) office in Washington DC.

April - NFRA provided comments on and suggested language for HR 1489, The Coastal Ocean Observing System Integration and Implementation Act of 2005 to Wayne T. Gilchrest, Chair of the Subcommittee on Fisheries and Oceans.

February - SCCOOS began examining legal and functional structures to meet Ocean.US certification criteria, including the acceptance and dispersal of funds, indemnification, and product liability. Analysis has included MOU structures, examination of 501(c)3 not-for-profit structures, and the use of the Joint Institute of Marine Observations as a business office.

2004

November - The SCCOOS Board of Directors appointed an Executive Steering Committee and a Board Executive Committee. The Executive Steering Committee recommended to the Board the appointment of Eric Terrill as SCCOOS Chief Operations Officer.

October - The SCCOOS user survey became available online.

October - SCCOOS Governance and Planning Meeting held at the Ocean Institute in Dana Point.

August - SCCOOS responded to the Ocean.US request for priorities for the development of an Integrated Ocean Observing System.

August - The First Annual IOOS Implementation Conference--A Joint Federal-Regional Workshop was held in Arlington, Virginia.

March - George Robertson, Chief Scientist from the Orange County Sanitation District, attended Ocean.US meeting to discuss industry participation in the IOOS. Other regional representatives included Buzz Bernstein of Seaspace Corporation.

March - SCCOOS held a Strategic Planning meeting in Santa Barbara and created an operating board and internal review process for prioritizing components to the estimated $11M COCMP program.

February - CeNCOOS and SCCOOS signed an MOU establishing a Federation of California Regional Observing Systems.

2003

September - The Southern California Coastal Water Research Project is unanimously voted to become a member of the SCCOOS Board of Governors MOU.

April - Ocean.US meeting (Washington D.C); the National Federation of Regional Associations (NFRA) was established (attended by John Orcutt, Chair of the SCCOOS Board of Governors).

March - The Memorandum of Understanding between the SCCOOS Board of Governors was signed. The MOU is posted at http://sccoos.ucsd.edu/documentation.shtml. The MOU establishes the framework for the consortium that operates SCCOOS.

February - First SCCOOS organizational meeting held at Scripps Institution of Oceanography.

C. SPECIFIC ACTIVITIES TAKEN TO ADDRESS REGIONAL DMAC ISSUES IN CONCERT WITH NATIONAL IMPLEMENTATION OF THE OCEAN.US DMAC PLAN

2005

November - Ocean color products from the 300m resolution Ocean Color Monitor (OCM) sensor aboard the "Oceansat" satellite are available once again via www.sccoos.org. The data complements already available 1km resolution ocean color products and sea surface temperature (SST) obtained by the MODIS sensor aboard the "Aqua" satellite. Recent imagery from both OCM and MODIS is available in the SCCOOS website.

November - DEBBIE _ADD THE QARTOD MEETING INPUT YOU RECEIVED FROM JULIE HERE

October - SCCOOS member, Julie Thomas, participated and supported the IOOS Interoperability Demonstration (See http://www.openioos.org/), which is the test-bed for addressing DMAC specifics. The Interoperability Demo addresses 3 main issues:

- to establish a National Testbed for interoperability;
- to establish Regional theme orientated demos (that might be of interest to the Weather Service or Coastal Managers); and
- to address standards and protocols.

Certain components of the demo have progressed. However, the demo project is now out for peer review. The intent is to obtain outside advice as to which components the committe should focus on.

September - Mark Moline convened a special session for the 2006 AGU Ocean Sciences Meeting. The session, entitled "New Results From Science Programs Employing Autonomous and Lagrangian Platforms (ALPs)", solicits contributions focused on the ALPS theme with a particular emphasis on science applications and results. This class of instruments facilitates sampling at relevant temporal and spatial scales while providing the continuous presence needed to capture multiple realizations of episodic events and characterize longer-term seasonal and interannual changes. Profiling floats, autonomous underwater vehicles and gliders offer a combination of high-resolution spatial coverage, vertical sampling through the water column and extended (days to years) deployments.

September - The IMT Lab in the Marine Physical Laboratory has installed an underwater junction box at SIO Pier. This installation facilitates quick deployment of instruments in the nearshore and the long-term deployment of sensors.

August - Julie Thomas (SIO), Jerry Wanetick (SIO) and Mark Otero (SIO) attended the Marine Metadata Interoperability Project Workshop in Boulder, Colorado. The workshop focused on metadata management and design standards for metadata mapping. Julie Thomas led both SCCOOS and NOAA participants' work on metadata for waves and currents.

July - The Central Bight Water Quality Working Group, composed of agencies operating publicly operated treatment works, which maintain monitoring station for their NPDES permits, agreed to provide SCCOOS their hydrographic data. Coordination between the various participating organizations, including the Orange County, LA City, LA County, and Ventura/Oxnard Sanitation Districts, has resulted in a standardized grid that is sampled by the different agencies on a quarterly basis.

July - SIO representatives Eric Terrill, Bill O'Reilly and Julie Thomas attended a workshop at the San Diego National Weather Service Office. Personnel from the

Marine Weather Office at Camp Pendleton and the Navy Pacific Meteorology and Oceanography Center on North Island were there for an open exchange of knowledge and data between the various participants, as well as coordinating the communication of priorities for the Integrated Ocean Observing System (IOOS) in Southern California.

May - The SCCOOS Executive Steering Committee, composed of members Russ Davis, Chair (SIO), Paul DiGiacomo (JPL) Burt Jones (USC), Keith Stolzenbach (UCLA) and Libe Washburn (UCSB), prepared a progress report outlining working groups for Near Shore Processes and HF Radar, as well as Data Management.

May- Naval Research Laboratory and the Pacific Fleet weather office begins providing SCCOOS with high resolution weather weather nowcast and forecasts that are not available from the National Weather Service. Graphical products of the surface wind fields are provided to the public via the sccoos.org website in response to user desires for offshore winds in the vicinity of the many Channel Islands within the region.

April - SCCOOS began generating an "Existing practices and short term needs assessment for data management" white paper.

March - A modeling group from SCCOOS composed of Yi Chao (JPL), Bruce Cornuelle (Scripps) and Jim McWilliams (UCLA), along with investigators from the Monterey Bay Aquarium Research Institute and the Naval Research Laboratory have submitted a proposal to a broad agency announcement from the National Ocean Partnership Program (NOPP) to examine and further develop regional modeling capacities. If funded, the program will significantly improves the regions's ability to predict oceanic conditions on the west coast, and will be a component of the Global Ocean Data Assimation Experiment (GODAE). Both SCCOOS and CENCOOS have submitted letters of support for this effort.

April- SCCOOS representatives Eric Terrill, Lisa Lelli, and Mark Otero visited the NDBC to provide recommendations for the management of a nation-wide network of surface current mapping HF radar systems.

March – SCCOOS representatives Julie Thomas and Bill O'Reilly visited NDBC to provide technical guidance for system wide enhancements for the measurement of directional waves and the management of data. Fruitful discussions took place concerning how to add directional sensors to existing NDBC stations in a way that both advances the creation of an offshore deep water directional wave backbone for the entire US, while also addressing each region's coastal wave information priorities.

March – The State Coastal Conservancy approved commencement of work for the Coastal Ocean Currents Monitoring Program (COCMP), a partnership of academic and

government institutions working with industry and private organizations to design a real-time monitoring system for currents along the coastline.

February- SCCOOS representative Julie Thomas attended QARTODII in Norfolk VA to provide expertise on the Quality Assurance of Real-Time Ocean Data.

2004

November- SCCOOS sent delegates to the Coastal Observing Technology Systems (COTS) workshop. In preparation for a nationwide demonstration of IOOS DMAC, SCCOOS had representatives serving on both the QA/QC Working Groups and the Data Aggregation and Assembly Working Groups. Julie Thomas of CDIP was nominated to serve on the IOOS demonstration Steering Committee.

May - SCCOOS submitted a comprehensive proposal the California State Coastal Conservancy with participants from CeNCOOS for $21M worth of coastal current monitoring infrastructure. SCCOOS will be providing data management capacity for this statewide program.

May - SCCOOS representatives Larry Cooper (SCCWRP), Mark Otero (SDCOOS), Paul Reuter (SDCOOS), and Julie Thomas (CDIP) attended OOSTech in Washington D.C. to share experiences in I.T. and online data products.

2003

October - SCCOOS submitted to NOAA a request for resources to implement a pilot observatory effort. The pilot program is to focus on integration of observations and the management of those data.

May - SCCOOS provided a coordinated response plan to the State of California to apply Proposition 40 funds to implement infrastructure to measure ocean currents.

1.2 RESULTS OF THE ACTIVITIES

Establishing a Business Plan.

SCCOOS representatives Eric Terrill and Debbie Duckworth work with NFRA closely by participating in monthly teleconferences and annual meetings held in Washington Dc approximately every February or March. NFRA provides guidance and resources for SCCOOS to develop the procedures and documents necessary for a market-driven business organization. NFRA guidance for creating a Business Plan was key to SCCOOS when producing its own draft Business Plan and while working CeNCOOS to produce a similar plan for that neighboring RA.

Presently, a draft Business Plan has been created which focuses on market analysis and regional needs in Southern California, present and future funding opportunities and in-kind programs and the system's operating procedures. The business plan incorporates practical information to explain SCCOOS broad success in attaining funding and the participation of

exceptional scientists/participants in the consortium to what areas of coastal observation remain SCCOOS objectives and why.

The business plan is intended as a living document and major building block to an organization that proves to be a permanent resource in the state. Areas that are expected to change and require routine review and revision include: the definition of operating costs, the best organization structures to engage users, and legal examination of liability.

The framework for the Business Plan will undergo an internal review among the members of the Executive Steering Committee members in December 2005. The Plan, once reviewed and approved by an outside Senior Advisory Committee in 2006, will be made available to the public.

Mention of the marine resources legacy foundation grant to work with cencoos?

Establishing a Management and Governance Plan.

SCCOOS has developed a functional legal structure that permits sound and efficient means for entering into contracts and receiving/distributing funds in a manner than promotes the bottom-up exchange of ideas. It has demonstrated its functionality through management of approximately $15M in awards since its inception. While management refers to the functions of technical design, building, implementing, and operating SCCOOS, SCCOOS governance is designed to collate key decision-makers of different disciplines and participating entities so that data providers and users are instrumental in the design, operation and improvement of the product development and dissemination.

In the case of SCCOOS, a twelve-member Board of Governors (BOG) makes overall decisions concerning the RA. The BOG in turn, receives guidance from senior stakeholders, funders, and agencies at both the local, State, and Federal level. The BOG is comprised of volunteer representatives from the original operating consortium and decisions are based on findings and advice from the four-member Board Executive Committee (BEC) and the five-member Executive Steering Committee (ESC). While the BOG effectively serves the role for general voice and operation of the consortium's management, the BEC and ESC were established to provide operational oversight, assist with project/opportunity development, long range planning and vision development, and to provide an organized interface with local, state, and federal politics. The BOG and the ESC meet once a year to discuss strategic planning. Voting is be conducted by the Board of Governors and the recordings of which are disseminated through the RA website through meeting minutes and news bulletins. An example of SCCOOS governance in the meeting minutes from the SCCOOS Board of Governors conference call, dated 23 November 2004, is attached as **Appendix C**. This meeting saw the appointment of the Executive Steering Committee, the Board Executive Committee,and Chief Operations Officer. . The most recent BEC and ESC meetings were on October 13, 2005 and November 17, 2005, respectively. The BEC discussed government relations and governance strategies (see **Appendix D** for October 13, 2005 meeting notes), while the ESC discussed how to meet the ongoing and most recent significant budget cuts in NOAA's overall IOOS funding and how SCCOOS would absorb those cuts within the COTS budgets, yet start new programs in the LA Basin region.

Expanding Support for the Governing Body.

"Senior Strategic Advisory Board" (SSAB) check naming – Senior Advisory Committee :

SCCOOS will be adopting a Board to assist the SCCOOS governing body by providing insight and advice on technical and market-driven issues as well as identify markets for SCCOOS. The advisors will be called the "Senior Strategic Advisory Board" (SSAB) and will be made up of key local, State and Federal agencies, interest-group representatives, industry, and other stakeholders. . The SAC will enable state and federal entities to participate and provide input to SCCOOS development and strategic planning efforts without conflicts of interest that arise from 'funder:recipient of funds' situations. The SAC is expected to also be accessible to the ESC to discuss technical, market and funding trends. Based on their input, the ESC will further advise the BOG of strategic planning options.

The observational and data management components of SCCOOS are managed by a consortium of eleven Southern California universities and laboratories, with institutional representatives serving as the Board of Governors. Consortium members include the California Polytechnic State University, San Luis Obispo (CalPoly), the University of California campuses at Santa Barbara (UCSB), Los Angeles (UCLA) and Irvine (UCI), The Jet Propulsion Laboratory, University of Southern California, Cal State Los Angeles, the Southern California Coastal Water Research Project (SCCWRP), Scripps Institution of Oceanography, the Universidad Autonoma Baja California (UABC), and Centro de Investigacion Cientifica y de Educacion Superior de Ensenada (CICESE). Each institution has a history of coastal observing, monitoring, and modeling and a reputation for developing novel environmental sensors, platforms, and data management techniques.

Research into various governing bodies and business entities has lead SCCOOS a structure that uses a system of collaborative agreement amongst its members. There is no present driver to move the business office functions of SCCOOS to a 501(c)3, due to the administration, insurance, liability, government relations, indemnification advantages, and institutional history/experience available through the partner institutions. There also appears to be no real advantage to establishing a membership structure where data users are required to pay a fee for access. SCCOOS is instead committed to the free dissemination of useful data for the public benefit and for public agencies to better manage the natural resources along the coast, while in concert developing special projects with organizations that seek services that are outside the scope of the existing funding streams.

Bylaws: There is considerable progress in establishing formal rules for the government of SCCOOS members and the general regulations concerning the consortium in the form of draft bylaws. The bylaws have been created and are presently under review by the Chief Operations Officer. Once approved, they will be presented to the BOG to approve and formally adopt.

Upon recommendation of the ESC to the BOG, Eric Terrill was appointed the role of SCCOOS Chief Operations Officer. Besides managing the 'operational' aspects of collecting, storing, and distributing data for SCCOOS, Eric works with a team to develop establish operating protocols and products, and at present serves as a vehicle for outside communication with key stakeholders and interests group. Other pivotal duties for SCCOOS are staffed by a part-time Organization and Administration Coordinator (OAC) and a part-time Outreach and Communications Coordinator (OCC), presently served by Deborah Duckworth and Carolyn Keen respectively. Julie Thomas similarly leads DMAC development. A critical need for

SCCOOS is to obtain funding to support these positions at a higher level as well as to bring onboard a full time Product Development Manager who would work with the data management groups, external organizations, and technical groups to guide the translation from "what customers want" to "what can be delivered" and oversee the development of products.

Technical Working Groups have been established and include HF radar, nearshore observations, modeling, and education and outreach. SCCOOS is assessing the need for additional workgroups that may include subsurface observations, remote sensing, and customer/product development.

Users presently make up at least three different sub-groups based upon the user's needs and objectives in data collection. Users can submit comments and suggestions directly to the Board of Governors or through any of the Committees through formal and informal meetings.

NFRA has established a number of NFRA Committees to head up region wide exchange of ideas and to facittate the IOOS development at the national level. The Committees and corresponding SCCOOS member are as follows:

Governance Committee – Eric Terrill
Organizational Committee – Debbie Duckworth
Legislative Committee – Kathleen Rizman
Communications / Outreach / Inreach - Carolyn Keen
Data Management – Julie Thomas

Operating a Fiscally Responsible Organization.

SCCOOS is administered by the collaborative office called a Joint Institution of Marine Observations (JIMO) created by UCSD and NOAA. NOAA created JIMO offices to create advantages when contracting with a number of Universities for a common goal with increased efficiency and integrity of the research objectives. Through JIMO and progressive collaboration with NOAA, SCCOOS operates as a system of contractual agreements / partnerships between the implementers of observing system components. SCCOOS has experienced a number of advantages in having contractual relationships between the participants and members including: a) responsibilities and entitlements of every party are carefully laid out in work orders and proposals; b) liabilities can be imparted or limited openly and by mutual agreement; and c) individual implementers of components of the observing system that have individual business needs that are specific to their affiliation or employer organization can be accommodated. SCCOOS is able to provide unique agreements tailored specifically to meet the needs of each of its participants or members, and may be modified with ease. SCCOOS' approach eliminates the need for arduous modifications to by-laws or for convening a corporation and negotiating its policies in order to meet the needs of its participants.

In practice, contractual agreements have not been found to dilute SCCOOS' stakeholder interest, but might be found to be more agreeable to industry, state and federal participants. As a result of easy participation, participants who are a part or represent larger business entities also help SCCOOS by broadening the SCCOOS community through a wider base of networking.

JIMO (specifically within the Marine Physical Laboratory Department at Scripps) is the lead business office for SCCOOS, and has demonstrated capability to handle all business activities for SCCOOS, including the issuing of subawards to industry, private, and public

partners, invoicing, and reporting for complex and large programs. In the past year, over a dozen contractual arrangements between consortium members have been established for ensuring the smooth operations of the SCCOOS consortium. For additional information about JIMO and its capabilities, see http://jimo.ucsd.edu/overview/about_us.html.

In 2005 alone, the federal and California State governments invested close to $20 million toward (that sounds huge – is that defensible?) the development of SCCOOS specific infrastructure. The common goal of the Federal and State Governments is to establish a working regional ocean observing system that provides efficiency and benefits for the users and stakeholders within the community. To this end, NOAA manages a Congressionally directed award for a pilot program (COTS) that establishes the initial means for data collection for a range of disciplines which aligns with the seven initial societal goals outlined for an Integrated Ocean Observing System (IOOS). In addition, the State of California, through Propositions 40 and 50, are investing in infrastructure for the Coastal Ocean Currents Monitoring Program--a program focused on the measurement and modeling of coastal circulation. Approximately $15M of resources from this program are directed toward a statewide HF radar array. The regional coordination grants are both timely and complementary to these programs, as they provide the opportunity to ensure coordination of these investments with the planning efforts of IOOS, and examine avenues for long term, sustained operational support.

Engaging Users.

SCCOOS has matured as an organization to provide observations, translate data to meet user information needs, integrate regional data and increase data management capacity, and provide centralized operations and communications for the regional observing system. SCCOOS disseminates information of SCCOOS technical capabilities and products in handouts at every outreach event (See **Appendix E** for SCCOOS Product and Applications Handout).

An attribute of Southern California is the large number of organized coastal constituents who have a diverse (and potentially conflicting) set of needs from an observing system. As such, SCCOOS has been active/proactive in engaging users by the identification of user needs for the delivery and management of data/products, yet conservative in defining a broad organizational structure which may introduce conflict of interests between the implementation of the observing system and its regional financial support, which will be necessary for sustained operations.

The outreach program has focused on developing a regional network of issue-driven data user/provider working groups (DPUGs) in the areas of water quality, coastal hazards/erosion/sediment transport, and coastal ecology/living marine resources. These groups will be tasked with defining those management needs that will benefit from enhanced coastal observations and data integration/management, building on existing collaborations, and articulating the benefits of such a system to science and society. These groups will also serve as cornerstones for the two-way communication of information, with the premise that their engagement will not only provide meaningful use of the products generated by SCCOOS, and also that the assimilation and integration of their data collection activities into the SCCOOS data system will provide for a bottom-up pull for SCCOOS.

The first DPUG meeting for receiving comments from the user community was held on October 27, 2005 at the Headwaters to Oceans Conference (“H20” Conference) in Huntington Beach, CA. The meeting successfully collected groups of individuals from industry, agency resource management offices and others to discuss current and future objectives for the regions ocean observation system. The response from stakeholders was excellent and will be used with

other surveys conducted as input to strategic planning efforts. The agenda and attendance sheet are attached as **Appendix F**.

In general, outreach activities with different interest groups has already resulted in overwhelming support, including the support for observational activities in both direct and indirect resources from the water quality community.

Engagement of the Data Provider/User Groups has resulted in detailed discussions on the data management capacity of SCCOOS, and the desire for many organizations to have SCCOOS integrate their mission-driven data collection efforts with observatory data collection efforts. We have already begun to engage the coastal water quality in data sharing activities, including integration of their data with regional observing system data, the usage of SCCOOS data within their permit reports, mandates to work with SCCOOS in their 5 year EPA/NPDES permits, and the direction of fine moneys towards SCCOOS operational support. Wastewater and storm water permit-holders have indicated a willingness to begin examining new methods of monitoring that would provide greater benefit to SCCOOS and to the community at large. Water Quality Managers are also adapting their beach management practices and decision making in San Diego based upon iterative product development efforts that focus on predicting beach water quality.

To date, SCCOOS has been markedly successful in supplying products developed by the collaboration of SCCOOS scientists and stakeholders' input. For an overview of present data products developed and currently made available on the website, see **Appendix G.**

Broadening Awareness of SCCOOS

Since the Fall of 2004, the California Coastal Coalition (CalCoast) commenced its work as the primary convener in the development of an end-user outreach effort designed to engage stakeholders in Southern California in developing collaborative partnerships among data collectors, data managers, and users of data and information from coastal ocean observing systems.

CalCoast advocates coastal interests and to bring coastal cities and counties together through regional meetings, conferences, newsletters and e-communications, and to act as a clearinghouse for information about studies and projects in progress up and down the coast. The organization is a non-profit advocacy group comprised of 35 coastal cities, five counties, and four regional governance organizations: Association of Monterey Bay Area Governments (AMBAG), Beach Erosion Authority for Clean Oceans and Nourishment (BEACON), San Diego Association of Governments (SANDAG), and Southern California Association of Governments (SCAG). CalCoast membership also includes coastal consultants, business associations, and allied groups committed to restoring California's shoreline and watersheds through sand replenishment, increasing the flow of natural sediment, wetlands recovery, and improved water quality. Its board of directors consists of elected officials from coastal communities.

CalCoast is a member of the Public Advisory Committee of the Southern California Wetlands Recovery Project (WRP), a partnership of public agencies working cooperatively to acquire, restore, and enhance coastal wetlands and watersheds between Point Conception and the International border with Mexico. CalCoast is the local government representative on the Coastal Sediment Management Workgroup (CSMW), formed in 2000 by the California Resources Agency and the U.S. Army Corps of Engineers to facilitate regional approaches to protecting, enhancing and restoring California's coastal beaches and watersheds through federal, state and local cooperative efforts. The CSMW is developing a Coastal Sediment Master Plan for

California's coastline. Every year, CalCoast's public outreach efforts will consist of the following:

1. Identify stakeholders for user groups;
2. Design, organize and convene five sub-regional needs workshops;
3. Produce draft report based on information gathered at workshops;
4. Develop data needs/format inventory; and
5. Create work groups.

In a separate effort directed just for students, the California Center for Ocean Sciences Education Excellence (COSEE) and the Ocean Institute in Dana Point, in concert with the greater public ocean education entities in the region, have formalized an education and outreach plan for SCCOOS. A 5th grade science curriculum based upon SCCOOS assets consistent with State mandated science education requirements which is in place at this grade level. The eight-week program was designed by the Ocean Institute in Dana Point and California COSEE to meet 5th grade Earth Science standards on the water cycle and weather; it will include new classroom activities, science kits, CD-ROMs, web-based materials, field trips, teacher professional development and will incorporate SCCOOS science and scientists as a link to research being done in the field. Curriculum development for this program will occur over a three-year period, and will include teacher focus groups and training sessions in order to develop a program that effectively helps prepare students for California science standards and rigorous new assessments. The program will be piloted with approximately 500 students in three school districts in the coming year, and will be distributed via the Beckman Foundation Young Investigators Program to students in Orange County after the three-year testing phase of the program.

Ocean Institute in Dana Point, a SCCOOS Partners, is a non-profit ocean education center that hosts over 90,000 K-12 students per year through 60 field science courses aboard the vessel R/V Sea Explorer, in the new 33,000 sq. ft. Ocean Education Center, in the Dana Pt. Marine Life Refuge, at Catalina Island and with the Ocean in Motion traveling classroom.

Broadcasting News, POCs and Data on the Inter-Net.

An ongoing project, the SCCOOS website, www.sccoos.org, has evolved considerably since its inception two years ago, and now includes links to existing observational data from a dropdown box on the map on the homepage, SCCOOS news and events, a calendar, governance and organization information, SCCOOS documents (proposals, reports, outreach materials), related agency information, current data products, the SCCOOS survey, information on and minutes from past meetings, and projects underway. The website has proven to be an excellent means for SCCOOS members to exchange information and to further ties between working groups. Users who browse www.scooos.org encounter a Flash screen at which they can either go to the SCCOOS survey or to data and news from the homepage menu. Our intent is to encourage participation in the user survey, which was designed primarily to identify end users and data providers who are willing to work with SCCOOS to either help develop data products or incorporate existing data into the SCCOOS data management system. We will be contacting those who responded positively to survey in the near future.

To ensure that all participants and members are aware of SCCOOS news and events, a monthly newsletter is distributed electronically, which lists all events and other items published on the website since the last newsletter, as well as upcoming funding opportunities. Participants

and members are encouraged to contribute to its content and further distribute the newsletter. For a copy of June 2005's newsletter, see **Appendix H**, attached here.

1.3 PLANS FOR THE NEXT YEAR

Plans to Approve the Business Plan.

In the coming year, the BOG will be responsible for approving the draft Business Plan into a working document Prior to approval, the draft plan will be distributed for a thorough Review and discussion within the BOG, BEC, and ESC and with the Senior Advisory Committee. This plan is designed and will be modified with the intention that it meet Ocean.US/NOAA standards for business development and criteria for accreditation as a component in the IOOS.

Plans to Expand the Governance Structure.

The next BOG meeting is scheduled for February 13-14, 2006 at UCLA's campus. The BOG's objectives include: (1) to address strategic planning, (2) to begin review and approval of the draft business plan, (3) to begin review and approval of the draft bylaws, and (4) vote on the creation of an additional advisory body called the "Senior Strategic Advisory Board" (SSAB).

The SSAB will have specific duties of advising the Executive Steering Committee (ESC) on technical and budgetary matters that relate to the long and short-term strategic goals and objectives of SCCOOS. The appointees to the SSAB, preferably members of state and federal agencies, industry, scientific community and other stakeholders, will be selected among suggestions made and voted on by the BOG. The SSAB will be selected for their close connections with the data providers and user groups, called working groups. The intention is that the SSAB will provide the ESC with insight into technical and market matters, having gained that insight from direct interaction with working groups. It has been suggested that the ESC and SSAB would meet three to four times annually. Presently, the BOG, ESC and BEC meet at least annually with the option to convene special meetings as needed.

Plans to Engage Stakeholders.

Through meetings convened by the California Coastal Coalition (Cal Coast), SCCOOS will continue to meet with regional organizations to introduce them to regional coastal observing efforts and IOOS. Following upon our engagement of the Orange County Coastal Coalition, SCCOOS intends to meet with San Diego County, Los Angeles County, Santa Barbara County and Ventura County organizations that are similar in scope. Specific stakeholder groups include the oil spill interests of the Operators Group, organized by the Oil Spill and Prevention Response (OSPR) and USCG, industry interests of liquid natural gas (LNG) terminals, security interests of the USN and USCG, and the maritime and port interests in the region. As the observational components of SCCOOS matures, preliminary products will be introduced to these groups for feedback.

Plans to address DMAC.

Our guiding principals are taken from the DMAC plan, which proposes:

- Interoperability
- Open easy access and discovery
- Reliable, sustained, efficient operations
- Effective user feedback
- Open design and standards process
- Preservation of data and products

We will build upon work at the San Diego Supercomputer Center and SIO in the development of the Storage Resource Broker (SRB) and the NSF-sponsored Information Technology Research Real time Observatories and Data management Network (ROADNet) project. The SRB is middleware that provides distributed clients with uniform access to diverse storage resources in a heterogeneous computing environment (see http://www.sddsc.edu/DICE/SRB/CurrentSRB/SRB.htm). The Application Programming Interfaces for the SRB include a simple Unix shell, JAVA and NT WWW Browsers, Prolog and Python. An Oracle-based Metadata CATalog (MCAT) server manages the metadata for the SRB. MCAT stores metadata associated with data sets, users, and resources managed by the SRB. Metadata include information for access control and data structures. The JAVA-based MySRB provides a WWW interface to the SRB and ROADNet extends the ideas of SRB to real-time data including dynamic metadata. The guiding principles of the DMAC are fully met by SRB and ROADNet. SCCOOS data managers meet regularly with principal investigators at SDSC and at SIO involved in SRB and ROADNet. More specifically:

- Eric Terrill and his HF radar staff will be providing data management for HF radar nationally.
- SCCOOS will serve as a test bed for the NSF funded ITR project LOOKING (http://lookingtosea.ucsd.edu/), which is tasked with developing an integrated knowledge grid for planned ocean observatories, such as the NSF funded ORION project.
- SCCOOS is in the process of convening a bight-wide data management working group.

Several diverse groups are actively participating in the early SCCOOS data management process, contributing both near-real-time and delayed data from cruises, CTDs, and manual sampling processes. The diversity inherent within these datasets has greatly strengthened the nascent SCCOOS data system by helping the project to develop flexible yet thorough metadata standards, and by improving the robustness of the data transport process.

SCCOOS data management software for legacy and non-real-time data are currently written in Java and PHP, with the goals of cross-platform support and rapid development. The current data server is centralized for the initial development stages, but most portions of the server will be modular and machine-independent. Much of the development efforts thus far have focused on the data transport and archival processes, quality control, and the creation of FGDC-compliant metadata standards; future efforts will emphasize delivering data to users through XML and web displays, on further decentralizing and coordinating data servers, and on

interfacing with the Storage Resource Broker at the San Diego Supercomputer Center for further data archival and dissemination needs.

As SCCOOS moves forward, it will continue to promote easy project involvement and transparency through source code repositories, documentation policies, and community responsiveness. The project is currently hosting its work in a Subversion repository that will be made available to the general public in a read-only format, with write permission available upon request. The development process will incorporate documentation standards such as JavaDoc and PHPDocumentor. Project documentation and data formats will be made available on the SCCOOS interactive website as time progresses. The interactive website will continue to host community forums for discussion of practices, as well as an issue tracker to provide specific feedback from the community.

The real-time HF radar data is handled by ROADNet technologies, which allows federated, heterogeneous systems to work together transparently through the seamless exchange of data. ROADNet are not limited by knowledge of how the data were collected, and the software and standards are all available to partners through largely noncommercial sources. SCCOOS will enable access to the real-time software as the California Ocean Current Monitoring Program grows in 2005.

Plans to Continue Education and Outreach activities.

The Ocean Institute will continue development of a model outreach and education project targeting approximately 280 students and testing effective methods for integrating SCCOOS products into 5th grade public classrooms. The SCCOOS outreach program will consist of three primary components: a) Teacher Professional Development – a one day workshop and field cruise for teachers showcasing SCCOOS scientists, equipment, protocols and products; b) Weather and Water Field Explorations for Students – field trip to OI where students visit a working CDIP buoy and, conduct solar, CTD and sea-surface measurements and correlate buoy reading with real-time observations; c) Weather and Water Classroom Curriculum – continue development of a comprehensive 9-week Weather and Water Curriculum and Science Kit that utilizes SCCOOS products to support 5th grade science assessments and California Science Content Standards in Earth and Physical Sciences. ***The program will be piloted with approximately 500 students in three school district. The Arnold and Mabel Beckman Foundation has generously provided funds to further develop and disseminate this emerging curriculum to 100 schools in 17 districts in Orange County; the program will eventually reach over 15,000 5th grade students.***

In the coming year, Ocean Institute will add additional emphasis toward the implementation of web-based solutions for integrating SCCOOS products into 5th grade classrooms.

2. PRIORITIES FOR OBSERVATIONS FROM A REGIONAL PERSPECTIVE

2.1 TOP FIVE PRIORITIES FOR DEVELOPING THE NATIONAL BACKBONE

1. A focused program of autonomous (mooring, glider, AUV, acoustic) sampling arrays should be established to (1) extend the density and coverage of long-term moorings describing synoptic weather variability and routine profiling of ocean properties (temperature, salinity, currents, radiation, optical properties), (2) begin time series of processes (mixing, primary production, particle settling, river inputs, zooplankton growth), and (3) survey benthic and pelagic habitats. This will require national coordination of efforts to extract maximum use from national assets like NDBC moorings, to convert research tools into operational techniques, and to develop products of broad utility.

2. Data assimilating models of the ocean and atmosphere are the most promising way to combine observations from diverse observing systems into a coherent and dynamically consistent picture of the ocean and its ecology as they evolve. Several such data synthesis methods are being developed within regional observing arrays but have not yet developed to a state where they are useful operational tools. Development of these tools must be accelerated in order to be ready for use generating IOOS products. Various coast-wide applications (the monitoring of the California Current Large Ecosystem, climate impacts, offshore search-and-rescue and spill response) would benefit from assimilating models that cover the west coast from Mexico to Canada and span both physical and lower trophic-level properties and processes.

3. Dealing with near shore problems (pollution dispersion, beach sand management, coastal erosion) depends on observations of sand volumes on the beach and offshore (aerial photography, LIDAR and acoustic surveys), measurements of the waves that force near shore currents, a model that links wave forcing to currents and dispersion in the near shore and extension/coupling of these models to data driven models in the offshore, and observations of these processes with which to validate models. Initially these will be developed on a site-by-site basis, but a national effort will be needed to see that support of these developments reflect their practical importance and that technology is developed to efficiently observe near shore waves, currents and dispersion. Investment in the identification and generation of products based upon model output (nowcasts, forecasts, statistical descriptors, and risk assessments).

4. Marine Life Resources Management and Ecosystem Health Assessment depend on ecosystem measurements, particularly of species and habitats. Species observations are the bases underlying scientific judgments and products related to resources and ecosystems. Existing surveys do not sample all habitats, nor are all species of concern surveyed; the frequency of observations are often below that required to rack annual trends, and enhancement beyond FY 04 levels is required. Similarly, present methods do not allow widespread sampling of many habitats. A national effort is needed to convert available research robotics, acoustic and optical survey methods into reliable and well calibrated tools to sample species abundance from habitats not now accessible.

5. Fluxes of fresh water, nutrients and pollutants from rivers and less concentrated run-off are important drivers of ocean circulation, biological productivity and patterns of the effects of pollution. Inputs of freshwater into the ocean should be determined by stream

gauges and be augmented by measurements of nutrients, fecal indicators and other key pollutants and other constituents to determine their fluxes into the ocean.

2.2 TOP PRIORITIES FOR REGIONAL OCEAN OBSERVATIONS

1. Further develop pre-operational activities
    - Development of a data management, data assimilation and nested ocean modeling systems of varying resolutions for all existing and predicted observations within the region including remote sensing, gliders, HF radars, shore stations, moorings, shipboard, and meteorological data. Initial goals of system should be directed towards the prediction of physical variables of the ocean (temperature, density, salinity) and currents which will be required for most all applications of ocean observing activities including national security, shipping management, search and rescue, water quality, marine life resource management, ecosystem health evaluation, and oil spill response.

    - Education and outreach to K-12 and beyond and local communities to the importance of regional and U.S. west coast oceanographic studies/operations.
2. Initiate pilot projects
    - Enhanced near shore observations to allow effective prediction of 1) the initiation of algal blooms/red tides, their persistence, location, fate, and impacts on the surrounding ecosystems and human health; 2) the dispersion, transport, and impacts of land-based freshwater inputs and their constituents to ecosystems and human health. These observational projects will require deployment and integration of data from real-time, physical, bio-optical, and chemical sensors from moored and autonomous platforms (gliders, AUVs, drifters), shore stations, HF radars, stream gauges, vessel based sampling, and data from remote sensors into data driven models.
    - Enhance PORTS programs within Southern California ports to include data driven models of bay and estuarine circulation, forecasts of sea level, observations and models of diver visibility, transport of pollutants and sediments, and mapping of benthic and water column communities. Couple these PORTS systems to coastal ocean observational systems.

    - Development of small-scale, ecosystem monitoring systems to evaluate the effectiveness of Marine Protected Areas (MPA) and other Areas of Special Biological Significance (ASBS). A preferred method of developing a system of optimal marine protected areas includes (1) determination of local habitat types (2) determination of species affinities for these habitats (3) identification of goals and choice of species for the MPA (4) identification of the species and/or ecological processes indicative of the ecosystem state within the habitat (5) local circulation features that spread larval life (6) determination of adult movement

from tagging studies. The parameters used to design the MPA or ASBS will require continuous observation over the lifetime of the MPA to determine is efficacy. Monitoring approaches would include traditional survey and sampling methodologies and acoustic methods coupled with concurrent studies of local circulation and regional oceanographic climate. SCUBA and ROV surveys, benthic sampling, and acoustic surveys should focus on keystone species (larval, juvenile and adult life stages), indicator species and life stages and ecological processes, as well as species specifically targeted for protection in habitats targeted for protection. Circulation and climate data will be coupled with biological data for interpretation of biological change in terms of physical and biological forcing and the response of the system to protection.

3. Enhance operational capabilities

    - The highest priority in Southern California is to make available all oceanographic and surface meteorological data that has been and is being gathered. This requires finding and collecting the data, establishing quality control and assurance, describing measurement protocol and quality control methods, distributing data as rapidly as is feasible and archiving it in readily accessible yet safe forms. The tools to do this are available, but considerable manpower is needed at the outset to set up procedures and work through existing data.
    - Continuous knowledge of surface currents is of high priority because surface currents are central to so many management and safety issues (beach and water quality, oil spills and search-and-rescue, harmful algal blooms, biological connectivity, etc.) and because surface currents are a useful proxy for circulation at depth. Our goal is to complete an array of both high-resolution HF radars to describe shelf-scale circulation and long-range units to monitor seasonally changing circulation out to 150 km. As the array is established, the highest priority will go to making the system fully operational with minimal outages and useful products available on a 24/7 basis.
    - Surface forcing by wind is central to variability in the ocean, and wind patterns vary widely over short scales near complex coastal topography. Operational modeling of coastal meteorology should be extended to sub-kilometer scales to generate products for users and to better force data-assimilating ocean models. Expansion of meteorological stations at the shoreline, on islands, and on small buoys near shore where possible.

4. Coordinate and continue research

    - Sensor and platform development to enable autonomous and real-time measurement of physical, chemical, and biological properties.
    - Research efforts directed towards effective translation of user needs to sensible data products.

3.0 ISSUES, CHALLENGES AND OPPORTUNITIES

Expectation Management: Marketing efforts by NOAA and Ocean.US run the risk of raising expectations of local IOOS supporters/users to a level which may be difficult to meet in the foreseeable future. Regional organizations are often placed into a difficult predicament of generating enthusiasm for the promise of what may come, yet remain grounded in the capabilities and time scales of IOOS implementation. With the reality of the federal budget, regional observing systems must be flexible in defining regional priorities and mechanisms for implementing those priorities.

Clarity on Outreach/Stakeholder Involvement: A successful observing system must strive to: 1) define the needs of the management community; 2) define the needs of mission driven agencies or compliance based monitoring communities; 3) identify the potential sources of operational support through delivery of data products based upon these needs; 4) communicate the capacity/vision of the utility of an integrated observing approach; 5) integrate science education using the observing system; and 6) generate advocates for federally supported IOOS activities. As a result of these broad classes of outreach, confusion exists in the IOOS vision for stakeholder involvement. We have attempted to recognize the distinction between defining/creating the pull for SCCOOS, general marketing activities, and the communication/translation of data to meaningful information to aide decision-making processes.

Regional Definition: Identified variables chosen as priorities for the IOOS backbone will require significant integration and interpretation to honestly meet many regional user needs. "One size fits all" will not meet all local user needs.

PACOOS: The Pacific Coastal Ocean Observing System (PaCOOS) is a nascent effort being built by the NMFS to provide regular ocean observations along the entire U.S. west coast for managing fisheries and ecological change, and observing climate impacts on the coastal ocean. In some ways PaCOOS is like a regional association (i.e. government and academic consortium, practical management objectives), and in others it is more sensibly thought of as part of the national backbone, providing an offshore, large-scale context for RAs. However one views it, PaCOOS should be regarded as part of the emerging national network of coastal ocean observatories. How should PaCOOS be recognized by Ocean.US so that it is involved in the OOS development process? While PaCOOS has recently begun to engage the local regional associations on the west coast, no such complementary action appears to be taking place at Ocean.US to involve PaCOOS in prioritizing for the national backbone or in data management plans.

Certification: There appears some confusion within the regional associations of what metrics will be used to provide certification. Should the certification process prove onerous, it will stifle the generation of local funds should the regional organizations appear forever nascent.

Funding: The development of the regional association is still under funded in both data management and product generation activities. While SCCOOS is well poised to generate and maintain observations, what is lacking is the federal support for a product development manager. This fulltime position would handle the following tasks:

- Develop SCCOOS–client relationships. Serve as the primary interface between existing and potential clients.
- Act as the primary communicator between and with users of existing and future SCCOOS products (outreach), and would work with SCCOOS team to define the market, the size of the market, and needs of the market. Communicates and translate from market requirements ("this is what the market wants") to product requirements ("this is what we will build").
- Identify and work with Data Provider User Groups in Southern California. Identify potential linkages between observing system framework and these groups. Define and prioritize areas of focus for the product development team in concert with SCCOOS development team.
- Assist new users in defining data/information requirements. Assist in the translation of user requirements to definition deliverable products.
- Serve as the interface between the Data Management team and Data Provider User Groups.
- Facilitate integration of end-user data sets into the SCCOOS data system.
- Define end-user data sets.
- Define access methods for end-user data from the SCCOOS data system.
- Serve as interface between Product Development team and Data Provider User Groups.
- Assist Data Provider User Groups in defining user requirements.
- Demonstrate/iterate with above groups in the creation of a successful product (beta versions, etc.).
- Serve as primary POC between SCCOOS and users during the product development phase.
- Serve as interface between implementers of SCCOOS observations and the Data Management and Product Development teams.

Non-Profit Pros and Cons.

SCCOOS is attempting to form an appropriate governance structure that would minimize liability for SCCOOS and its participants. SCCOOS has researched how to establish and operate an independent non-profit organization, but presently finds it desirable to maintain contractual relationships with its participants, its researchers, and with members and end users. **Appendix I** is attached hereto and serves as an example of some of some discussion on this matter.

Liability.

Concerns remain regarding liability in connection with: (1) business management and (2) distributing products to end-users. Communications at Regional Association and Ocean.US meetings indicate that there is no clear understanding whether end users may rely and hold Regional Associations or their data providers financially liable for damages, for example, negligently caused by faulty data. This is an issue that may be mitigated if handled properly. This may warrant the use of inconspicuous warnings or disclaimers at data distribution sites. For example, it may desirable to caution end users by including such statements as, "this data is intended to be informative only and should not be relied upon to ensure safety," "this data is provided for the user's benefit and discretion in making informed decisions," etc.

State & Federal Stakeholders.

SCCOOS, like other Regional Associations, has observed the difficulties that federal and state representatives and organizations have in participating in the Regional Associations in any meaningful way. Ideally, federal and state employees could become active members that would contribute by voting or through supporting one of the committees. Federal and state employees

often have relevant technical backgrounds and are familiar with regulatory issues that affect the Regional Associations.

A problem exists, however, because state or federal representatives who assist in governing a government-funded program may violate a conflict of interest doctrine or state statute. The question is whether a funding agency may or may not also participate in, or even serve on the governing board of the organization that it funds.

Discussion on this topic during Ocean.US meetings has revealed that there is still no clear resolution as to whether a funding entity, e.g., state or federal, can participate without fear or real violation of a conflict of interest policy.