SOUTHERN CALIFORNIA MARINE MONITORING CONFERENCE IV

24-25 APRIL 2006 · AQUARIUM OF THE PACIFIC · LONG BEACH

SPONSORS: *Catalina Conservancy Divers • Wrigley Institute for Environmental Studies • Aquarium of the Pacific's Marine Conservation Research Institute • Southern California Coastal Ocean Observing System (SCCOOS)*

WELCOME

Welcome to the fourth conference focused on marine monitoring efforts in Southern California. This conference historically has been hosted by Catalina Conservancy Divers and the Wrigley Institute for Environmental Studies at University of Southern California. This year the sponsors have been expanded to include the Aquarium of the Pacific's Marine Conservation Research Institute and SCCOOS, the Southern California Coastal Ocean Observing System.

BACKGROUND

In late 1997 representatives of USC Wrigley Institute for Environmental Studies (WIES) and the Catalina Conservancy Divers (CCD) met to exchange ideas on a range of topics. From that meeting emanated the idea of an annual conference to bring together researchers who specialize in marine research projects in the geographic region of Southern California. At such a conference researchers could share ideas, protocols, resources and research results. The first conference, held in 1998, brought together various researchers who presented an overview on their work.

A second conference was held in 1999 and again presenters provided overviews on their research efforts. The third conference was more oriented towards identifying all of the individuals and groups doing monitoring in the Southern California Bight.

The sponsors of Southern California Marine Monitoring Conference IV hope that the conference can further cooperation as well as the sharing of ideas, technology, protocols and data among those who are involved in marine monitoring efforts in the Southern California Bight. As sponsors, we are confident in knowing that

- the collective knowledge of the group is greater than the knowledge of any individual or group, and
- the sharing of this knowledge with those who are responsible for making decisions that impact the environment of the Southern California Bight can only lead to intelligent decisions.

THE SOUTHERN CALIFORNIA BIGHT

The Southern California marine environment is particularly unique in that it combines the cold water fronts from the north with the warm water fronts from the south. Their interaction combined with the Channel Islands creates a unique underwater environment. The Southern California Bight, also known as the Davidson Bight, creates unique water circulation patterns that only occur in Southern California.

The sources of water in the Southern California Bight include

- the cold, low salinity, highly oxygenated sub-arctic water brought in by the prevalent California Current which flows south along the coast of California,
- the warm, saline, central north Pacific water from the west, and
- the warm, highly saline, low oxygen content water entering the bight from the south.

The flows of these different waters are impacted by the location of the Channel Islands which are located in the bight.

CONFERENCE EVENTS

PROGRAM

24 APRIL

7:00pm **Reception & Poster Session** - ***Aquarium of the Pacific***

8:00pm **Dinner** - ***Aquarium of the Pacific, Great Hall***
Opening Remarks - *Dr. Anthony Michaels*

25 APRIL

8:00am **Breakfast** - ***Gameworks at the Pike***
Park in the parking structure nearest the Aquarium of the Pacific & walk across the street to the Gameworks facility.

9:00am **Conference Session 1** - ***Gameworks at the Pike***
The OOS - *Dr. Jerry Schubel*
SCCOOS - *Dr. Eric Terrill*
Channel Islands Marine Sanctuary Data Integration Experience - *Ben Waltenberger*
Southern California Marine Institute Data Integration Experience - *Dr. Rick Pieper*

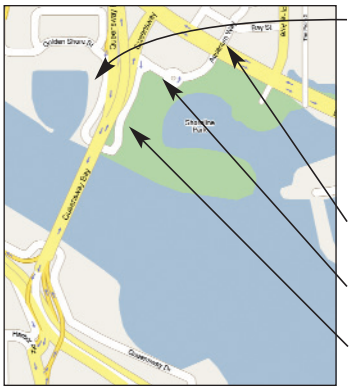
11:30am **Lunch**

12:30pm **Breakout Session**
Participants will be split into groups to address conference questions.

3:00pm **Conference Session 2** - ***Aquarium of the Pacific Honda Theater***
Representative from each breakout group will present answers to conference questions.

5:00pm **Adjourn**

SITE MAP



Lunch & brakeout session rooms
320/330 Golden Shore Drive (Above Catalina Express Terminal)

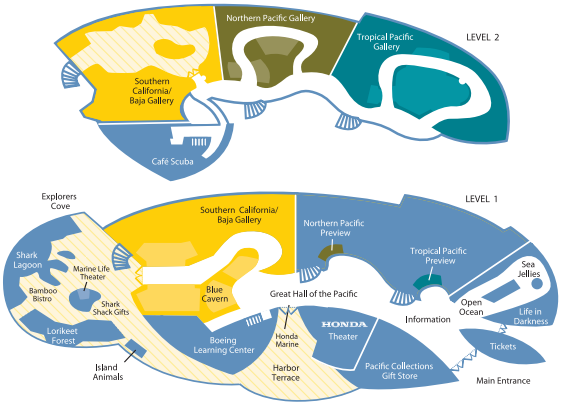
Gameworks at the Pike

Parking

Aquarium of the Pacific
100 Aquarium Way, Long Beach

VENUE MAPS

AQUARIUM OF THE PACIFIC



FOR DISCUSSION

CONFERENCE GOALS & OBJECTIVES

- Learn about different marine monitoring efforts in the Southern California Bight.
- Set the stage for ongoing collaboration among those involved in these marine monitoring efforts.
- Discuss how to integrate data to answer questions related to the marine environment.
- Explore opportunities to make data available to a broader user community through SCCOOS.

BREAKOUT SESSION QUESTIONS

1. What qualities/characteristics should SCCOOS develop to provide the framework for accepting, organizing, synthesizing, and delivering data/information collected by marine monitoring groups throughout Southern California that would be of potential interest to a wide range of stakeholders? Be as specific as possible in your list of requirements. What are some of the data and informational products that will be most useful for different stakeholder groups?
2. How can the various stakeholders retrieve and use these data and this information? What are the most important applications to different stakeholder groups?
3. What are some potential barriers to implementing data integration and dissemination and to fostering collaboration?
4. Create a list of existing and potential customers for marine monitoring data and information, and identify the kinds of data and information that would be most valuable to them.
5. From the list of data sets presented, pick two of the customers from Question 4 and identify all of the data sets you believe would be of most interest to them.

SPEAKERS

ANTHONY F. MICHAELS

Dr. Anthony Michaels (Tony) was born in San Diego, California and lived in a variety of locations around the world as a child. He split his undergraduate education between the University of California, San Diego and the University of Arizona. He did his Ph.D. research at the University of California, Santa Cruz, where he began research in biological oceanography and how the oceans affect the concentrations of greenhouse gases in the atmosphere.

After a postdoctoral fellowship at the Woods Hole Oceanographic Institute, he moved to the Bermuda Biological Station for Research, Inc. to develop an ocean time-series program and study the link between climate and how the oceans process greenhouse gases like carbon dioxide. This program developed into a premier site for the study of ocean biogeochemistry.

In 1993, as the catastrophe reinsurance industry in Bermuda began to expand, Dr. Michaels and Dr. Anthony Knap began to interact with these new companies. Through this process, they created a program called the Risk Prediction Initiative (RPI), a partnership between science and business. The RPI is designed to create new mechanisms for insuring against the catastrophic losses from hurricanes, earthquakes and other natural disasters.

After a seven-year stay in Bermuda, Dr. Michaels moved to Southern California in 1996 to become the first director of the new University of Southern California Wrigley Institute for Environmental Studies. The Wrigley Institute has facilities on both the mainland and on Catalina Island. It is involved in a wide variety of marine and environmental science research and education, as well as efforts to make that research relevant, usable and understandable to decision makers.

The Wrigley Institute has created a unique ocean environmental biology group with research that spans the range from genes to global change. Interdisciplinary programs bring together biology, earth science, economics, policy, business, medicine and engineering. These new programs include efforts to understand a broad range of environmental risks, how those risks are quantified and how that information is used to make decisions. The Wrigley Institute also interacts broadly with stakeholders in such areas as fisheries, coastal water quality, conservation, human health and aquaculture. The new knowledge produced by universities is most valuable when the scientists are engaged participants in the decision process.

Dr. Michaels is also passionate about broadening environment education. We need a more informed society and a “K-to-gray” education philosophy, that reaches students of all ages, and must be part of both the science and practice of the environment. The science of the oceans and the environment can create excitement within the K-12 science curriculum at the same time that it gives future voters tools to make better decisions. Undergraduate and graduate training must prepare students with both the content and the tools for leadership, analysis and communication in a more complex world. The current generation of decision-makers must also be informed of the many new options made possible by new knowledge through partnerships, education and public outreach.

SPEAKERS

JERRY R. SCHUBEL

Jerry R. Schubel is president and chief executive officer of the Aquarium of the Pacific in Long Beach, California. He was president and chief executive officer of the New England Aquarium in Boston from 1994 to 2001, and dean and director of the Marine Sciences Research Center at the State University of New York at Stony Brook from 1974 to 1994. Under his leadership, the Center became known for excellence in fundamental research in coastal oceanography and for the development of innovative strategies allowing humans to live in harmony with their coastal environments. In 2005, an endowed Jerry R. Schubel graduate fellowship was created by the Center in recognition of Dr. Schubel's contributions to the evolution of the institution. Dr. Schubel has published more than 200 scientific papers in academic journals and has also written extensively for general audiences. He chairs the National Sea Grant Advisory Panel and is a member of the National Science Panel for the South Bay Salt Ponds Restoration (San Francisco Bay). He chaired the National Oceanic and Atmospheric Administration's committee assessing the effects on the San Francisco Bay of the proposed expansion of San Francisco International Airport and was a member of the science advisory board of National Public Radio's "Living On Earth" series. In 1997, Dr. Schubel was awarded an honorary D.Sc. degree by the Massachusetts Maritime Academy, and in 2004 he was named a National Associate of the National Academies. He is a former chair and vice-chair and a current member of the Marine Board, and chaired the Phase I Committee on the St. Lawrence Seaway: Options to Eliminate Introductions of Nonindigenous Species into the Great Lakes. Dr. Schubel earned a B.S. degree in physics and mathematics from Alma College, Michigan, a master's degree from Harvard University, and a Ph.D. in oceanography from the Johns Hopkins University.

ERIC J. TERRILL

Eric has a B.A. in Engineering and a Ph.D. in Physical Oceanography. His research focuses on air-sea interactions, physical and acoustical oceanography and technology development. Eric established and leads the local San Diego Coastal Ocean Observing System (www.sdcoos.ucsd.edu), with funding from the CA Clean Beaches Initiative. Project partners include the City of Imperial Beach and the San Diego County Department of Environmental Health. Eric was instrumental in establishing the region-wide Southern California Coastal Ocean Observing system (www.sccoos.org), and is the program lead for the SCCOOS component of the state-wide $21M Coastal Ocean Current Monitoring Program (COCMP), which includes the deployment of region-wide HF radar network for mapping ocean surface currents. He also leads programs in naval hydromechanics and air-sea interaction processes; this work resulted in a successful deployment of an array of autonomous vehicles into Hurricane Francine in 2004. Eric is a native Californian, and resides in Solana Beach with his wife and two sons.

BEN WALTENBERGER

Ben Waltenberger is a physical scientist with the National Oceanic and Atmospheric Administration (NOAA), Channel Islands National Marine Sanctuary (CINMS). He works with geographic information systems (GIS) and remote sensing technology to map and geospatially analyze data collected within the region of the CINMS. Ben primarily works in the CINMS aerial reconnaissance program, analyzing vessel and visitor use patterns in the Channel Islands region. During the CINMS Marine Reserves process, Ben and a colleague designed a public participation GIS decision interface (Channel Islands Spatial Analysis Tool (CI-SSAT) to allow stakeholders to intuitively view and understand the myriad of data used in the reserves planning process. Ben has worked on several committees dedicated to spatial data integration and sharing, both regionally and nationally.

SPEAKERS

RICK PIEPER

Dr. Pieper received his B.A. in analytical biology from the University of California, Santa Barbara (UCSB). He continued his education with an emphasis in marine biology at UCSB and received a M.A. in biology. After a summer at the Smithsonian Institution in Washington, D.C. he went to Graduate School in British Columbia, Canada, and completed his Ph.D. in zoology and oceanography at the University of British Columbia.

Dr. Pieper is presently the Director of the Southern California Marine Institute (SCMI) which is a consortium laboratory operated by the Ocean Studies Institute of the California State Universities (CSU) and the University of Southern California's (USC) Wrigley Institute for Environmental Studies. He has taught graduate and undergraduate classes at USC, CSU Fullerton, the University of Texas and Marymount College. Dr. Pieper is also a consultant in Pelagic Marine Ecology at BAE Systems (previously Tracor Applied Sciences) in San Diego. He is a member of the Southern California Academy of Sciences where he was secretary, vice president, and president. He was on the board of directors of the National Association of Academies of Science and was president of that organization. Dr. Pieper is also a member of the Oceanographic Society and the American Society of Limnology and Oceanography.

Dr. Pieper has over 30 years of experience in the marine science field. His major interests include the measurement and understanding of various temporal and spatial scales of biological interactions in the sea, and the interactions of the biological structure with physical oceanographic structure and variability. His present research is based around water quality monitoring in the near-surface waters off the continental shelf and in the Los Angeles River. His projects have also involved monitoring zooplankton abundances and water column temperature at a long-term mooring ten nautical miles off of the Los Angeles, CA breakwater. This project used acoustical sensors to measure zooplankton biomass every one-half hour at six different depths at the edge of the continental shelf in 100 meters of water. He has recently studied Thin Layers in East Sound (San Juan Islands) and has analyzed zooplankton data from the Arabian Sea JGOFS project. Dr. Pieper was also involved in the monitoring of the water quality in Marina del Rey, a small-boat marina in Santa Monica bay.

His past research has encompassed much of the oceanographic field. While earlier work was primarily on zooplankton and micronekton ecology, more recent interests cover the entire oceanic system, including fisheries, marine birds, long term environmental changes and environmental studies. Along with conventional sampling such as CTDs, box corers, instrumented net systems and other measurement techniques, he has developed and used high frequency acoustics to both direct biological sampling and to obtain real-time, rapid estimates of zooplankton and micronekton abundance and distributions.

Dr. Pieper has published numerous articles in scientific journals and books, as well as reports on various studies. He has been an invited participant in oceanographic, acoustics and sampling workshops. He has been a periodic member of various GLOBEC working groups and has presented papers at many national and international scientific meetings. He has worked under the sponsorship of the National Science Foundation, the Office of Naval Research, the National Aeronautics and Space Administration and the National Sea Grant Program. He has conducted research and studies off of Southern California, Oregon, Texas, Florida, North Carolina, Hawaii, British Columbia, England, Ireland, Costa Rica and in the Indian Ocean.

SPONSORS

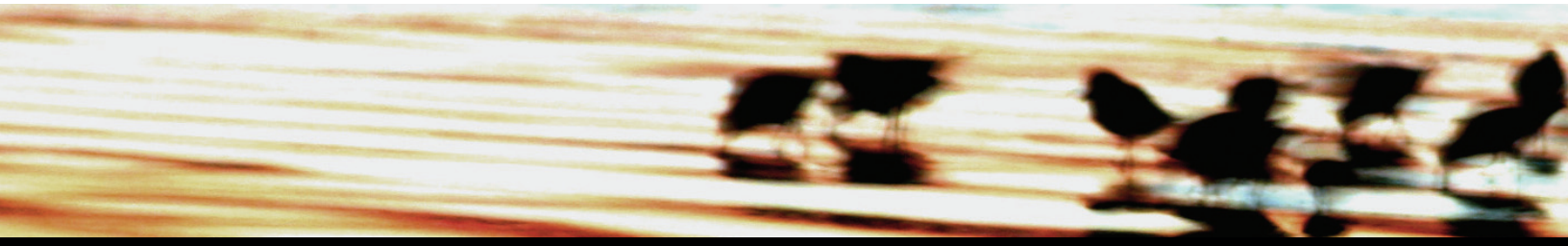
AQUARIUM OF THE PACIFIC - MARINE CONSERVATION RESEARCH INSTITUTE

The Aquarium of the Pacific's Marine Conservation Research Institute (MCRI) was established in late 2001 "to expand and enhance the body of scientific knowledge relating to the Pacific Ocean, its inhabitants, and ecosystems and to preserve this valuable resource for future generations through research, conservation, and education focused around the Aquarium of the Pacific."

MCRI research efforts are primarily focused on species propagation. Because of the confined nature of the diverse habitats at the aquarium, including California/Baja, the northern Pacific and the tropical Pacific, we have a unique opportunity to study and observe lifestyles of various species in a controlled micro-environment. As a result, we have formed collaborative efforts with various researchers and institutions to focus on understanding the life and reproductive cycles of various species on display in the aquarium. MCRI also has research links to a variety of educational institutions and links with researchers at these institutions to help them fulfill their Broader Impact/Criterion 2 requirements.

MCRI conservation efforts are focused on delivering a message of urgency to the public about the state of our oceans and encouraging actions that lead to the conservation of the Pacific Ocean and its inhabitants. Working with other major public aquariums in California, MCRI laid plans to develop a new Ocean Agenda for California. At the California and World Ocean '02 Conference (CWO 02) held in Santa Barbara, MCRI presented a plan to update California's Ocean Resources: An Agenda for the Future (Ocean Agenda). MCRI has also been a leader in presenting the results of the two major studies on the state of our oceans, the Pew Commission Report and the US Commission on Ocean Policy, both of which are maintained and indexed on the MCRI marine knowledge base along with other marine related reports, at http://mcri.publishpal.com/links?PHPSESSID=eb301278a96d1d96b6f788e2ad7a5092.

MCRI education efforts are directed at enhancing the dialog between the scientific community and the public by bringing lecturers to the aquarium to speak to the public on their fields of expertise. MCRI also has had the lead for the aquarium in its ocean literacy initiatives. MCRI was the first organization in the nation to host a regional workshop with leading scientists to develop the scientific content that they thought every resident of a major region (Southern California) should know about how the ocean affects them and how they affect the ocean. This was followed by a workshop in which leading informal science education experts outlined ways of delivering this information to the public that would engage, educate and empower them. Because of this leadership role, MCRI and the Aquarium of the Pacific have been asked to be one of only five satellite downlink sites as part of the national Conference on Ocean Literacy that will be held in Washington, D.C. in June 2006.



SPONSORS

SOUTHERN CALIFORNIA COASTAL OCEAN OBSERVING SYSTEM (SCCOOS)

The Southern California Coastal Ocean Observing System (SCCOOS) is a consortium of eleven universities and organizations launched in September 2004 to implement and evaluate new sensor and information technologies to facilitate the creation of an integrated, multi-disciplinary coastal observatory in the Southern California Bight. 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 Investigación Científica y de Educación Superior de Ensenada (CICESE). The SCCOOS governance structure includes a Board of Governors, made up of representatives of the eleven Consortium institutions, Executive Steering Committee, and Senior Advisory Committee.

A primary goal of SCCOOS is to provide policy makers and managers with a better scientific basis to evaluate and design new management strategies and manage risks. SCCOOS brings together agencies and data provider and user groups to streamline, coordinate, and further develop individual institutional ocean observing and monitoring efforts. Real-time observations, model and database forecasts, and a flexible information distribution system will provide critical information to agencies, managers, and end users. SCCOOS will integrate data and projects from local, state, and federal and individual activities to create an integrated, multidisciplinary coastal observatory. SCCOOS is committed to leveraging infrastructure, partnerships, and other resources to develop a fully operational coastal observing system to address a variety of policy, monitoring, and management needs.

Since its inception, SCCOOS has engaged in developing stakeholder support at the local, regional, and state levels as encouraged by the Ocean.US IOOS initiative. The SCCOOS consortium provides the framework for a collaborative network of southern California's leading institutions and laboratories which are conducting tens of millions of dollars of research that is essential to supporting several coastal resource management initiatives with a focus on improving water quality, supporting fisheries management (the CALCOFI program), protecting marine life, and predicting and mitigating coastal hazards. These activities are relevant to the broader goals of both State initiatives (e.g., The Clean Beaches Initiative and the California Coastal Nonpoint Source Pollution Control Program) and federal initiatives (e.g., IOOS, the NSF Ocean Observatories Initiative [OOI], and the Oceans and Human Health Initiative).

SPONSORS

WRIGLEY INSTITUTE FOR ENVIRONMENTAL STUDIES

The mission of the USC Wrigley Institute for Environmental Studies is to encourage responsible and creative decisions in society by providing an objective source of marine and environmental science and fostering an understanding of the natural world among people of all ages.

With generous donations from the Wrigley family, the University of Southern California created the USC Wrigley Institute for Environmental Studies (WIES) to unify and advance USC's efforts in environmental education and research. Under the directorship of Dr. Anthony F. Michaels, the institute brings together new and veteran faculty, programs and facilities with a renewed commitment to objective and relevant environmental science.

The Institute serves as an umbrella for all of the marine and environmental programs at the university. WIES gives interested faculty and students from all disciplines a physical center for their work and a set of innovative programs to focus their attention on goals that are meaningful. It is here that researchers from many different fields can work together at understanding and solving society's toughest environmental problems and preparing solutions for the future. Perhaps our most important objective is to effectively communicate the findings of this truly interdisciplinary scholarship to the public, students of all ages and those who can effect positive environmental change.

The Philip K. Wrigley Marine Science Center (WMSC), located on Catalina Island just 20 miles off the coast of Los Angeles, is the heart of the Wrigley Institute. Generous gifts from the Wrigley family and many others have transformed the center into a state-of-the-art laboratory and teaching facility.

Catalina's proximity to an urban center and the island's protected status provide an excellent site for marine and terrestrial investigations. Eight laboratories accommodate up to 24 researchers and groups of up to 60 students. Housing can host 90 overnight guests and provide meals for up to 150 people. The lab is currently used by faculty and students from USC and other regional universities, and is available for a broad range of research and educational activities.

SPONSORS

CATALINA CONSERVANCY DIVERS

CCD is a membership support group of the Catalina Island Conservancy, a private, non-profit conservation organization dedicated to the preservation of the natural heritage of Santa Catalina Island. The goal of CCD is to assist the Catalina Island Conservancy in achieving its mission with respect to Catalina's marine environment. A scientific advisory board composed of a group of marine science experts provides guidance to the organization's research projects and training activities.

ABALONE RESTORATION PROJECT

In 1991, CCD divers introduced over 20,000 juvenile green abalone to specific sites around Catalina to enhance the severely depleted abalone population. The planting of abalone today is prohibited, so this project is currently oriented primarily to monitoring the progress of the prior plantings.

KEY SPECIES MONITORING PROJECT

CCD designed this project to document the underwater habitat around Catalina Island. Currently this project is conducted at seven sites including Cactus Bay, Church Rock, Casino Point, Italian Gardens, Little Harbor, Pumpernickel Cove and Eagle Reef. CCD scientific research divers periodically dive these locations and use scientific methods to document what they encounter. This is a long-term study to document changes to the marine ecosystems around Catalina.

KELP FOREST MONITORING PROJECT

CCD conducts this project within the protected marine refuge at the USC/Wrigley Institute for Environmental Studies outside Big Fisherman Cove near the Two Harbors area of Catalina. Within this refuge are permanent transect lines at depths of 15, 30 and 60 feet. CCD Scientific Research Divers have been monitoring giant kelp at this location since 1992 by measuring plant densities and growth rates. There are also ongoing efforts to monitor the populations and densities of sea urchins in the area.

MARINE THERMOGRAPH PROJECT

CCD has deployed marine thermographs (temperature recording devices) at four locations around Catalina at three different depths to record water temperature on an hourly basis. Water temperature data is available back to 1992, and it has been used by a variety of scientists in studying Catalina's marine ecosystem.

SCIENTIFIC RESEARCH DIVER TRAINING

CCD trains members to become scientific research divers and prepares them to become participants in CCD research projects. Training classes emphasize species identification and scientific research methods. Once divers have completed the basic training classes, instruction is expanded to include the specific protocols associated with the project in which an individual diver is to become involved.

SCUBA TRAIL

CCD educates recreational divers on the marine environment at Catalina by hosting the SCUBA Trail at the Casino Point Dive Park in Avalon. On selected weekends, CCD divers set out markers to help divers find and identify the common species found in Catalina's marine environment.

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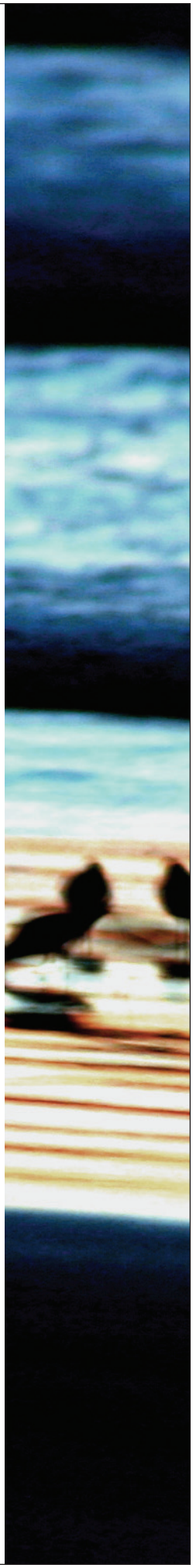

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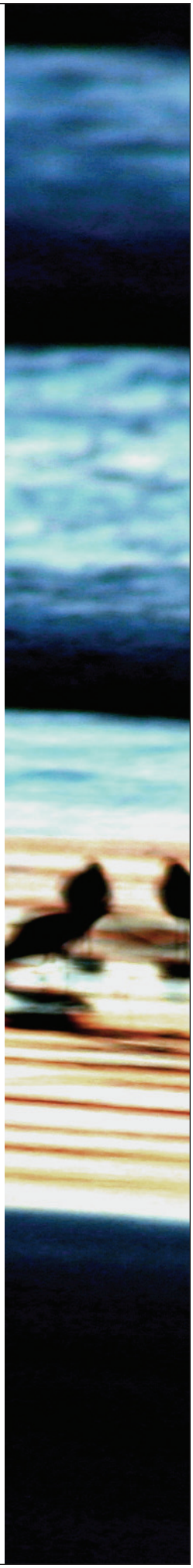

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