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SLOSEA

San Luis Obispo Science and Ecosystem Alliance

Program Updates



Joint Oceans Commission Initiative

“One Coast, One Future”

JOINT
OCEAN COMMISSION
INITIATIVE

ONE COAST, ONE FUTURE

SECURING THE HEALTH OF WEST COAST
ECOSYSTEMS AND ECONOMIES

RECOMMENDATIONS TO LOCAL
AND STATE LEADERS FROM THE
JOINT OCEAN COMMISSION INITIATIVE

We appreciate your continued work and commitment to advance the recommendations of the U.S. Commission on Ocean Policy and the Pew Oceans Commission. A report from you could help us ensure that the citizens within our cities, counties and states enjoy vibrant coastal communities and healthy ocean resources for generations to come.

Sincerely,

James Aubom, Mayor
Port Orford, Oregon

Janet Beautz, Supervisor
Santa Cruz County, California

Sam Blakeslee, Assemblyman
California State Assembly

Deborah Boone, Representative
Oregon House of Representatives

Al Carter, Commissioner
Grays Harbor County, Washington

Nancy Gardner, Council Member
Newport Beach, California

Bill Hall, Commissioner
Lincoln County, Oregon

Tom Harman, Senator
California State Senate

Ken Jacobson, Senator
Washington State Senate

Don Munks, Commissioner
Skagit County, Washington

Pedro Nava, Assemblymember
California State Assembly

Greg Nickels, Mayor
Seattle, Washington

Kevin Rankin, Commissioner
San Juan County, Washington

Ron Sims, Executive
King County, Washington

Pam Slater-Price, Supervisor
San Diego County, California

Harriet Spaniel, Senator
Washington State Senate

Darrell Steinberg, Senator
California State Senate

Mark E. Wheatley
Mayor, City of Arcata

John Woolay, Supervisor
Humboldt County, California

ONE COAST, ONE FUTURE

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Joint Oceans Commission Initiative “One Coast, One Future”



ONE COAST, ONE FUTURE

SECURING THE HEALTH OF WEST COAST
ECOSYSTEMS AND ECONOMIES

- Actions local leaders can take to implement an integrated, ecosystem-based approach
- Actions state legislatures can take to support local communities in this effort
- Ways both local and state leaders can begin to address coastal climate change impacts
- Strategies coastal communities and state legislatures can employ to ensure the resources needed to implement the recommendations are available
- On-the-ground examples of how local and state governments on the West Coast are already making progress toward an integrated, ecosystem-based approach

SLOSEA "In the News"

VOICES

Letters and commentary from the Central Coast and beyond

SANLUISEBISPO.COM

THURSDAY, JANUARY 15, 2009

THE TRIBUNE 8

VIEWPOINT

Support SLOSEA for everyone's sake

By JANICE PETERSON, DEAN WENDEL AND BRUCE GIBSON

Right now, all eyes are on another coast as we wait for a new administration to select its team and prepare to take the helm. Amidst our focus on the changes occurring at the national level, a respected national group of ocean leaders is releasing a long-awaited report that will draw attention to the Pacific Coast, and specifically to important action taking place right here in San Luis Obispo County.

This week the Joint Ocean Commission Initiative, a national bipartisan voice for ocean policy reform, released a report titled "One Coast, One Future" that highlights specific actions West Coast states can take to combat the threats facing our oceans and coastal communities.

The report brings welcome attention to efforts already under way in the San Luis Obispo region to implement new approaches to protecting our greatest natural resource —

our coast. The San Luis Obispo Science and Ecosystem Alliance (SLOSEA) at Cal Poly is recognized in the report as a model of progress toward integrated, holistic management of vital coastal resources.

SLOSEA's comprehensive approach to managing marine resources is termed "ecosystem-based management." This integrated approach brings together citizens, businesses, stakeholders, scientists and managers to jointly make decisions that impact not only natural resources, but also the people and communities affected by the ecosystem.

This approach takes into account the many interconnections within the ecosystem, including how humans impact and are impacted by the animals, plants, waters and other ecosystem components that

make this area so beautiful and livable. SLOSEA's approach combines multiple strategies in order to sustain a productive and resilient ecosystem and a thriving human community.

Our nearshore coastal areas are unique ecologically. We live in a transition zone between the warmer waters of southern California and the cooler waters to the north, which has blessed us with incredible biological diversity and productivity. Our coast also has a rich human history of fishing and recreation, and in Morro Bay we have one of only two significant estuarine systems in central California.

Indeed, Morro Bay provides a breeding ground for many species of fish, an important stopover and winter home for more than 200 species of migratory birds, and a habitat for almost two dozen endangered species.

During the past six months, SLOSEA brought together more than 35 people including local elected officials, managers at resource agencies, marine scientists, leaders from the local nonprofit community and people who live and work in coastal communities to develop an integrated strategic plan for our coastal ecosystem. The group collectively identified the major human factors that impact our area and recommended specific scientific and management actions to mitigate those impacts and create a sustain-

able and thriving community for generations to come.

SLOSEA's integrated, ecosystem-based approach accounts for all ocean, coastal and watershed activities in order to understand the entire coastal ecosystem, including the ways that various human activities are helping or hurting the ability of the system to function properly.

Because a healthy coastal ecosystem provides many benefits for people, including healthy fisheries, clean water and natural scenery worth traveling to see, the potential benefits of this approach reach beyond the environmental issues to include protection and enhancement of the local economy and well-being of the San Luis Obispo community. As the Joint Ocean Commission Initiative report highlights, SLOSEA's success in implementing an ecosystem-based approach here could provide a model for other U.S. coastal communities along the Pacific Coast and beyond.

While California is a relatively progressive state in terms of environmental policy, there are still many barriers to fully implementing a marine ecosystem-based program on the Central Coast. Local policymakers could benefit from an increased understanding of the significant challenges

facing our coastal resources and the positive impact of this innovative approach.

Some agencies, including harbor authorities, local government and Parks and Recreation, understand the benefits and are eager to participate, while others seem constrained by their individual mandates and have fewer resources to consider more coordinated policies. State and federal resource agencies are generally supportive of ecosystem-based management, but find it difficult to implement this new approach when faced with more pressing short-term issues.

We are delighted that the Joint Ocean Commission Initiative has highlighted SLOSEA in its new report, and especially pleased that a reputable, national voice for ocean policy reform has underscored the necessity of implementing ecosystem-based management for the health of coastal communities and the economic future of the West Coast. Policies that approach vital natural resources holistically also use government resources more efficiently and ensure the long-term sustainability of our coasts and our coastal economies. As no other time in our country's recent history have efficient and effective economic and

environmental policies been more essential.

We hope that county and state officials will come together to support SLOSEA and similar programs, for the sake of our coast and our citizens.

Janice Peters is mayor of Morro Bay. Dean Wendel is SLOSEA Program Director and an Associate Professor of Biology at Cal Poly San Luis Obispo. Bruce Gibson is chair of the San Luis Obispo County Board of Supervisors.

'At no other time in our country's recent history have efficient and effective economic and environmental policies been more essential.'

SLOSEA "In the News"

News

BY COLIN RIGLEY

Tumors and sex changes: a goby story

Cal Poly researchers suspect a chemical is affecting Morro Bay fish

It's hard not to see the irony: A common chemical sometimes used in spermicides may be turning fish into hermaphrodites.

The chemical is called nonylphenol (pronounced "non-ill-le-NALL") and it is increasingly being eyed as the cause of some unexpected developments in goby fish.

The compound is used most commonly for industrial purposes, but is also a common ingredient in detergents, cosmetic products, and spermicides.

Studies suggest the chemical could be responsible for giving male fish female parts. Transgender fish haven't turned up in local waters yet, but in Morro Bay the same chemical is suspected of causing goby fish to grow pale, vein-coursed liver tumors.

Local biologists can't be certain there's a connection, but they are suspicious. Last spring, Cal Poly biologist Lars Tomanek, along with others from Cal Poly and the Central Coast Regional Water Quality Control Board, went to investigate what chemicals might be leaching into local waters. They tested gobies because they're bottom dwellers and a good indication of what's in the sediment.

Tomanek said some of the gobies looked pregnant—they weren't. The group soon found that the gobies, and particularly their tumors, were riddled with nonylphenol.

"That's all we found," Tomanek said. "And we're like, OK, what the heck is that?"

He estimated about 10 percent of the fish they found had tumors.

Nonylphenol is a degraded form of the chemical nonylphenol ethoxylate. That chemical helps break down other

compounds, which makes it useful in products such as detergents. But when the chemical goes through sewage treatment it breaks down to the more hazardous nonylphenol form.

Such chemicals as nonylphenol have some environmentalists concerned because they often slip through sewage treatment and end up in the ground and water. Sewage sludge, the solid byproduct, and septic tanks are big contributors of nonylphenol. County officials have banned sludge application to local lands, but that ban will expire in a year. A new ordinance that would allow some land application is working through the approval process, but some environmentalists have raised questions over how the ordinance would prevent chemicals and heavy metals from being leached.

"I think it's just a good chemical to illustrate how far behind the United States is in properly protecting the public..."

Ed Hopkins, Sierra Club director of environmental quality

For gobies, nonylphenol is like a hormonal guessing game. It's chemically similar to goby estrogen and, when introduced into males, has been shown to lead to the development of female anatomy, including eggs.

Whatever is going on, it doesn't appear that Morro Bay is the only place it is happening. Tomanek said he found nonylphenol in Tomales Bay and the gobies that live there. At this point, "We are basically trying to find gobies that don't have [tumors and nonylphenol] and



POISONED Cal Poly biologists thought Morro Bay goby fish were just pregnant before they cut them open and found liver tumors.



we don't know where that's going to be." The next testing ground will likely be farther north—probably along the Oregon coast—and those studies will begin in a couple of months.

Members of the Southern California Coastal Water Research Project are also taking a look at pollutants that seep into California waterways. They found nonylphenol, too.

Steven Bay, who heads the project's toxicology department, said they have found nonylphenol along with a cocktail of other contaminants. Project researchers also found fish with some signs of gender-switching, he added.

Like here, the suspected source of the contaminants in Southern California is treated sewage discharge. Bay said the whole field of analyzing chemicals is still new territory; the tools and methods they use are only about a decade old. For now, the challenge is to sift through thousands of chemicals to find the really nasty ones.

"The information we don't have right now is how to prioritize which of these chemicals are of the greatest concern," Bay said.

But others have already labeled nonylphenol a big concern. The European Union effectively banned the chemical in nearly all uses. Canada officially classified nonylphenol as a toxic chemical and severely restricted the levels allowed in waterways.

It's a different story in the U.S., where the allowable levels of nonylphenol are about twice those of Canada.

Members of the Sierra Club tried to change that, but have so far been

unsuccessful. In 2007, they petitioned the federal Environmental Protection Agency to limit the use of nonylphenol because of its potential dangers. A Sierra Club paper on nonylphenol also points out that there are alternatives to the chemical that come with minimal cost increases. Ed Hopkins, who worked extensively to lobby for nonylphenol restrictions, said efforts to limit or ban the chemical were stymied by a combination of outdated policies, the Bush administration, and the political clout of big industry.

"I think it's just a good chemical to illustrate how far behind the United States is in properly protecting the public..." Hopkins said.

The Sierra Club is still in the middle of a lawsuit with the EPA.

The tricky part about nonylphenol is that despite its correlation to hermaphroditic fish and tumors, few seem willing to declare there's a definitive link.

Tomanek and another Cal Poly biologist, Dean Wendi, were reluctant to say there is a cause-and-effect relationship. Instead, they say there is a correlation between nonylphenol and tumors.

Still, if their suspicions are correct, researchers from Cal Poly and the regional water board could be helping lay the foundations for a U.S. nonylphenol ban.

The research Tomanek is doing right now isn't unheard of, he admitted. "But the extent and the levels [of nonylphenol] we're finding, that seems to be groundbreaking."

So what's next? There's little question that nonylphenol is common in coastal waters. The key for Tomanek and others will be to show whether the chemical is hazardous in the amounts allowed under U.S. law.

Morro Bay looks to be a kind of Petri dish to answer that question. Local scientists will track the food chain to see if other species, such as larger fish or even sea otters, have nonylphenol in their bodies.

Even in these early testing stages, it doesn't look like there's a direct threat to humans. Tomanek noted that gobies aren't a common menu item. Even if the chemical is making its way into other more edible fish, fish lovers generally aren't eaten. As for the spermicides, they're safe, unless you're a fish. A

Staff writer Colin Rigley believes that fish have a right to change genders. Send comments to crigley@newtimesla.com

SLOSEA “In the Academic Literature”

Northwest Straits Marine
Conservation Initiative



Delaware Inland
Bays Estuary Program



Trilateral Wadden
Sea Cooperation



Practical Framework for Implementing Marine Ecosystem-Based Management

Kimberly W. Heiman^{1*}, Chris Bason², Tom Cowan³, Folkert de Jong⁴, Benjamin S. Halpern⁵, Brian Keller⁶, Belinda Jago⁷, Karen McLeod¹, and Dean Wendt⁸

*To be submitted to:
Ocean and Coastal Management*



San Luis Obispo Science
& Ecosystem Alliance

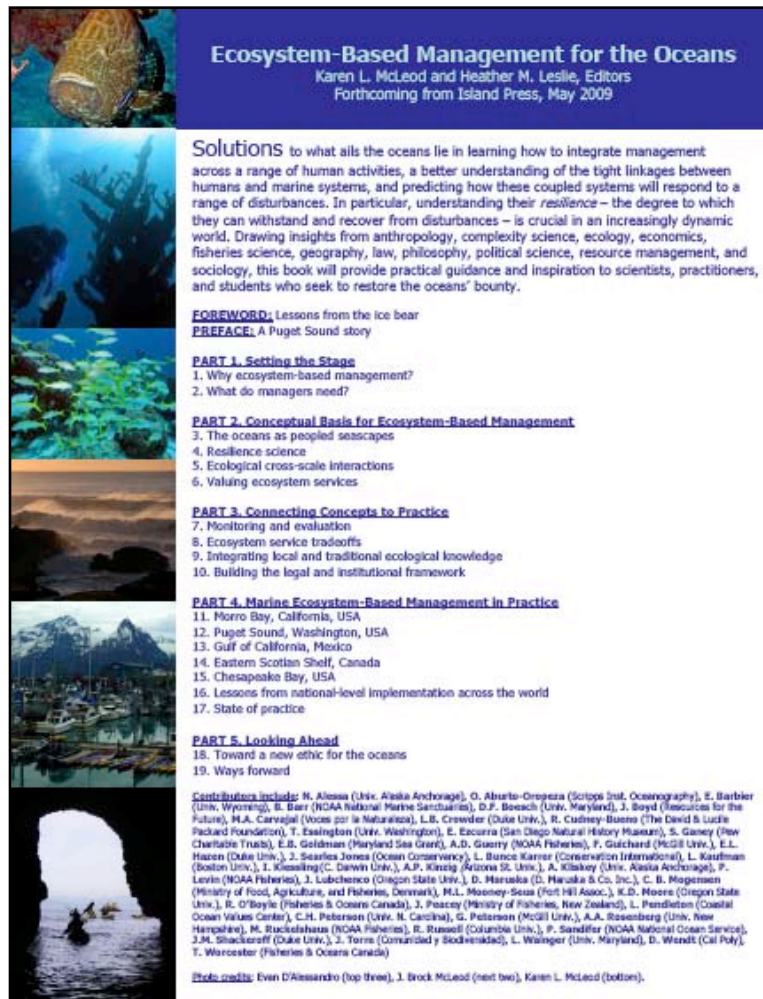


Florida Keys National
Marine Sanctuary



Great Barrier Reef
Marine Park

SLOSEA “In the Academic Literature”



Morro Bay, California, USA

D. E. Wendt, L. Pendleton, and D. Maruska

In Ecosystem Based Management for the Oceans. Eds. K.L. McCleod, H.M. Leslie. In press, Island Press, May 2009

SLOSEA “In the Academic Literature”

Collaborative Research: An Effective Way to Collect Data for Stock Assessments and Evaluate Marine Protected Areas in California

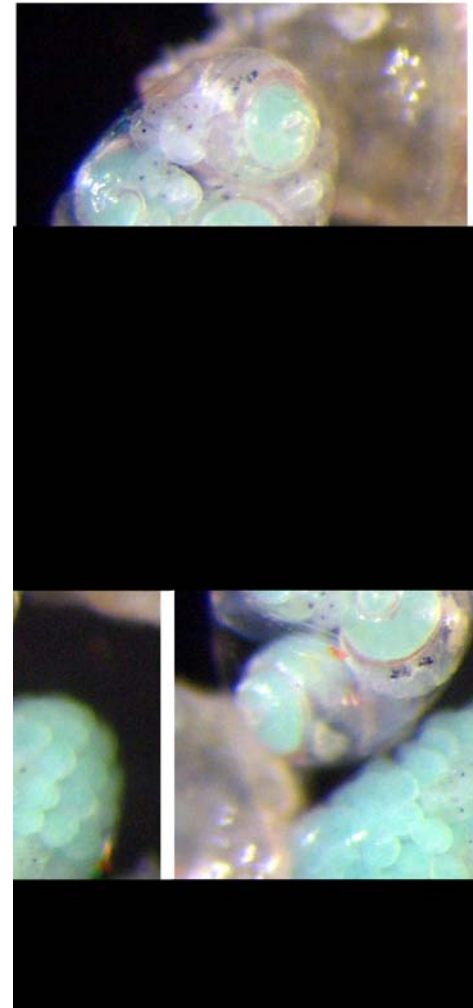
Dean E. Wendt^a and Richard M. Starr^b

In Review: American Fisheries Society "Marine and Coastal Fisheries"



SLOSEA Funding and Pending Proposals

- Packard and RLFF have committed 1.9 M to next 3-years
- State Bond Freeze
 - Impacts on current work (ca. 60K was frozen on Dec 19th)
 - Impacts on future proposals to OPC
 - Fisheries, Key Pollutants, Human Access
- Pending Proposals
 - Sea Grant Focused Research and Outreach Initiative (Key Pollutants; research on nonylphenol)
 - 2009 Fisheries Challenge (Regional Fisheries; data collection for another year)



New SLOSEA Staff

- Jennifer Oquendo, Postdoctoral Researcher, Key Pollutants Strategy
- Don Maruska, Policy Lead, Regional Fisheries Strategy
- TBD, Policy and Communications Manager, Leadership Team

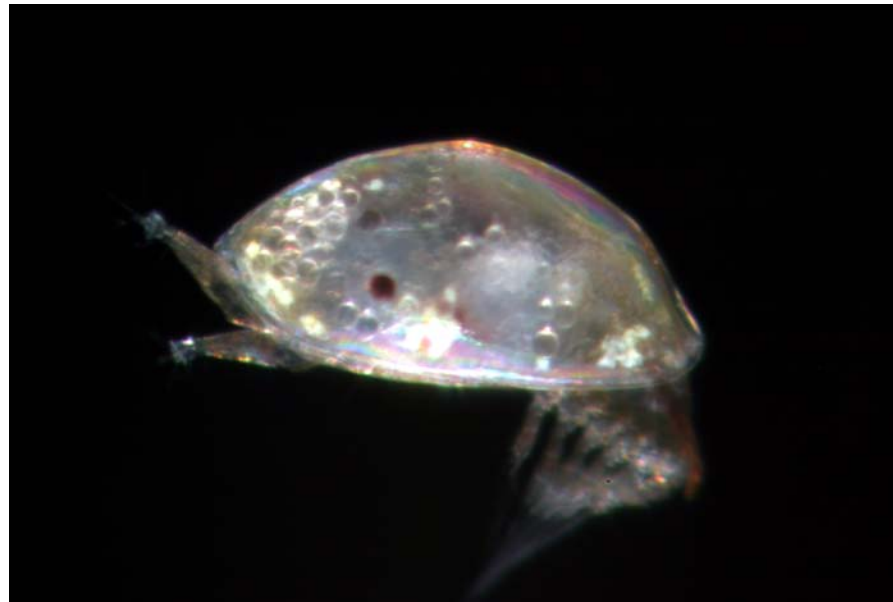




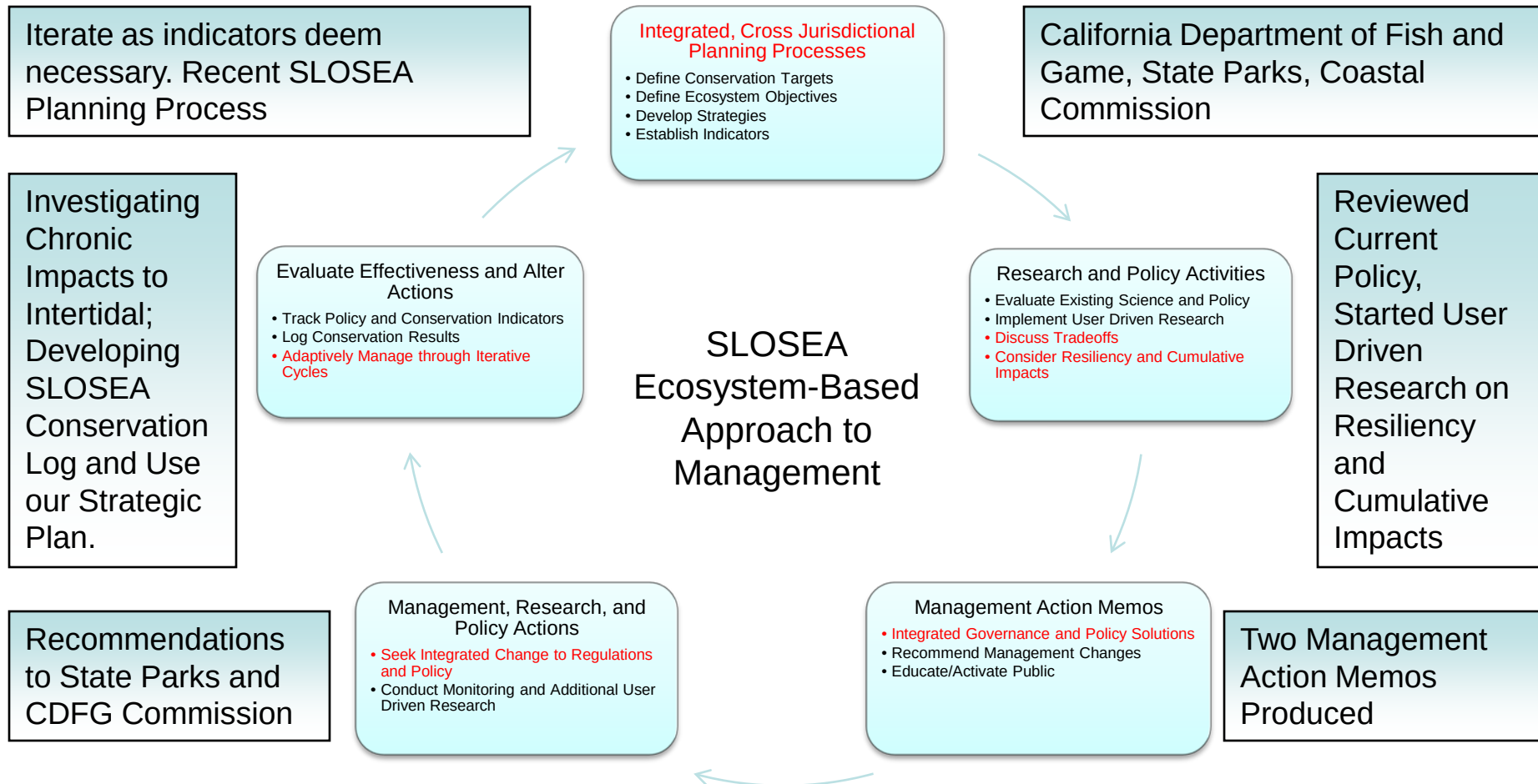
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San Luis Obispo Science and Ecosystem Alliance

Human Access Management Action Memo



SLOSEA Process for EBM



Red Text Unique to EBM

Discussion: Visitor Access MAM

SLOSEA

San Luis Obispo Science and Ecosystem Alliance

Center for Coastal Marine Sciences – Biological Sciences Department
California Polytechnic State University
San Luis Obispo, CA 93407

Office - 805-756-6068 Fax - 805-756-7314
info@slosea.org http://www.slosea.org

SLOSEA Management Action Memo (DRAFT for Advisory Committee review)

TOPIC: Managing Visitor Access to Rocky Intertidal Areas
DATE: 03-26-09

Action Opportunity

Resource managers (California State Parks, California Department of Fish & Game, and California Coastal Commission) and county and local governments have an important opportunity to protect and manage rocky intertidal species in existing and newly acquired coastal areas. New scientific findings from SLOSEA provide important information that should be considered in decisions regarding visitor access levels for rocky intertidal areas.

Situation and Findings

Several newly acquired public properties on the Central Coast of California have relatively undisturbed rocky intertidal resources. These include Hearst, Sea West, Estero Bluffs, and the newly opened public access trail into the Diablo Canyon Power Plant reserve area. In addition, there are multiple areas (e.g., Hazard Reef, Corallina Cove) that have received moderate, but consistent, levels of visitation for multiple decades.

A recent two-year study in the Point Buchon Marine Reserve on Diablo Canyon property has demonstrated that high levels of access affect a number of intertidal algal (rock weeds) and invertebrate (limpets and chitons) species. Moderate levels of visitation affect fewer species and low levels of access had no observable effects. The controlled experiment was designed as a Before-After-Control-Impact study and it is the first of its kind to use such an approach to investigate the effects of human access on intertidal areas. Under high levels of impact it is clear that the community shifts in terms of relative abundance of intertidal species. As part of the access study it was also demonstrated that the current number of visitors to rocky intertidal environments was similar to the "moderate" treatment levels reported above. These results provide important new information documenting clear impacts to the resources from high levels of public access. Ongoing monitoring at the research sites will address two remaining issues of critical importance to management: 1) What is the impact of chronic moderate and low levels of access on the rocky intertidal and, 2) what is the response of the intertidal community after the impact has been removed?

SLOSEA Involvement

This research was designed and conducted by SLOSEA in response to resource managers identifying a need for better information to guide their decisions regarding the appropriate balance between public access and resource protection on rocky shorelines. The SLOSEA team included scientists from Tanager Environmental and the Cal Poly Center for Coastal Marine Sciences.

Recommended Management Actions

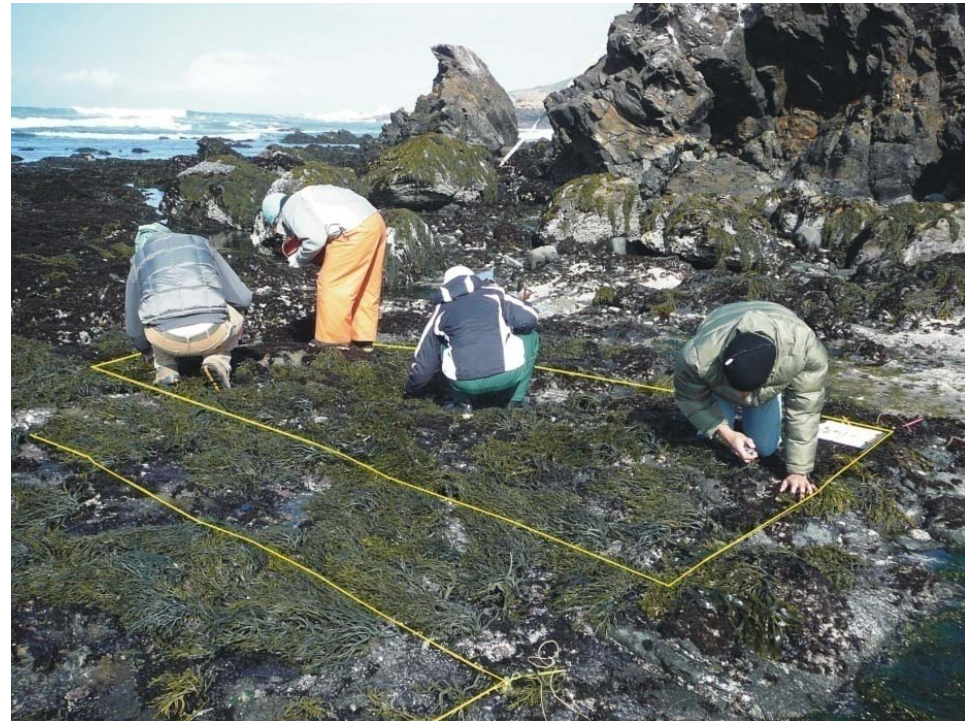
The current management recommendations to State Parks is to maintain, but not increase, the current levels of access to the rocky intertidal areas currently open to the public. For new areas, State Parks should manage access to be equal to or lower than current levels seen at Montaña de Oro State Park. Further recommendations will be forthcoming based on the outcome of current research on chronic, lower-level access and the resilience of the rocky intertidal community in our experimental plots. SLOSEA also recommends the development of volunteer docents who might educate the public about protection of the resources through active partnerships with the Morro Bay Museum of Natural History docents and the Friends of the Elephant Seals.

Next Steps and Continuing Research

State Parks should incorporate the results into policy and management actions associated with coastal access and SLOSEA should explore how to develop the results into a statewide recommendation for levels of access. SLOSEA will continue research on resiliency and effects of chronic low to moderate levels of access. Additional recommendations for resource managers will follow at the conclusion of the results about the potential use of rotating closures of heavily accessed areas. These results should be communicated to the California Coastal Commission for their planning purposes as well.

SLOSEA Collaborative Partners

Cal Poly Center for Coastal Marine Sciences – California Bureau of Land Management – California Coastal Commission –
California Coastal Conservancy – California Department of Fish & Game – California State Parks –
Central Coast Regional Water Quality Control Board – Coastal San Luis Resource Conservation District –
Los Osos Community Advisory Council – City of Morro Bay – Marine Interests Group of San Luis Obispo County –
Monterey Bay National Marine Sanctuary – Morro Bay National Estuary Program – NOAA Fisheries Service – Port San Luis Harbor District



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San Luis Obispo Science and Ecosystem Alliance

Update on Initiatives and Activities



Key Pollutant Sources and Impacts

Strategic Objective: Understand the sources and impacts of key pollutants in Morro Bay and update regulations in an effort to mitigate pollutant effects

Accomplishments:

1. Completed bathymetry and topography of Morro Bay Harbor, Mud Flats, Salt marsh, and Dunes
2. Deployed a near-real-time water quality observatory in Morro Bay which can be used in concert with bathymetry/topography to build a 3-D model.
3. Discovered abnormal tumors in resident fish and identified high levels of an industrial pollutant in the environment and organisms of the the bay and elsewhere in CA.

Current Efforts:

1. Active Partnership with RWQCB on pollutants research and management (Focused Research and Outreach Initiative).
2. Focused research on sources and fates of nonylphenol in the Morro Bay Estuary
3. Integrated SLOSEA sampling with state-wide monitoring program (SWAMP)
4. Building 3-D model to track point source pollutants, investigate climate change scenarios, and understand ecological dynamics of the bay.

Future Plans:

1. Determine the extent of nonylphenol pollution in California
2. Determine the impacts on organisms
3. Change regulations via updated basin plan and other regulatory mechanisms

Identify, Detect and Control Marine Invasives

Strategic Objective: Prevent arrival of new invasives and reduce the distribution of currently established invasive species.

Accomplishments:

1. Determined the extent of invasive invertebrate species in the “fouling community” in Morro Bay.
2. Showed phase shift in the bay from a mussel (native) dominated community to a bryozoan (invasive) dominated community.
3. Determined serial replacement of the invasive with other invasive species under removal regimes
4. Empirically determined the community and habitat characteristics that lead to greater or less invisibility of a community.

Current Efforts:

1. Active research into what mechanisms are preventing the return of the native mussel community.
2. Seeking partnerships to develop the detection program for newly arrived invasives.

Future Plans:

1. Develop a Management Action Memo based on the previous research results
2. Implementation of the detection program.

Data and Framework for Regional Fisheries Management

Strategic Objective: achieve sustainable fish stocks and sustainable fishing communities through regional ecosystem management and stewardship.

Accomplishments:

1. Developed statistically valid protocols to engage expertise of recreational and commercial fishermen in collaborative research.
2. Gained interest and support for consideration of the data in stock assessment models (cabezon representing current use).
3. Drafted an action plan with collaborative participants (CDFG, NOAA Fisheries, and OPC) to analyze opportunities for regional management with innovative stock assessment methodologies and the development of portfolios of sustainable fishing opportunities.
4. Positioned SLOSEA with PFMC/NMFS and advocated (with Marine Interests Group) for community fishing associations.

Current Efforts:

1. Partner for development of regional stock assessment models.
2. Gain funding to continue required long-term data collection.
3. Extend application of data collection protocols to other areas.

Future Plans:

1. Build model for regional ecosystem management of fisheries.
2. Evaluate efficacy of regional ecosystem management and pursue demonstration.

Regional Fisheries: Pursuing Policy and Funding

1. Pursue funding for Pacific Coast cooperative fisheries research to address critical data needs and improve stakeholder and public understanding and stewardship of the resources.

- a. Obtain added federal funding for Pacific Coast cooperative fisheries research.
- b. Focus funding on research targeted to improve data needed for stock assessment.
- c. Develop methodologies for setting catch levels that rely on less data than traditional methodologies
- d. Decrease cost of data collection techniques by utilizing fishermen in sampling
- e. Develop regional, ecosystem-based fisheries management

Potential partners: OPC, PSMFC, CDFG, commercial fishermen organizations, recreational fishing associations.

2. Gain legislative and regulatory support to advance ecosystem-based fisheries management and stewardship initiatives.

- a. Develop a collaborative plan between SLOSEA, NMFS, and other interested parties to scope regional ecosystem-based fisheries management methods and implementation issues.
- b. Obtain funding from the federal government for participants to formulate the plan and illustrate how it can be applied.

Potential partners: JOCI, Compass, Meridian, Packard, WCEBM, PEW, EDF, TNC.

3. Support sustainable coastal communities with a coordinated framework of policies and resources.

- a. Scope and implement parameters that support Community Fishing Associations (CFAs) in the Individual Fishing Quota program and provide funding for technical support to establish and encourage successful CFAs. [Consider Agricultural Extension model.]
- b. Include policy provisions in the Coastal Zone Management Act Reauthorization of 2009 to aid coastal communities in integrating federal, state, and local land and ocean management and collaborating to apply resources effectively.

Potential partners: EPA/NEP, NMS, RLFF, Environmental Law Institute (ELI).

Inform Decision Making for a Diversified Marine Economy

Strategic Objective: create a foundation of socio-economic data about trends and preferences in use of ecosystem services (fishing, beach going, bird-watching, etc.) and apply perspectives to promote a thriving diversified marine economy.

Accomplishments:

1. Completed a three-year study with surveys and analysis of baseline ecosystem-dependent business activity in Morro Bay.
2. Analyzed linkages between changes in environmental and ecological conditions and economic activities, creating an interactive economic indicator website.
3. Generated interest among local businesses and decision makers in opportunities to develop a more diversified marine economy.

Current Efforts:

1. Pursue use of interactive economic indicator website as an educational tool for decision makers and the public at large.
2. Apply data about the diversity of ecosystem services and preferences to help evaluate economic considerations in choices and tradeoffs affecting other SLOSEA strategies (e.g. pollution and fisheries management).
3. Encourage collection of comparable data in other Pacific coastal communities to understand similarities and differences and opportunities for improvement.

Future Plans:

1. Develop an outline or template for economic considerations in evaluating ecosystem tradeoffs.
2. Quantify economic benefits of SLOSEA's conservation results (subject to funding).



Photo Courtesy of Malcolm