Sea Grant California

Sea Grant News

JUNE 2010

Coastal Science Serving California

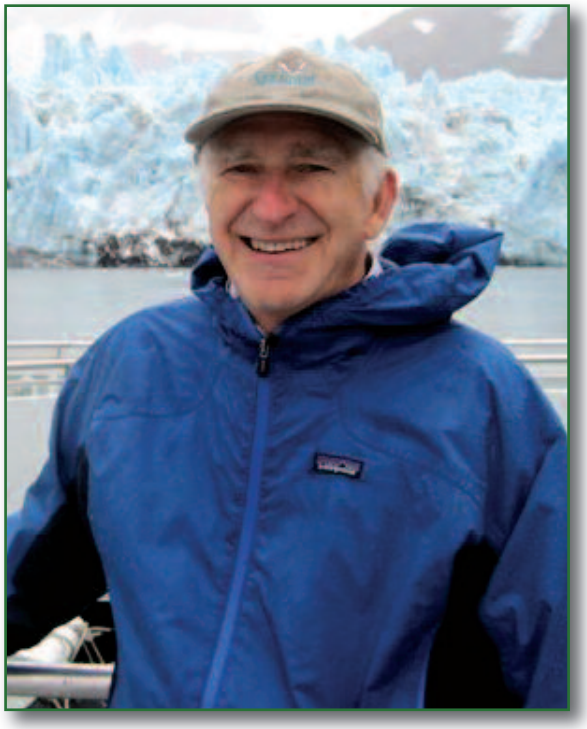
Director Dr. Russell Moll to Retire

LA JOLLA – After a decade at the helm of the largest of the nation's Sea Grant programs, California Sea Grant Director Dr. Russell A. Moll has announced his decision to retire by August's end.

Known for his mild manners and quick wit, Dr. Moll can be proud of having greatly polished the image and credibility of CA Sea Grant.

A testament to his diplomacy, he also successfully negotiated changing administrations at nearly every institutional level affecting CA Sea Grant – at Scripps, where it is housed, the University of California, the National Sea Grant Office, in California and nationally.

Despite the shifting institutional winds and unprecedented belt-tightening, Dr. Moll was able to double the program's operational budget during his tenure. He departs having positioned the program on a smooth fiscal and programmatic path, and with much goodwill from its staff and many partners.



Dr. Russell Moll.

"In my eyes the most important thing I did was to mend some bruised relationships with investigators in California," says Dr. Moll, a phytoplankton ecologist by training who was director of Michigan Sea Grant before coming to California. "We revamped the peer-review process of our research proposals and changed all the committees. It restored our credibility within the scientific community as serving not just a few university campuses but as being a truly statewide program."

The internal stability of the greater Sea Grant family was also enhanced under Moll's leadership, with the full integration of the CA Sea Grant Extension and Communications programs into the CA Sea Grant management team and by a sincere reinvigoration of collaborations with USC Sea Grant.

"Russ provided sage advice and sound leadership," says Dr. Paul Olin, former director of CA Sea Grant Extension, currently a marine adviser for Sonoma and Marin counties. "When most of the university was losing FTEs (faculty full-time equivalents), he was able to hire four new advisers. He has been a tremendous supporter of the outreach activities of the extension program."

"He really has brought a true spirit of congeniality and inclusiveness to Sea Grant," agrees USC Sea Grant Director Dr. Linda Dugay. "He's done a great job of collaborating with my program."

Besides unifying the greater Sea Grant family, Moll established several key new partnerships with the state of California's ocean-related entities, broadening and deepening dialogs with state managers, scientists and policy makers – and significantly leveraging the basically flat-funding of federal dollars from the National Sea Grant Office.

Notable among the new partners is the Ocean Protection Council (OPC), established in 2004 to serve as a coordinating body for Gov. Schwarzenegger's landmark "ocean action plan."

This year, CA Sea Grant is administering five research projects on behalf of the OPC and collaborating with it and other state entities on a $4-million North Central Coast marine protected area baseline studies program. It was a collaborator on a similar baseline study of the Central Coast marine protected areas and, prior to this, had partnered with

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the California Department of Fish and Game and OPC on research to help implement the Marine Life Management Act and Marine Life Protection Act.

Dr. Moll was also a founding member and then chair of the board of trustees of the California Ocean Science Trust (2003-09), as well as a member of the UC Marine Council (2000-present).

"His work in bringing together the academic and resource management communities has really served us well," says Brian Baird, Assistant Secretary for Ocean and Coastal Policy with the California Natural Resources Agency. "We are starting to see this research applied on the ground, where it should be."

"Russ has been a fantastic, open, accessible conduit of information for the state and has been invaluable in creating valuable partnerships between the state and Sea Grant," says Dr. Amber Mace, executive director of the OPC and a former CA Sea Grant State Fellow. "He has given so much service to ocean science in California."

Educational opportunities were also improved during Dr. Moll's directorship.

As of April 2010, CA Sea Grant on behalf of the Delta Science Program (formerly the CALFED Science Program) had awarded 43 doctoral and postdoctoral fellowships in support of research related to the San Francisco Bay and Sacramento-San Joaquin Delta.

Dr. Russell Moll and wife Marilyn Moll.

CA Sea Grant was itself directly supporting 20 graduate students participating on its funded research in 2010. Since 2000, about 300 "traineeships" have been awarded.

Reflecting the solidified relationships with state and federal marine-related programs in California, Dr. Moll was able to leverage and hence expand CA Sea Grant's marine policy fellowship program by requiring matching funds from "host" agencies. State Fellows, both past and present, have become a prime source of staff for the California Natural Resources Agency, OPC and NOAA National Marine Sanctuaries, among others.

Although CA Sea Grant is, by design, a statewide program, Dr. Moll remained active in regional and national ocean research, education and policy, serving as treasurer of the American Society of Limnology and Oceanography (1996-2002), an appointed member of the Marine Protected Areas Federal Advisory Committee (2008-present), as well as member and past chair of the Birch Aquarium Faculty Advisory Panel (2003-present). He also co-chaired the Ocean Sciences Meeting in 2002, 2004 and 2006.

Prior to coming to the Golden State, Dr. Moll was based at the University of Michigan in Ann Arbor for more than two decades, minus a short appointment at the National Science Foundation. He was assistant director (1985-93) and then director (1996-2000) of Michigan Sea Grant and former associate director (1998-2000) of the University of Michigan Biological Station, which oversees the Center for Great Lakes and Aquatic Studies. In 1994-95, he was a program officer for NSF's biological oceanography division and before this director of University of Michigan/Michigan State University/NOAA Cooperative Institute for Limnology and Ecosystems Research (1989-96).

Before "dying and going to administration," as Dr. Moll is fond of saying, he conducted research on plankton biology in the marine nearshore, salt marshes, African mangroves, Great Lakes, and "lesser" lakes and rivers, both temperate and tropical. He also studied aquatic invasive species in ship's ballast water and spent 18 months in eastern Africa as a project team leader for the "Gambia River Study."

Francophiles, Dr. Moll and wife Marilyn Moll, plan to spend two months in Southern France after his retirement. An avid cyclist, Dr. Moll also looks forward to more pedal-time on his high-performance bicycle.

CA Sea Grant Announces 2010 Grant Recipients

LA JOLLA – An oceanographer who thinks climate change is shifting the timing of the spring phytoplankton bloom, an environmental scientist who wants to release parasites to control an invasive mollusk and a fisheries biologist developing computer models to assess marine protected areas are among this year's recipients of CA Sea Grant research funds.

CA Sea Grant and the California Ocean Protection Council are providing about $1 million to the nine projects in 2010. Projects, which range from one to three years in duration, began in February and include support for seven graduate students.

"This year, we see a heavy investment in the sustainable management of fisheries and marine resources," says CA Sea Grant Director Dr. Russell Moll. "We are very pleased to continue our support of outstanding research on topics of real relevance to California."

The new projects and their lead investigators, with a short summary of each project's key objectives, follow.

FUNDING STATS*

Number of preliminary proposals submitted to CA Sea Grant:	99
Number invited to submit full proposals:	24
Number of projects funded:	8
Average award amount, including graduate support:	$101,375
Average duration of grant:	2.4 years
Number of graduate students supported:	7

* Does not include the Ocean Protection Council-funded project.

Developing a Biological Control for the New Zealand Mud Snail

Tom Dudley, Ryan Hechinger and Armand Kuris, UC Santa Barbara

US Geological Survey

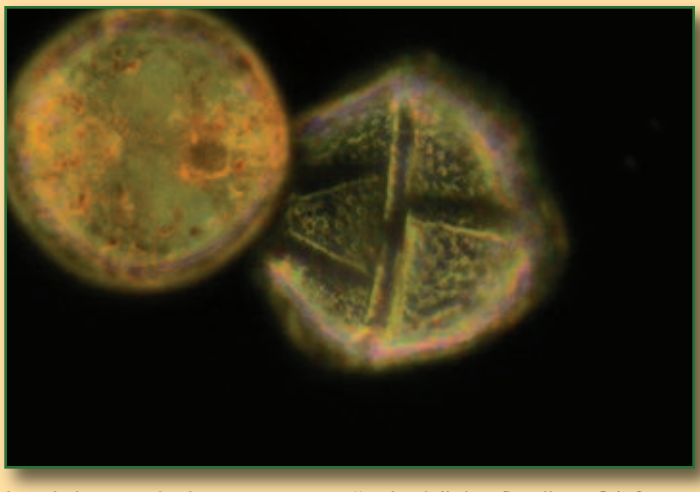
New Zealand mud snails beside a dime for scale. CA Sea Grant scientists are investigating whether snail parasites might offer a biological control strategy for this invasive species.

"Castrating" trematode parasites are being investigated as a possible biological control agent for the troublesome New Zealand mud snail. The project will involve fieldwork to document the degree to which the parasites are reducing snail numbers in the wild, as well as laboratory experiments to ensure the parasites cannot infect native North American snails. Findings will validate or invalidate the merits of releasing parasites to halt the invader's spread.

Is C/N Decoupling Caused by Harmful Algal Blooms in Santa Monica Bay?

Anita Leinweber and Rebecca Shipe, UCLA

Do dinoflagellates swim up and down in the water column to obtain the nitrogen they need? If so, their vertical migrations might explain the apparent decoupling of dissolved inorganic carbon and nitrogen cycles and offer a mechanism for the formation of harmful algal blooms in low-nitrate surface waters. The ideas will be tested in Santa Monica Bay.



R. Shipe/UCLA

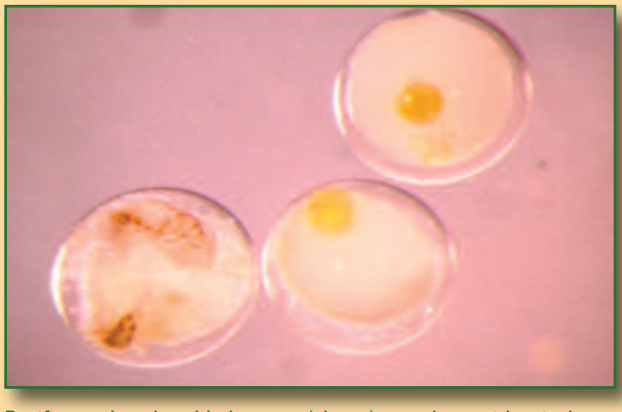
Lingulodinium polyedrum, a non-toxic "red-tide" dinoflagellate. CA Sea Grant researchers think the organism descends below the mixed layer at night to obtain nitrogen, returning to the mixed layer by day to absorb sunlight.

2010 Grant Recipients (cont'd.)

High-throughput Molecular Identification of Fish Eggs and Larvae

Ron Burton, Scripps, UC San Diego

DNA bar-coding methods, coupled with a bead-array technology, capable of simultaneously identifying multiple specimens, will be combined to build a sea-going instrument for speciating fish eggs and larvae, collected by a continuous fish-egg sampler. The first application of the bead array will be to classify eggs in a 12-year archive of samples from CalCOFI cruises.

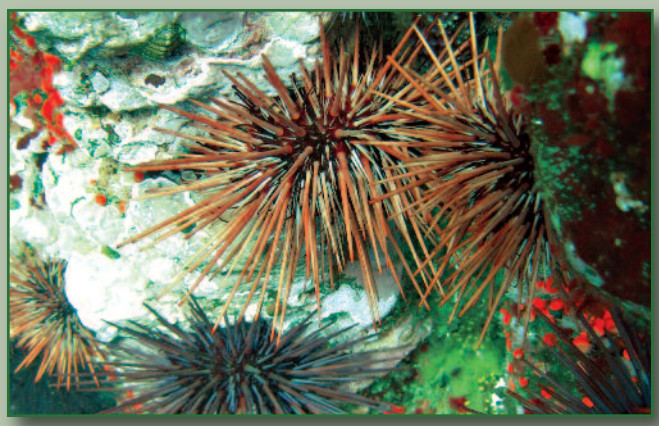


NOAA Fisheries

Pacific mackerel and hake eggs (above) are almost identical visually. A CA Sea Grant researcher is using their genetic differences to distinguish them rapidly.

Sustainability and Fine-scale Management of an Urchin Fishery and the Ecology of Exploitation

Paul Dayton and Ed Parnell, Scripps, UC San Diego; Stephen Schroeter, UC Santa Barbara



C. Dawson/Reef Check

Red and purple sea urchins off California.

Scientific and commercial urchin divers will collect data needed to estimate sea urchin recruitment, growth, movement, fishing mortality and foraging behavior within the Point Loma kelp forest off San Diego. This information will be used, among other things, to determine ecologically relevant spatial scales for local urchin populations.

Competing Bacterial Endosymbionts in Abalone Health, Management and Restoration

Carolyn Friedman and Glenn VanBlaricom, University of Washington; Peter Raimondi, UC Santa Cruz

C. Johnson/CSG

Cultured red abalone.

A newly discovered rickettsial bacterium is hypothesized to reduce mortality rates from the abalone disease known as "withering syndrome." Warmer water may exacerbate disease transmission, with susceptibility to disease varying among abalone species. Scientists will test these ideas; findings have applications to farmed and wild (including endangered) abalone.

Adaptive Management: Predicting MPA Responses for Comparison to Monitoring Data

Louis Botsford, Marissa Baskett and Alan Hastings, UC Davis

Biologists are developing computer models for evaluating the performances of the Central Coast marine protected areas (MPAs) for target species such as blue rockfish, black rockfish, lingcod and cabezon. The models will incorporate what is known about larval dispersal, adult movement and species interactions; model output can then be compared to monitoring data, to evaluate MPA effects.

Blue rockfish.
Life Sciences/UCSB

Exploiting Marine Actinomycetes for Drug Discovery

Paul Jensen and Bradley Moore, Scripps, UC San Diego

K. Freel/UCSD

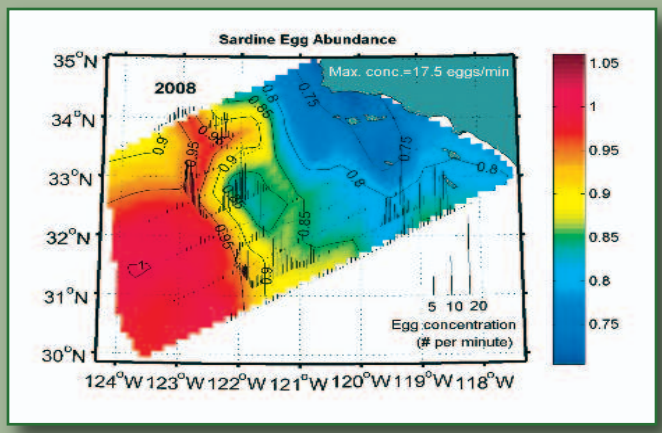
CA Sea Grant investigator Paul Jensen (left) and graduate student Kevin Penn suited up to collect sediment samples off Southern California.

With highly sophisticated molecular techniques, researchers will screen a collection of marine bacteria for their potential to produce new hybrid isoprenoid antibiotics and the presence of prenyltransferase genes, which are associated with antibiotic biosynthesis. Specific objectives include experimentally characterizing gene clusters associated with isoprenoid biosynthesis, and cloning and heterologous expression of prenyltransferases.

Climate Change, Plankton Phenology and Fish Production in the California Current

David Checkley, Scripps, UC San Diego

Global warming, by altering upwelling dynamics, appears to be changing the timing of the spring plankton bloom, disrupting the normal spawning patterns of Northern anchovy, Pacific sardine and jack mackerel. To test these ideas, four types of satellite data will be used to monitor seasonal fluctuations in oceanographic conditions and primary productivity in the California Current and their relationship to yearly fish recruitment success.



R.Asch/UCSD/NOAA Fisheries

A graphic showing sardine egg concentrations off Southern California. CA Sea Grant biologists will be studying the effects of climate change on the timing and success of sardine reproduction.

The Chinook Fishery's Future: Roles of Climate Variation, Habitat Restoration, Hatchery Practices and Biocomplexity

Brian Wells, NOAA Fisheries; David Hankin, Humboldt State; Louis Botsford, UC Davis

What are the pros and cons of different restoration options for runs of Central Valley and Klamath River Chinook salmon? To provide managers with the tools for answering these, researchers will conduct a retrospective analysis of the links between climate variation, human activities and salmon numbers. They will then conduct a prospective analysis to determine the life-history stages of salmon that most affect fish production. Of particular interest is whether restoring genetic diversity within and among salmon populations might reduce wide swings in annual salmon survival rates.

The Ocean Protection Council awarded a total of $720,000 for this research project, with approximately $200,000 to be spent the first year.

Z. Larson/Smith River Advisory Council

Fall Chinook salmon staging (waiting for rain to migrate) during a low-flow period in the Smith River. Research will examine restoration options for salmon in the Central Valley.

$4 Million to North Central Coast MPA Baseline Program

LA JOLLA – Monitoring of the newly created North Central Coast marine protected areas is underway.

Through the $4-million North Central Coast MPA Baseline Program, funded by the Ocean Protection Council, eleven teams of researchers will be studying marine life and habitats, as well as commercial and recreational activities, inside and outside the protected areas.

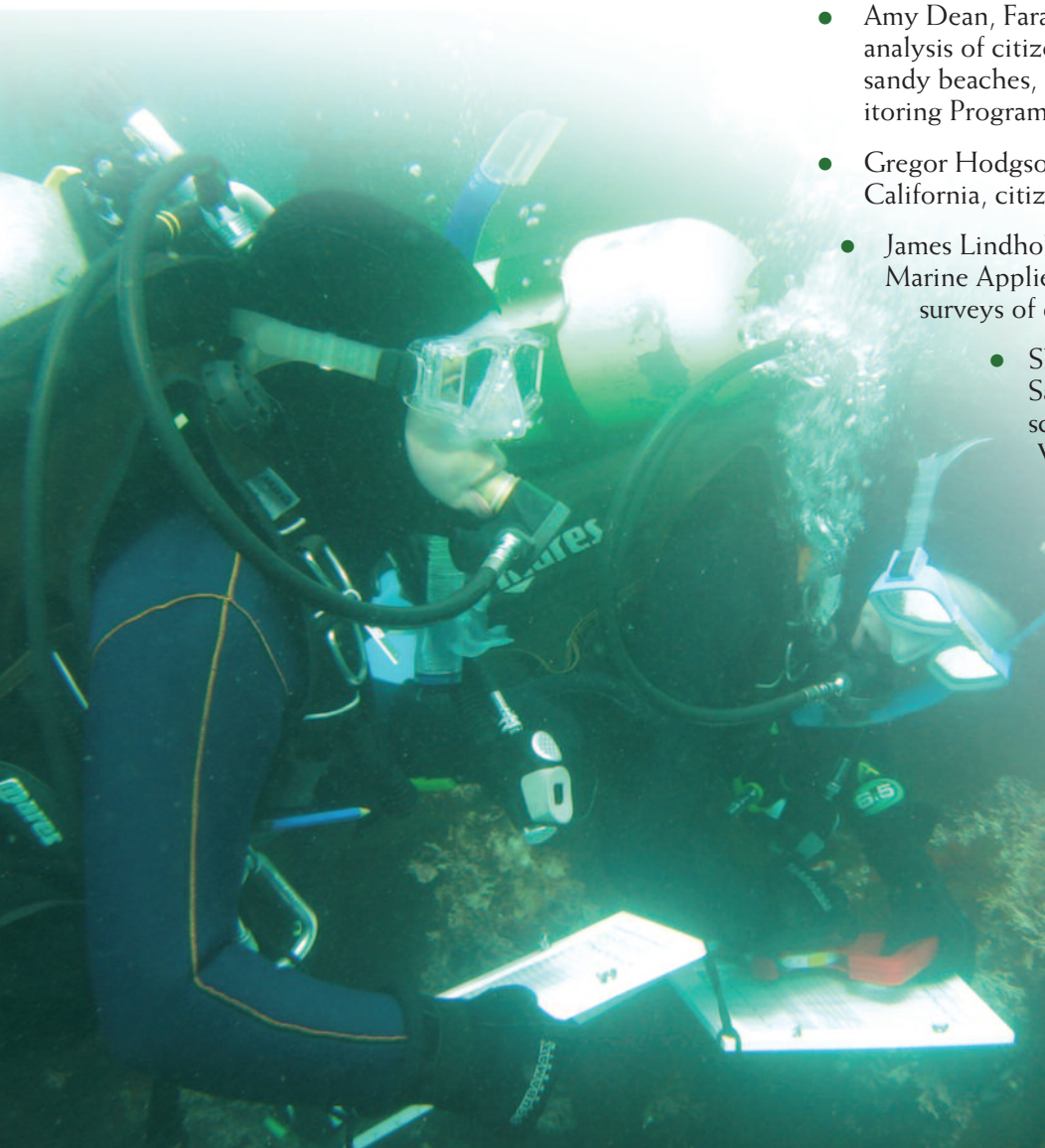
This "time-zero" benchmark—the marine protected areas went into effect May 1—will lay a foundation for future assessments of whether, where, how and why protected areas are meeting the state's policy goals.

CA Sea Grant, which organized and led the competitive peer-reviewed grant proposal process, is pleased to announce the winning projects and their principal investigators:

S. Lyday/Beach Watch

Beach Watch volunteers document a dead bird.

- Mark Carr, UC Santa Cruz, scuba surveys of kelp and shallow rock ecosystems
- Amy Dean, Farallones Marine Sanctuary Association, analysis of citizen-science data from rocky shores and sandy beaches, collected by LiMPETS (Long-term Monitoring Program and Experiential Training for Students)
- Gregor Hodgson and Cyndi Dawson, Reef Check California, citizen-science scuba surveys of rocky reefs
- James Lindholm, CSU Monterey Bay, and Dirk Rosen, Marine Applied Research and Exploration, ROV surveys of deep-water habitats
- Shannon Lyday, Farallones Marine Sanctuary Association, analysis of citizen-science data collected through Beach Watch
- Gerry McChesney, U.S. Fish and Wildlife Service and Dan Robinette, PRBO Conservation Science, surveys of seabird distributions and ecology
- Karina Nielsen, Sonoma State University; Steven Morgan, UC Davis, and Jenifer Dugan, UC Santa Barbara, surveys of sandy beaches and surf-zone ecosystems



Two Reef Check divers survey fish along the North Central Coast. Divers record the number and sizes of 33 fish species along a 30-meter transect. Eighteen transects are completed at each survey site.

C. Dawson/Reef Check

- Peter Raimondi, UC Santa Cruz, surveys of rocky intertidal ecosystems
- Astrid Scholz, Ecotrust, and Christopher LaFranchi, NOAA National Marine Sanctuaries, socioeconomics and demographics of coastal use
- Jan Svejkovsky and Jamie Kum, Ocean Imaging Corporation, aerial kelp surveys and intertidal habitat mapping
- William Sydeman, Farallon Institute for Advanced Ecosystem Research, integrated ecosystem assessment

More detailed summaries of the North Central Coast projects are available at the CA Sea Grant webpage at www.csgc.ucsd.edu/newsroom.

R.Tavernetti/Reef Check

Anemone and sea stars on rocks at Fort Ross in Sonoma County.

Divers after a successful Reef Check survey of key fish, invertebrate and seaweed species. The diver data are shared with marine scientists to help them evaluate the effectiveness of various management decisions, including the establishment of marine protected areas.
C. Dawson/Reef Check

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To go paperless, visit www.csgc.ucsd.edu/paperless.

Mercury Entering Coast through Groundwater

SANTA CRUZ – Groundwater at Stinson Beach in Marin County and Elkhorn Slough in Monterey County is contaminated with a highly toxic form of mercury that poses health risks to pregnant women and fetuses, according to CA Sea Grant scientists.

L. Jennings/UCSC

F. Black/Princeton

Above: UC Santa Cruz graduate student Priya Ganguli (left) and former UC Santa Cruz graduate student Frank Black collect groundwater samples from Stinson Beach.

Right: UC Santa Cruz graduate student Priya Ganguli collects groundwater at Elkhorn Slough.

Below: Coal-burning power plants are the planet's single largest producer of man-made mercury emissions.

The findings, reported in *Environmental Science and Technology*, suggest that submarine groundwater flows at these two sites can inject about as much total mercury into coastal waters as that falling out of the sky locally through atmospheric deposition.

More significantly, the groundwater was shown to contain relatively high levels of methylmercury, the heavy metal's bioavailable form that accumulates in the marine food chain and poses a public health problem in most regions of the world, according to the Madison Conference Declaration on Mercury Pollution.

"What we have shown is that methylmercury is coming from groundwater in California at surprisingly high levels," says coauthor Russell Flegal, a professor of environmental toxicology at UC Santa Cruz.

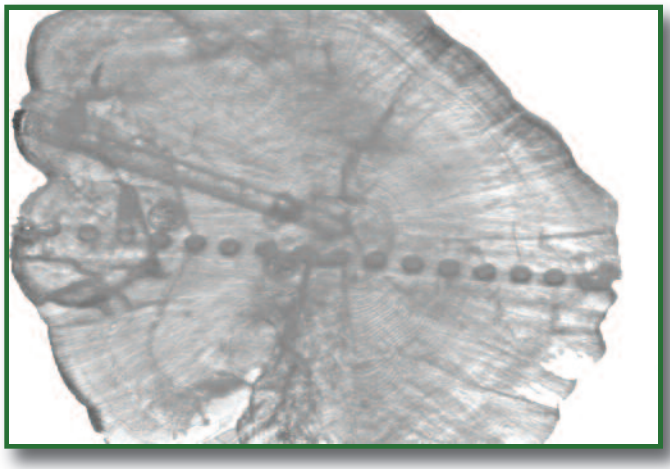
Septic tanks, such as those near Stinson Beach, may also contribute to methylmercury formation by providing methylating bacteria with a low-oxygen environment and nutrients needed for growth, says Frank Black, a postdoctoral researcher at Princeton University and the paper's lead author. At Elkhorn Slough, groundwater may be flushing out methylmercury produced in low-oxygen wetland sediments.

Getty Images

New Spawning Grounds Still Don't Spell Relief for Delta Smelt

A Delta smelt.
J. Hobbs/UC Davis

DAVIS – The state and federally protected Delta smelt is no longer spawning in the interior of the San Francisco Bay-Delta, a UC Davis researcher says. Instead, the small fish, which is unable to swim against the currents created by the state's massive water pumping system, is seeking refuge in the Cache Slough Region of the lower Sacramento River.



J. Hobbs/UC Davis

A slice through an otolith about 1.2 mm in diameter. The spots and lines are scars from the laser.

The shift in spawning habitat, the scientist reports, occurred after water exports rose by 30 percent between 2002 and 2004. During this same period, the Bay-Delta witnessed declines in several other pelagic fish species, besides the Delta smelt.

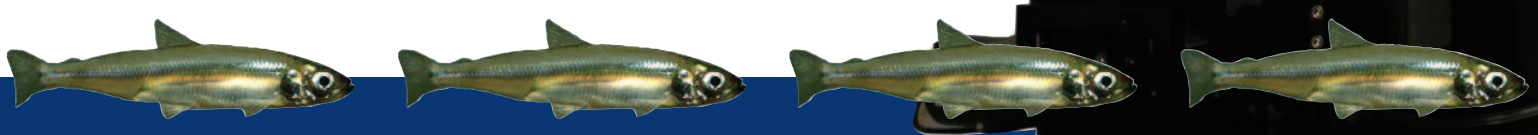
Many scientists theorize that the cause of the decline in pelagic organisms is due to a lack of food (such as copepods) in the Bay-Delta, says James Hobbs, a former CALFED Science Fellow, now a researcher at the Interdisciplinary Center for Inductively Coupled Plasma Mass Spectrometry at UC Davis. Consistent with this, Hobbs has documented a slowing of Delta smelt growth rates since 2002 and 2004.

As if there can't be any good news for the fish, which is listed on both state and federal endangered species lists, Hobbs has also found that water diversions can entrain and kill smelt residing in Cache Slough, more than 30 miles from the intake system.

Hobbs' findings, presented at several science conferences, are based on growth rates and isotope analyses of more than 1,000 Delta smelt otoliths (ear bones) collected by the California Department of Fish and Game between 1999 and 2007.

A summary of his project's findings, as well as references to scientific presentations, can be downloaded at no charge from the CA Sea Grant website at: **www.csgc.ucsd.edu/BOOKSTORE/project_profiles_10.html.**

Sophisticated lasers can extract material from otolith rings for chemical analysis.
J. Hobbs/UC Davis



2010 State Fellowships Awarded

CA Sea Grant is pleased to announce the 2010 State Fellowship winners.

Fellows will spend a year interning with state and federal agencies engaged in marine policy and/or resource management in California. The five outstanding recipients and their host agencies are:

KRISTINE FALOON
NOAA's Monterey Bay National Marine Sanctuary

JASON HASSRICK
West Coast Regional Office, NOAA Coastal Services Center

ERINN MCKELL
Ocean Resources Management Program, California Natural Resources Agency

PAM RITTELMEYER
California Ocean Protection Council, State Coastal Conservancy

LIZ ROGERS
California Ocean Science Trust

For more information on the CA Sea Grant State Fellowship, visit www.csgc.ucsd.edu/Education.

2010 Knauss Fellowships Awarded

The National Sea Grant Office has awarded John A. Knauss Marine Policy Fellowships to four CA Sea Grant nominees.

The four are among 46 outstanding students and recent graduates from across the nation to receive yearlong paid assignments in executive and legislative branches of the federal government.

The four recipients are:

Karen Carlson, who earned a master's degree in public policy from California State University, Monterey Bay in 2009. She is interning at the NOAA Office of Program Planning and Integration.

Sherry Lippiatt, a doctoral student in ocean sciences at UC Santa Cruz, studying the distribution of reactive iron in the Columbia River plume and Gulf of Alaska. She is spending her fellowship at the Marine Debris Program, NOAA's National Ocean Service.

Katie Nichols, who holds a master's in marine conservation ecology from San Diego State University (2009) for her work on sea urchin and lobster ecology in the Point Loma kelp forest. She is interning at the Office to the Assistant of NOAA Fisheries.

Kyle Vanderlugt, a doctoral student in environmental science at the University of Arizona, developing techniques for using aquaculture effluent as a crop fertilizer. He is spending his fellowship with the Assistant to the Deputy, NOAA's Office of Oceanic and Atmospheric Research.

Karen Carlson

Sherry Lippiatt

Katie Nichols

Kyle Vanderlugt

For more information on the Knauss Fellowship, visit www.seagrant.noaa.gov/knauss.

Atlantic oyster drill.
A. Cohen/SFEI

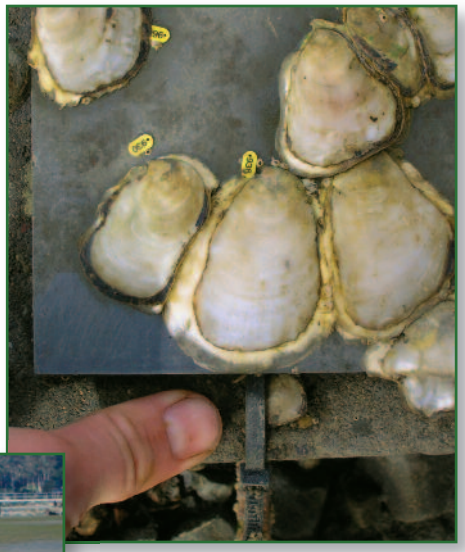
Snails to Blame for Faltering Success of Native Oyster Restoration

TOMALES BAY – Voracious alien snails are devouring California's only native oyster in Tomales Bay along Point Reyes National Seashore, halving the amount of hospitable habitat for the bivalve, according to CA Sea Grant researchers.

The exotic whelk snail, called an Atlantic oyster drill, is especially problematic because its tolerance to fresh water exceeds that of its enemies: red rock crabs, marine species found near the mouth of the bay. The upshot is that the Atlantic drills have been free to invade low-salinity waters around the head of Tomales Bay, which also happens to be prime habitat for native Olympia oysters.

UC Davis researcher Ted Grosholz and former graduate student David Kimbro, now a post-doc at Florida State University, are recommending that oyster restoration efforts focus on rebuilding beds in the center of the bay, where Atlantic drills are scarce and phytoplankton (food) abundant. Their findings were published in *Limnology and Oceanography*.

In separate but related research, UC Davis graduate student Anna Deck found that oyster survival is not being compromised by "space competitors" such as tunicates and barnacles. There is also mounting evidence that hard substrate may not be a limiting factor for oyster recruitment, meaning that future re-establishment efforts may require captive rearing of native oysters for release in the wild.



C. Zabin/UC Davis

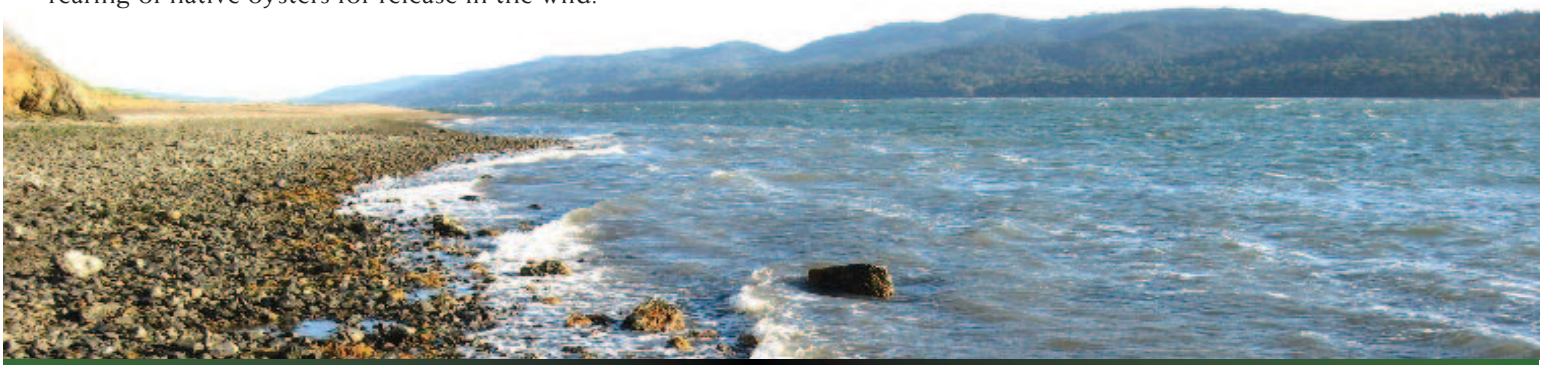
A. Hettinger/UC Davis

Above: Olympia oysters on a recruitment collector in Tomales Bay.

Left: Oyster density surveys in Tomales Bay.

Below: Tomales Bay field site.

A. Deck/UC Davis



California Sea Grant

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Sea Grant News

JUNE 2010

Free Copies of "The Blue Book"

For a limited time, CA Sea Grant is offering free copies of "California's Living Marine Resources: A Status Report," on a first-come, first-served basis to government agencies, faculty and others who can pick them up from a warehouse in Richmond or pay the cost of shipping. Books must be ordered by the box (8 books, 33 lbs.). The cost to ship one box via Media Mail rate through USPS is approximately $15.

The 592-page spiral-bound book, published in 2001, is the most recent report addressing the status of the state's marine life and habitats and will be of particular interest to resource managers, researchers, conservation groups, etc. See a complete description at: www.csgc.ucsd.edu/bigbluebook.

To order one or more boxes and arrange for pick up or shipping, email Jon Mercy, UC ANR Bookstore, jrmercy@ucdavis.edu.