

## Parasite in Cats Killing Otters

Offering a partial explanation to a mysterious decline in the southern sea otter population, Sea Grant scientists have established a strong body of circumstantial evidence linking cats to a lethal otter disease.

University of California at Davis professor Patricia Conrad and her doctoral student Melissa Miller, both in the School of Veterinary Medicine, have shown that otters near heavy freshwater flows are three times more likely to be infected by the parasite *Toxoplasma gondii* than otters from areas where runoff is light.

*Toxoplasma gondii* is a protozoan that causes potentially lethal brain infections in otters. In people, toxoplasmosis is usually asymptomatic, though AIDS patients or



University of California sea otter researchers Pat Conrad, left, and Melissa Miller examine a lung scan of a dead sea otter. Photo: Regents of the University of California.

others with compromised immune systems can develop hepatitis, pneumonia, blindness or severe neurological disorders.

Toxoplasmosis can also be transmitted across the placenta, causing a spontaneous abortion, a stillbirth or severe brain damage.

In a survey of 233 live and dead otters from Santa Barbara to Half Moon Bay, a staggering 76 percent of those near heavy freshwater outflows, storm drains and river mouths, had antibodies to *T. gondii*. There was also

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## In Memoriam

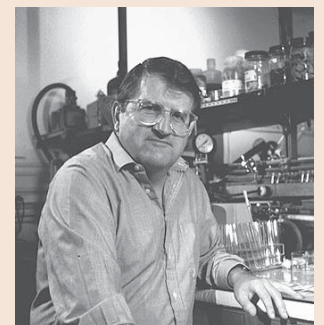
### D. John Faulkner 1942–2002

It is with deep sadness that we report that Dr. D. John Faulkner, a pioneer in the field of marine natural products chemistry, died November 23, 2002, from complications following recent heart surgery. He was 60 years old.

Faulkner had been a California Sea Grant researcher since 1970. A professor of marine chemistry at Scripps Institution of Oceanography, Faulkner dedicated his scientific career to the discovery and isolation of chemicals from marine organisms and to exploring their potential use as pharmaceuticals. Sea Grant-funded research on marine natural products by Faulkner and other scientists established California Sea Grant nationally as a pioneer in marine biotechnology research.

Faulkner’s expertise was in elucidating the chemical structures of compounds. His work was recognized in 2000 with the Paul J. Scheuer Award in Marine Natural Products for Outstanding Contributions to the field. A symposium in his honor was held at Scripps in August 2002.

“John was dedicated to the purity of scientific thought. He possessed uncompromising intellectual integrity and the courage to speak his mind,” said Charles Kennel, director of Scripps Institution of Oceanography. “He made numerous fundamental contributions to marine chemistry and became one of the world’s eminent marine natural products chemists.”



Faulkner is survived by his wife, Meryl, of La Jolla. Memorial services were pending.



Hunted to near extinction for their lush fur, sea otters are now protected under the federal Endangered Species Act. Their recovery, however, is being hampered by disease-causing agents spread in runoff. Photo: Regents of the University of California.

a surprisingly high rate of infection in the general otter population. Forty-two percent of live otters sampled had antibodies to the parasite, an almost certain sign of infection. The research was funded by the National Sea Grant College Program in Silver Spring, Maryland.

The scientists' best guess is that parasite eggs in cat droppings are being washed by rains and sprinklers into coastal-bound storm drains and creeks. Although many different kinds of animals, such as birds and rodents, can serve as intermediate hosts for *T. gondii*, cats are the only animals known to shed the parasite's eggs in their droppings. This cat-parasite link is the reason pregnant women are advised against cleaning cat litter boxes.

Though a potentially serious health threat to people as well as otters, *T. gondii* is only one of many waterborne pathogens that may be entering beach waters via runoff. A new California Sea Grant study is looking at one of the more worrisome of these, *Cryptosporidium*, widely regarded as one of the most significant causes of diarrhea in humans.

Leading the project are Rob Atwill, also at the School of Veterinary Medicine at Davis, and Conrad. Taking cues from sea otters, Atwill and Conrad are measuring pathogen levels in bivalves near outfalls of human and agricultural runoff to help them track upstream sources of pollution. Genetic tests are also being used to identify which animal species are the main sources of contamination. Wildlife, cattle, pets and people can spread *Cryptosporidium*.

The scientists are also working with dairies along the coast to test the degree to which management practices, such as planting vegetative buffer strips, can reduce pollution sluicing into coastal waters.

## Showcasing Sea Grant Trainee Program: Students Give Talks, Show Posters at Oceans Conference

Adding yet another facet to Sea Grant's portfolio of educational programs, Sea Grant hosted its first-ever symposium and poster session dedicated entirely to showcasing graduate research of Sea Grant Trainees.

The Sea Grant Trainee program is well-known for supporting the next generation of young marine scientists, but until now these budding researchers have not had a venue for sharing their discoveries either with their Sea Grant peers or before a broad audience of ocean scientists and policy-makers.

The inaugural Sea Grant Graduate Research Symposium was held at the California and the World Ocean Conference 2002 in Santa Barbara. This year 24 graduate students from the University of California, the California State University System, the University of Southern California and Stanford University gave short oral presentations or presented posters of their research. This research is usually the backbone of the student's master's or doctoral thesis. About 900 Sea Grant traineeships have been awarded over the last 30 years.

To add a little spice to the event, Sea Grant offered \$500 awards to the best oral and poster presentations; smaller sums were also awarded to second- and third-place winners. The event was organized and supported jointly by California Sea Grant and USC Sea Grant.

Those judging the presentations commented on the exceptional sophistication and professionalism of all of the presentations. Among this shimmering pool of talent, the panel



California Sea Grant Director Russell Moll with trainee Scott Rapaport, winner of the first-place oral presentation. Photo: California Sea Grant.

## Habitats Young Rockfish Call Home—New Survey in California and Oregon

Marine Advisor Susan McBride of Humboldt and Mendocino counties has won an award from the National Sea Grant College Program's Fisheries Extension Enhancement Program to conduct a year-long survey of juvenile rockfish populations in California and Oregon.

Her project, by design, will help both state and federal agencies develop fishery management plans for rockfish species, known generically as red snapper or rock cod in the marketplace. Fishers will be playing a central role in the project's field work, as they, after completing training classes led by McBride and others, will be the ones setting traps and identifying fish.

The bulk of the project involves collecting juvenile rockfish within the first six months of their metamorphosis from pelagic (open-ocean) to benthic (bottom) dwellers. At this stage, fish are about 1 to 3 inches.

The goal is to understand what kinds of habitats—rock reef, kelp forest, eel grass or sand and bolder—newly settled fish utilize and for how long.

Sampling will be conducted monthly at nine sites, and all sites will be sampled within a two-week window to capture “pulses” of rockfish settlement. The sites that will be monitored in California are Morro Bay, Monterey Bay, Bodega Bay, Humboldt Bay, Fort Bragg and Crescent City. The Oregon sites are Port Orford, Coos Bay and Newport.

The project is a collaborative effort with scientists from Oregon Sea Grant, the National Marine Fisheries Service (NMFS), the California Department of Fish and Game, the South Slough National Estuarine Research Reserve, the Oregon Department of Fish and



A young copper rockfish, one of the many rockfish species that inhabit shallow near-shore waters. Photo: California Sea Grant Extension.



Sea Grant Marine Advisor Susan McBride of Humboldt and Mendocino counties has won a National Sea Grant award to study juvenile rockfish, work that will help identify different marine habitats that support these long-lived fish. Photo: California Sea Grant Extension.

Wildlife, and the Pacific Marine Conservation Council, a nonprofit organization representing commercial fishers.

Both the California Department of Fish and Game and NMFS are in the process of developing fishery management plans for rockfish species. McBride's project complements an ongoing Fish and Game survey of adult rockfish populations.

There are more than 60 species of rockfish off the U.S. West Coast. Within the last decade, many of these stocks have plummeted to catastrophically low levels, to the point that huge swaths of the shelf have been closed to groundfish fishing. McBride said that some of these deep-water species may use shallow water habitats during their early life stages, migrating to deeper waters as they get older. The project may be able to confirm whether this is true and for what species.

McBride is also hoping to work with fishermen to establish “index sites,” which could be monitored as proxy estimates of young rockfish abundance in the surrounding areas.

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First-place poster winner James Weaver, Sea Grant trainee at UC Santa Barbara. Photo: California Sea Grant.

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awarded first place in the oral presentation category to Scott Rapoport, a graduate student at UC San Diego for his talk on “Whelk (marine snail) Egg Capsules: An Interesting Elastic Biomaterial.” Second place went to Lisa Kerr of Moss Landing Marine Laboratories for “Radiocarbon in Otoliths of Yelloweye Rockfish (*Sebastes ruberrimus*): A Unique Chronometer for the Waters of Southeast Alaska.” Third place went to Jonathan Fingerut of UCLA for “From Host to Host: Interaction of Behavior and Environment on Parasite Transmission.”

In the poster competition, the first-place winner was James Weaver of UC Santa Barbara for “Novel Approaches for Investigating Spicule Biosynthesis in Living Demosponges.” Second place went to Jayme Carter, of UC Santa Barbara for “Reactivity of *Vanadium Bromoperoxidase* from Marine Algae: Enzyme Induced Cyclization Reactions.” The third-place finisher was Rebecca Vega of Stanford University for “Early Embryonic Apoptosis in the Sea Urchin, *Strongylocentrotus purpuratus*: Developmental Timing, Control, and Response to Environmental Disturbance.”

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