Sea Grant News

"Coastal Science Serving California"

In this issue...

- Sea Grant Legend Retires
- Why Are Seabirds Dying?
- Tracking Spiny Lobsters
- Conserving Rockfish

Sea Grant California

Newsletter of the California Sea Grant College Program, Spring 2007

Christopher Dewees photo credits:
Cover and below left: John Stumbos; below right: Dewees family archives

Sea Grant News
Marsha Gear, Editor
Joann Furse, Designer
Steve Gabrysh, Publications
Christina Johnson, Science Writer

California Sea Grant
Russell A. Moll, Director
Paul G. Olin, Extension Director

This publication was supported by the National Sea Grant College Program of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration under NOAA Grant #NA04OAR4170038, project number C/P-1, through the California Sea Grant College Program. The views expressed herein do not necessarily reflect the view of any of those organizations.

Christopher Dewees, Marine Fisheries Specialist, Retires

Davis—After 35 years of service, the longest of anyone at California Sea Grant, marine fisheries specialist Christopher Dewees has retired to spend more time with family, play more tennis, pursue his art (*gyotaku* or Japanese fish printing), to travel and, of course, to fish.

"His retirement is an extraordinary loss of expertise and experience for the California Sea Grant Extension Program," said Extension Director Paul Olin. "While we are delighted that Chris can now say 'going fishing' for his annual report and upcoming work plan, his contributions to California's fisheries and the people who work with them will be deeply missed."

Dewees, 60, joined Sea Grant in 1972, a year before the University of California was officially designated a Sea Grant College. As a result of being with Sea Grant from literally day one, Dewees truly had an opportunity to shape the extension program, both as a marine fisheries specialist and later as director of California Sea Grant Extension, a position he held from 1992–2001.

Arguably, his greatest legacy has been his role as an impartial expert on a spectrum of fisheries management issues, including limited-entry programs, individual transferable quotas and cooperative fisheries management.

"My belief is that we should involve people in issues, listen to their ideas, expose them to research-based information, and let them work out where they stand," Dewees said. "Through the years, I really tried to ingrain a sense of nonadvocacy in my program and my colleagues….We should strive to inform the decision-making process, not be advocates for one side or the other."

Dewees was also an early exponent of understanding the human dimensions of resource management decisions and linking this to science. We are, after all, managing people as well as fish, he would say.

"We had all these stock assessments by the 1980s, but the human dimensions were getting ignored," he said. To help rectify this gap, Dewees, in the early 1980s, began studying human ecology, resource economics and

Dewees as a visiting professor in Chile in the 1970s. Photo courtesy Dewees family archives

anthropology at UC Davis, going on to earn a doctorate in ecology in 1985. (He earned a master's in fisheries science from Humboldt State University in 1970 and spent the next two years with the Peace Corps in Chile, teaching fisheries biology at the Catholic University of Valparaíso.) His doctoral thesis examined why people adopt or reject new technologies, using technical innovations in the West Coast commercial salmon and trawl industries as case studies.

Dewees exhibiting his enthusiastic and lively teaching style. Photos courtesy Dewees family and California Sea Grant archives

Dewees retirement continued p. 4

Dewees retirement continued from p. 3

He later went on to partner with salmon troller Nat Bingham to form an innovative grassroots watershed conservation project, the Spring Run Chinook Salmon Workgroup in California, which sought to improve salmon habitats by engaging salmon fishermen, farmers and loggers, among others, in constructive dialogs. The workgroup linked coastal fishermen with Central Valley farmers for the first time.

He and Marine Advisor Christopher Toole in the 1980s also began a fuel conservation program with the U.S. Department of Energy and the former Department of Naval Architecture at UC Berkeley, to help fishermen evaluate and retrofit their boats with fuel-efficient technologies. The program helped hundreds of boat owners retrofit their vessels. Texas has since adopted a similar program.

Yet another of his lasting contributions was in helping the state overhaul its fisheries management system, as mandated by the Marine Life Management Act (MLMA) of 1999. Among his achievements in this regard, Dewees helped establish the first independent peer-review process for state fisheries management plans, greatly elevating the level of scientific content used to craft regulatory plans.

As many know, Dewees also was co-editor of the MLMA-mandated document, *California's Living Marine Resources: A Status Report*. The 592-page tome published in 2001 has become the "blue bible" of fisheries information for Californians. It has given the public access to what is known about the history, biology and population status of all the state's fisheries, marine organisms and coastal habitats, he explained. As importantly, it provides a common data set and reference point for dialogs on marine resource issues.

In terms of his own research, Dewees has long studied alternative fishery management tools, especially individual transferable quotas (ITQs), which remain highly contentious and can have vastly different effects depending on their exact structure. Many of the 36 peer-reviewed articles and 70-some reports he has authored or co-authored during his career were on his studies of ITQ systems in Alaska, British Columbia and New Zealand, where he spent three sabbaticals, the most recent of which ended in 2006.

Dewees participating in the 2006 Duxbury reef rockfish-tagging study. Photo courtesy California Sea Grant Extension

Dewees cites his own 2005–2006 New Zealand Fishery Tour, in which he led 20 fishing community leaders from the United States on a tour of the country's ITQ fisheries, as a prime example of why impartiality is key to success.

"If I had advocated for or against New Zealand's ITQ system, half the people on the trip would have loved the tour, and the other half would have hated it," he said. "Nobody really would have learned anything. It was much more effective to expose people to the full range of opinions and ideas and let them make their own decisions. People have returned home and come up with really creative ideas about managing fisheries in their region."

That is success indeed. ■ ■ ■

Climate Change May Cause Seabird Deaths

(Above and right) Pigeon guillemots and tufted puffin. Photos: David Ledig and Roy W. Lowe, U.S. Fish and Wildlife Service

Pt. Reyes—For the third year in a row, large numbers of seabirds have washed up dead on beaches in California and Oregon, apparent casualties of shifts in the California Current's primary productivity.

Bill Sydeman, director of marine ecology at PRBO Conservation Science in Petaluma, believes that changes in productivity, which have translated into less food for seabirds, may in part be the result of climate change, a sort of regional footprint of the global warming trend.

"I think the bird deaths relate to long-term climate-related issues," Sydeman said. "We are seeing that it doesn't take much warming, at the wrong time of year, to push the California Current system into a less productive state. This may be the consequence of global warming."

Sydeman has California Sea Grant funding to study patterns of krill abundance in areas of Northern California supporting large colonies of seabirds. Ultimately, he would like to map the sequence of steps linking changes in the marine physical environment to the breeding success of Cassin's auklets, a species whose diet is comprised primarily of krill.

The California Sea Grant Extension Program is also participating in a West Coast "citizen science" seabird survey in which volunteers are trained to identify seabird carcasses that have washed ashore. About 200 beaches in Northern California, Oregon, Washington and Alaska are currently being monitored monthly.

We have seen an unusual composition of seabird carcasses," said Sea Grant marine advisor Pete Nelson, who helps organize the California component of the survey. There have been more rhinoceros auklets and horned puffins—pelagic species usually found further offshore. Presumably the birds are coming inshore to look for food they cannot find in their normal foraging grounds.

What could cause a redistribution, or worse, decline in food for seabirds? For one, changes in wind-driven upwelling, the process in which colder, nutrient-rich waters from depth are brought to sunlit surface waters where plankton grow. Researchers consider upwelling to be the single most important factor controlling primary productivity along the coast, which is why California is sometimes called an upwelling coast.

Global warming may be making it harder to vertically mix coastal waters, an idea put forth by Dean Roemmich and John McGowan, both at Scripps Institution of Oceanography in La Jolla, in an article, "Climatic Warming and the Decline of Zooplankton in the California Current," published in *Science* in 1995. Their analysis showed that waters in Southern California had become more stratified since 1951 and that enhanced stratification had translated into a shallower source of "upwelled" waters to support zooplankton production. They hypothesized that continued warming could lead to further declines in zooplankton productivity.

A newer idea is that the location at which the eastward-flowing North Pacific Current splits may also play a role in redistributing zooplankton. The North Pacific Current is a large current that originates off Japan, travels across the entire Pacific Ocean and then, in the southeastern Gulf of Alaska, splits into the northward-flowing Alaska Current and southward-flowing California Current.

Howard Freeland of the Institute of Ocean Sciences in Sydney, British Columbia, has found that there is a strong correlation between

Seabird die-offs continued p. 6

Seabird die-offs continued from p. 5

Cassin's auklet. Photo: NOAA National Marine Sanctuaries collection

where this split occurs and the distribution of warm- and cold-water plankton species off the coast.

"What we have seen is that when the bifurcation point heads north, to say 53 degrees north latitude, effectively the whole California Current system moves north too," Freeland said. The phytoplankton off British Columbia become characteristic of warmer-water species typically found off California. "The biology responds very, very quickly."

"We don't know yet if there is any relationship between the bifurcation point and global warming," Freeland said, because water temperature in the northeastern Pacific has only been monitored since 2002.

There does, however, seem to be a connection between the splitting point and the health of seabird populations, at least for one species, Cassin's auklets. "We have seen high breeding success of Cassin's auklets on the Farallones Islands when the bifurcation of the North Pacific Current is roughly at the Queen Charlotte Islands in British Columbia, as happened in 2002," Sydeman said. "In 2005–2006, when the North Pacific Current bifurcated approximately in central Oregon, the auklets suffered complete reproductive failures, unprecedented in the 35 plus years of studying seabird ecology at the Farallones."

The breeding success of Cassin's auklets is also itself a one-year leading indicator of chinook salmon landings and escapement rates in Central California, a fact that may be of use to salmon fishers and fisheries managers. About 60 percent of the variability in chinook salmon landings and escapement rates can be explained by the birds' breeding success, Sydeman said, likely because both auklets and salmon feed extensively on krill. "We call it the trophic equivalency hypothesis. Animals that exist on the same trophic level may be used as indictors for each other." ■ ■ ■

Tracking Spiny Lobsters Yields Surprising Results

San Diego—tracking study shows California spiny lobsters in the Point Loma kelp bed in San Diego move anywhere from 50 meters to one kilometer every night scavenging for food. By morning, many return to a home area, which on average is about 100 square meters.

The discovery surprises Charlie Graham, a commercial fisherman in Santa Barbara, familiar with the results. "What the study says to me is 'wow,' lobsters move around a lot more at night than I thought," Graham said.

"The art of lobster fishing is deciding where and when to set traps," he said. "The research tells me I can be happy setting my traps a little farther from the beach and letting them (the lobsters) come to me. I don't have to risk losing a trap by putting it near the surf grass."

Kevin Hovel, the San Diego State University biology professor leading the study, said that the average lobster moved about 400 meters a night, though there was a range of 50 meters to one kilometer. "The take-home message is that lobsters move a lot," he said. "We also showed lobsters move among habitats more than expected," and that their journeys between kelp forest and surf grass were often along protected corridors beneath understory algae.

California spiny lobster. Photo: Shane Anderson

Surprisingly, lobsters were not observed homing to specific shelters—a special rock crevice, ledge or rock pile, for example. Instead they showed fidelity to an area, usually about 100 square meters with many sheltering areas in it. ■ ■ ■

Research Suggests Rockfish Conservation Strategies

SANTA CRUZ—Pacific ocean perch, widow and yellowtail rockfishes are strong candidates for marine reserves, while the chilipepper rockfish is perhaps not, according to a new combined California Sea Grant and California Department of Fish and Game study.

Steven Berkeley of the Long Marine Laboratory at UC Santa Cruz bases this conclusion on an analysis he has led on the timing of rockfish spawning as a function of female rockfish age, and of larval quality as measured by oil globule size.

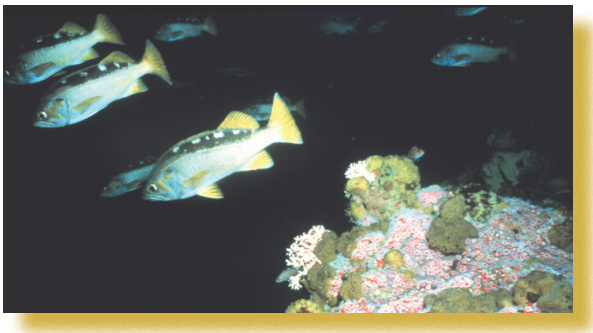
This analysis has shown that for Pacific ocean perch, widow and yellowtail rockfishes, the oldest females spawn earliest in the season. They also produce larvae with the largest oil globules (the source of nutrition for the developing embryo). Larger oil globules are associated with higher rates of larval survivorship, and good recruitment is usually correlated with high survivorship in larvae produced during the earliest part of the spawning season.

Translation: "Older female rockfish just get better with age," said Berkeley, whose research on rockfish reproduction has led to what is colloquially known as the "big-fat-mama" hypothesis. He calls it more delicately "the maternal effect," but the idea is the same: For many species of rockfish, the oldest, biggest females are the best reproducers.

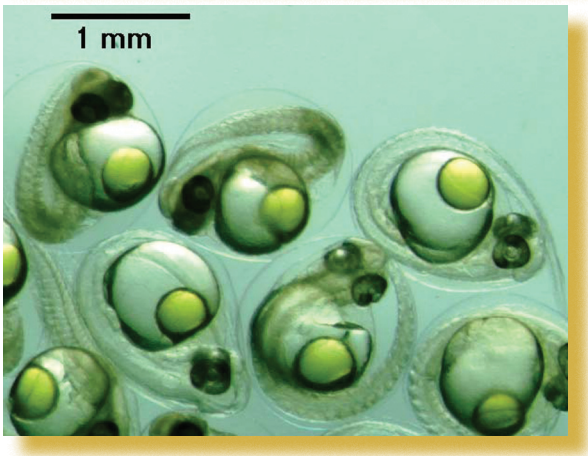
For the chilipepper rockfish, a different pattern was observed. There was no appreciable difference in the size of oil globules or in the timing of spawning for older versus younger females. The importance of this research is that "it tells us we need to protect the large adults of these three rockfishes," Berkeley said, since they are the ones most likely to be contributing to the next generation.

Enter marine reserves.

With traditional fishery management tools, it is almost impossible to selectively protect older females, he said. "One of the real advantages of marine reserves is that they can protect older fishes. This is important because fishing, even at sustainable levels, removes the oldest fish from the population, and it does it very quickly." ■ ■ ■



Adult yellow rockfish. Photo NOAA National Marine Sanctuaries collection



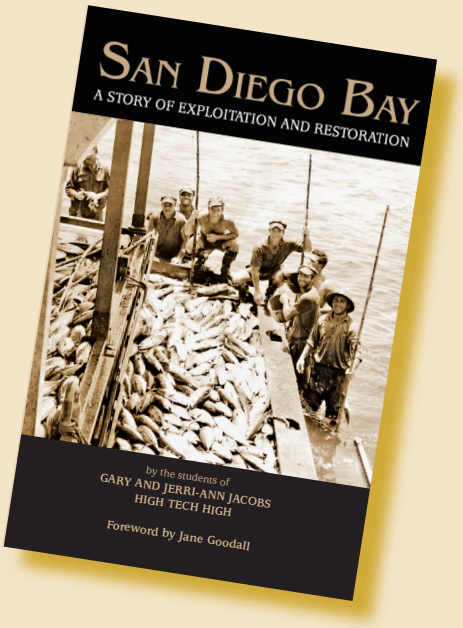
Chilipepper larvae—early stages and just prior to hatching. Photos courtesy Steven Berkeley, UCSC

University of California San Diego
California Sea Grant College Program
9500 Gilman Drive Dept 0232
La Jolla CA 92093-0232
http://www.csgc.ucsd.edu

PRESORTED
STANDARD
US POSTAGE
PAID
SAN DIEGO CA
PERMIT 1909

New California Sea Grant Publication

San Diego Bay: A Story of Exploitation and Restoration



"Students of High Tech High in San Diego have written a beautiful, inspiring and fascinating book that mines the rich history of San Diego Bay." So praises Erika Check of *Nature* magazine. This amply illustrated 350-page publication describes the bay's flora and fauna, and details the effects of human activities on its animals and plants. The student studies involved researching human impacts on the bay and interviewing individuals with historical or scientific backgrounds to augment their research. Also included are many family archival photos provided by those interviewed, and made public for the first time in this book.

The publication (SG022) is available for $24.95, plus shipping, handling and sales tax. It may be purchased online at: http://anrcatalog.ucdavis.edu/ or by calling 800.994.8849.