

Dungeness Crab Tagging Project

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Red sea urchin.
Photo Chris Dewees

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Larry Evanow receiving prize from David G. Hankin.
Photo Humboldt State

The latest winner of the \$3,000 "lucky tag" drawing in the California Sea Grant-funded three-year Dungeness Crab Tagging Project is Larry Evanow of Eureka, the second Eureka fisherman in a row to win the drawing.

Evanow, 19, received the prize from David G. Hankin, chair of Humboldt State University's Department of Fisheries Biology and a lead scientist on the project. The prize was awarded in November following a drawing at Englund Marine Supply in Eureka.

This marks the third year of Dungeness crab tagging aboard a chartered commercial crab boat off Trinidad, California. Legal- and sublegal-sized crabs have been tagged and released during November 2001, 2002, and 2003, just before the crab season begins. In addition, during the spring of 2002 and 2003, additional tagged crabs were released when most commercial fishing activity had ended. So far, 8,724 tagged Dungeness crabs have been released and over 1,100 have been recovered.

The Dungeness Crab Tagging Project relies on the cooperation of local crab fishermen to recover tagged crabs, and has accumulated valuable information regarding crab movements. All of the tagged crabs

in the past three years of the project have been released near Trinidad Harbor, but crab fishermen have recaptured tagged crabs at locations up and down the north coast of California. Most of the fishermen have recorded the depth and location where the tagged crabs were caught, allowing researchers to determine straight line distances between release and recovery locations, as well as directions of travel for individual tagged crabs. During the 2001/2002 fishing season, about 20% of tag recoveries were within 3 miles from the release location. However, during the same season, 10% were recaptured more than 25 miles from original release locations. Some individual male crabs exhibit exceptional movements. For example, this January 2004, a crab tagged off Trinidad in April 2003 was recovered near Port Orford, Oregon, a distance of about 120 miles!

As in many previous tagging projects with Dungeness crabs, tag recovery rates have been variable. During the first year of the project, overall recovery rate for crabs tagged just before the commercial fishing season started was 24%. But in the second year, the recovery rate of pre-season tagged crabs dropped to 11%. For the current (third) year, recovery rates from pre-season tagging will likely fall between these values. Through further analysis it is hoped that good explanations for the variations in recovery rates will be found. Estimation of tag loss from double-tagged crabs is also being explored.



Double-tagged Dungeness crab.
Photo Humboldt State



Two New Fisheries Extension Positions Funded

The results of a National Sea Grant fisheries extension enhancement competition are in and California Sea Grant has been awarded five years of funding for two new Fisheries Extension Marine Advisors in coastal counties. One of the fisheries positions will focus on economic and social issues critical to fisheries communities and fisheries management. This position will most likely be located in the Monterey Bay area with both local and statewide responsibilities.

The second position will be located in the tri-county area (Ventura, Santa Barbara and San Luis Obispo counties). This person will concentrate on local collaborative marine commercial and recreational fisheries research and education efforts.

Both these Marine Advisors will work closely with recreational and commercial fishing groups, agencies, researchers, Sea Grant Extension colleagues, citizens groups and others. The addition of the two new positions will significantly increase California Sea Grant's ability to address a wide range of urgent marine fisheries issues through the Sea Grant Extension Program. Position descriptions and application instructions will be available later this year and will be widely advertised.

IIFET to Meet in Tokyo

The 12th biennial conference of the International Institute for Fisheries Economics and Trade (IIFET) will be held July 26-29, 2004, at the Tokyo University of Fisheries on Shinagawa's waterfront. Industry, agency staff and academics are encouraged to participate. There will be a wide range of topics. The conference will be preceded by a three-day professional tour visiting fishery cooperatives July 21-23, a one-day tour in Tokyo July 24, including Tsukiji market, and a July 25 workshop on training fishery managers. The conference will be followed by a one-day symposium, which will bring to bear worldwide expertise on the conference theme: what are responsible fisheries?

The uniqueness of our biennial opportunity to explore a wide variety of national and international fisheries-related issues with peers from around the globe, is enhanced this time by its venue in the heart of Tokyo, Japan.

For more information about the conference and to find out about submitting an abstract, visit: <http://oregonstate.edu/Dept/IIFET/Japan/Japanupdate.html>

An Economic Overview of Dungeness Crab Processing in California

Part of a recently completed California Sea Grant-funded research project examines the economics of crab processing. Below is a summary of a paper by Humboldt State Professor Steve Hackett and colleagues, which was recently published in CalCOFI Reports (Volume 44).

Dungeness crab (*Cancer magister*) was among the three most valuable commercial fisheries in California in seven of the last ten years. The "sex-size season" regulatory system in California induces an annually intense fishery that results in a temporally compressed pulse of landings. The fishery relies on a few large receiver/processors capable of freezing and storing large quantities of crab. Research on former derby fisheries indicates that improved economic conditions (more valuable fresh product forms and more competitive processing) can be obtained if landings are temporally spread out. Consequently, questions have been raised about the current status of the Dungeness crab processing industry and whether economic conditions could be improved by eliminating the derby-like nature of the fishery. This article addresses part of the question by providing baseline economic information for this industry, including the mix of product forms and prices, value added, capital stock, and employment. For a copy of the paper, contact Sea Grant Communications at (858) 534-4446 or gfrederick@ucsd.edu.

Sea Urchin: A California Perspective

(Note: This is a summary of a paper presented by Christopher Dewees at the International Conference on Sea Urchin Fisheries and Aquaculture held in March 2003. A reprint of the entire paper is available from, Sea Grant Communications at (858) 534-4446 or gfrederick@ucsd.edu.)

During the past 30 years significant sea urchin fisheries developed, rapidly expanded, declined, and leveled off along North America's Pacific Coast from Baja California Norte, Mexico through Alaska. The primary target species is the red sea urchin, *Strongylocentrotus franciscanus*.

During the 1960s, sea urchins were considered a threat to valuable kelp (*Macrocystis*) resources by the state, divers and kelp harvesters. Fishery agencies encouraged urchin fishing in the early 1970s in southern California. From 1972 through 1985, landings ranged from approximately 3,500 tons to 11,200 tons. The northern California fishery opened up on virgin stocks in 1985 and statewide landings peaked in 1988 at approximately 23,600 tons. Landings declined to 6,409 tons by 1999 with most of the decline in northern California. Since the 1990s, the fishery has remained relatively static with annual variations due primarily to changes in urchin quality and domestic/Japanese market demand.

(Continued on page 3)



Sea Urchin - continued

*Sea urchin roe (uni) packed for export to Japan.
Photo Chris Dewees*

By 1987, industry and the state were both concerned about the rapid growth in landings and diver numbers and created a California Department of Fish and Game Directors Sea Urchin Advisory Committee (DSUAC). It was funded by a self-imposed landings tax to be used for activities supporting fishery monitoring, management, and enhancement.

During its first five years, DSUAC was crucial for implementation of minimum size limits, restricted access, and temporal closures. Size limits were set at a level that allowed several years of spawning and appears to have helped prevent collapse of the fishery. Restricted access reduced the number of divers with permits from 938 in 1989 to less than 400 today, primarily through attrition. To further slow down the fishery harvest, DSUAC and the California Department of Fish and Game (DFG) negotiated a series of time closures spaced throughout the year that reduced the number of fishing days to approximately 230 per year. These regulations slowed the explosive expansion and stabilized the fishery. There has been little change in management regulations during the past decade.

DSUAC funding augmented DFG staffs' market sampling and urchin field studies. This enabled DFG to track CPUE by locale, measure changes in size frequencies, identify levels of compliance with size limits, and monitor landings over time. DFG field studies measured changes in densities of legal-sized urchins over time at survey sites.

University staff, consultants, and industry personnel completed industry-funded studies testing enhancement techniques, urchin aquaculture, and establishing ongoing monitoring of urchin recruitment. To date, seeding and aquaculture experiments have proven not to be cost-effective and recent experiments are now testing translocation of urchins into food-rich habitats. Long-term monitoring of settlement indicates that recruitment has been consistent, partially mitigating fishery removals, especially in southern California.

The momentum of DSUAC waned in the late 1990s, and in 2001 it was disbanded. The industry's strong interest in collaborative management, research and monitoring led to establishing a new industry-funded organization in early 2004 to conduct research and marketing activities more effectively. This new organization hopes to be able to generate new management strategies for the fishery collaboratively with DFG to improve economic performance and maintain sustainability.

DFG biologists currently feel that the fishery is fully exploited and perhaps over-fished in some locations. The range of DFG management considerations include spatial management with protected areas or rotating harvest; separate zones for northern and southern California fisheries; accelerated reduction in diver numbers; annual harvest quotas; improved fishery-dependent and independent monitoring programs. The industry is examining its own fishery goals and preferred management techniques. With DFG under extreme budget constraints, it is unlikely to proactively seek management changes in the near future. Key components in the ultimate outcome will include industry/DFG collaboration on a long-term fishery management plan. This plan is likely to contain some type of spatial management, lower capacity goals, and research plans for stock assessment.



*Red sea urchin.
Photo Chris Dewees*



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Sea Grant Fisheries

Sea Urchin Conference Proceedings

The *Proceedings of the International Conference on Sea Urchin Fisheries and Aquaculture* is now available from DEStech Publications Order Dept., 1148 Elizabeth Avenue #2, Lancaster, PA 17601, Phone: 717-290-1660 or <http://www.destechpub.com>. Over 70 papers cover fisheries and their management, ecology and population biology, biology, feeds and nutrition, and aquaculture. The Proceedings editors were John M. Lawrence from the University of South Florida and Oscar Guzman of Chile's Instituto de Fomento Pesquero. OSBM: 1-932078032-0, February 2004, 439 pages hardcover, \$159.50

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