Northwest Fisheries Science Center

GROUNDFISH RESEARCH

July 2000

Research is conducted aboard NOAA's 215-foot stern trawler, *Miller Freeman*.

Healthy stocks goal of research plan

A series of public meetings have been completed along the West Coast on a comprehensive research plan developed by three National Marine Fisheries Service (NMFS) science centers that will guide groundfish research coastwide for the next three to five years.

The draft plan is intended to identify scientific information needed for management to achieve healthy fish stocks important to fisheries. It also is designed to identify the priorities for research so that the research can be focused on the most important work.

The Northwest Fisheries Science Center's (NWFSC) Fisheries Resource Analysis and Monitoring Division took the lead role in producing the plan, working closely with the Southwest and Alaska Fisheries Science Centers. Public input was sought so that viewpoints from various West Coast constituencies could be incorporated into the final plan. Written opinions still can be sent to the NWFSC at the address below. A meeting with state agencies and other scientific partners is

See "Plan," page 8

NWFSC begins 2000 summer research cruise

Cooperative groundfish slope survey in its third year

The Fishery Resource Analysis and Monitoring Division (FRAMD) of the Northwest Fisheries Science Center (NWFSC) has begun its third annual bottom trawl resource survey for Dover sole, sablefish, shortspine and longspine thornyhead, and other groundfish inhabiting the slope zone (100 to 700 fathoms deep) off the coasts of Washington, Oregon, and California. The NWFSC uses chartered, commercial fishing vessels to conduct independent, replicate surveys and uses standard trawl gear to match the boats' characteristics.

Special high technology equipment is used that tracks the trawl net as it moves along the bottom, allowing scientists to determine the success of the tow. Other special equipment includes a compensating scale that adjusts to the roll, pitch and motion of the boat while weighing fish and an electronic fish measuring board. The latter allows the survey team to record weight and species identification. All are linked to a single, portable computer.

See "Cruise," page 2

In This Report:

Research Plan developed	1
Research cruise begins	1
About FRAMD and NWFSC	2
Canary rockfish rebuilding	3
Coffee shop talk	4
Public groundfish exhibit	5
Electronic logbook testing	6
Who to call	7

Cruise ~

"It's all in digital form," says Bill West, a FRAMD investigator who helped develop the annual surveys. "That's why two people can do what normally takes four or more. No one has to type any information into a computer, and this means less time spent, fewer errors and reduced manpower costs."

Long-term goal

The long-term goal is to use survey results to produce indices of relative abundance for these species and to characterize their distribution. Specimens and data from the survey will be used to improve our understanding of their biological condition, population dynamics, and community relationships.

Fishing vessels *Coast Pride*, *Excalibur*, *Sea Eagle*, and *Captain Jack* have been contracted to survey the area from Cape Flattery, Wash. to Point Conception, Calif. beginning the first week of July and continuing through September. Each boat is chartered for four weeks. They operate in pairs, with the second pair beginning its leg of the survey about two weeks after the end of the first cruise. Mid-cruise port calls will be made after each five sea days at Newport, Eureka, and San Francisco for exchanging scientific personnel, replenishing fuel and provisions, and offloading retained fish.

Survey methods

The survey employs a stratified random sampling scheme with five stations at randomly selected depths ranging from 100 to 700 fathoms and arranged along east-west transects. The transects are spaced 10 minutes of latitude apart. Each vessel occupies a unique set of 20 transects covering the entire north-south extent of the survey. Therefore, by the end of the survey, all 80 transects will have been sampled.

The survey team conducts 15-minute trawl hauls at each station. Sampling tows are conducted according to predefined fishing and operational protocols. Catches are sorted by species, whenever possible, and weighed. Biological information such as length, sex composition, and age structures is collected and sea-surface and bottom temperatures are recorded at each station.

Fish are measured during survey operations using special electronic equipment.

The boat owners are paid half in cash with the balance paid by allowing fish caught during the survey to be sold. Any balance still owed is compensated through a special Exempted Fishing Permit that allows the vessels, after the survey is completed, to land fish in excess of their trip limits up to the value of the amount owed.

FRAMD
GROUNDFISH RESEARCH
JULY 2000 VOL I, ISSUE 1

National Oceanic and Atmospheric Administration
National Marine Fisheries Service

Northwest Fisheries Science Center

The Northwest Fisheries Science Center (NWFSC) provides scientific and technical support to NOAA Fisheries (the National Marine Fisheries Service or NMFS) for management and conservation of the Northwest region's marine and anadromous resources. The Center conducts research in cooperation with other federal and state agencies and academic institutions. Five divisions—Conservation Biology, Environmental Conservation, Fish Ecology, Resource Enhancement and Utilization Technologies, and Fishery Resource Analysis and Monitoring—conduct applied research to resolve problems that threaten marine resources or that deter their use.

Fishery Resource Analysis and Monitoring Division

The Fishery Resource Analysis and Monitoring Division (FRAMD) of the NWFSC develops and provides scientific information necessary for managing West Coast marine fisheries. It endeavors to provide useful, accurate and reliable stock assessment data with which fishery managers can set ecologically safe and economically valuable harvest levels. To do this, it works in partnership with state and federal resource agencies, universities and others interested in West Coast groundfish. The FRAMD conducts major components of groundfish research at the NWFSC Newport Research Station located at the Hatfield Marine Science Center, Newport, Oregon.

Canary rockfish rebuilding may take years

The number recruits added to the stock declined more than expected

Canary rockfish has long been an important component of the rockfish fishery. During 1999, a team of scientists led by Dr. Paul Crone from the Northwest Fisheries Science Center (NWFSC) completed an updated assessment of the status and potential yield of canary rockfish off Oregon and Washington. Here catches have ranged from a high of nearly 4,400 metric tons in 1982 to roughly 700 metric tons in 1995.

Past population studies noted a decline in canary rockfish abundance in these areas. Using more recent data, the researchers confirmed this decline and found that it has continued. Scientists, taking a cue from productive fisheries around the world, expected that abundances for these fully exploited stocks would fluctuate between 30 to 35% of unfished abundance levels.

However, the current stock is only 7 to 23 percent of its unfished level. This appears to have happened because the number of young canary rockfish added to the stock, or "recruited," declined much more than expected. In addition, the adult population subsequently declined.

The stock is now in a depleted state, and fishery managers have sharply reduced the fishery. Furthermore, it may take many years to rebuild canary rockfish to a healthy level.

"It's unfortunate that we didn't have enough data and knowledge and timely assessments to forecast the magnitude of this recruitment downturn sooner," says Dr. Richard Methot, director of the NWFSC groundfish division. "Tracking the rebuilding of this stock must be a high priority for future resource surveys and stock assessments."

Some declines expected

Some decline in abundance had been expected as the fishery began to harvest the canary stock at a full exploitation level in the late 1980s. For fish that live 50 or more years as canary rockfish do, the rates of both natural and fishing mortality are quite low. It can take many years to transition from a lightly exploited, highly abundant stock with many older fish to a fully exploited, less abundant stock composed mostly of more productive younger fish.

"This is much like the transition from an old growth forest to a highly managed forest," says Methot. "But in this case, the change occurred in the early to mid 1990s for canary as well as many other West Coast groundfish species."

Scientists believe the decline in recruitment of young fish could have occurred for one or two reasons. First, many West Coast groundfish may be inherently less productive. That is, they are not capable of maintaining good recruitment as the size of the spawning stock is reduced. Second, an ocean climate regime shift that occurred in about 1977 may have affected productivity and recruitment. There is no clear answer.

An interesting observation

An interesting and important observation for canary and some other rockfish is that older females are encountered in much lower proportions that older males. Researchers don't know whether this is due to a particular behavior that makes these females unavailable to the fishery and surveys or whether these older females have higher natural mortality rates. The updated, 1999 assessment explored both scenarios.

Several sources of data were used by stock assessment scientists last year.

See "Canary," page 8

Coffee shop talks help improve communication, mutual understanding of fisheries issues

By Bob Schoning

Bob Schoning is a former Director of the Oregon Fish Commission and National Marine Fisheries Service and an OSU professor. Most recently he consulted for the NWFSC on communication issues. He started the "Cuppatunes" program on the advice of Sea Grant Extension Agent Ginny Goblirsch and OSU Fisheries Professor David Sampson. Its purpose was to help improve communications between NWFSC staff at the Newport Research Station and local commercial fishermen.

Communication is very important in our daily lives whether we are talking to our spouse, children, employer, employee, merchant, friend or stranger. Are we understood and do we understand the other person? Communication and understanding have become particularly important in recent years in discussions between scientists and fishing industry representatives. Much is at stake: the future of the resource on one hand and the future of the industry on the other.

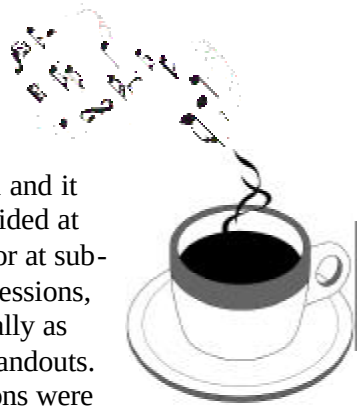
Is the fishery data sound, complete, reliable, understandable, competently analyzed and communicated so all can understand? Have the fishermen's views about what they see on a daily basis on the ocean and how it relates to the scientific data and analysis been communicated effectively? Is there agreement on conclusions and recommendations, and if not, have the differences been discussed and explained?

In an effort to improve communications between NWFSC scientist at the Newport Research Station and commercial fishermen in Newport, informal, discussions were held one morning a week last year from August through April at *Cuppatunes*, a favorite coffee shop and gathering place for fishermen on the Newport waterfront.

The sessions usually lasted two to three hours with attendance varying from two or three, to ten or fifteen. Draggers, shrimpers, trollers, longliners, crabbers, hook and liners, sablefish pot fishermen and biologists participated. People were continually coming and going, listening and talking, questioning and answering.

The program was started on the advice of Sea Grant Extension Agent Ginny Goblirsch and Oregon State University (OSU) Fisheries Professor David Sampson. Scientists from the National Marine Fisheries Service, Oregon Department of Fish and Wildlife and OSU participated periodically.

Subject material varied widely depending on attendees and current concerns. Information was requested and it was provided at the time or at subsequent sessions, occasionally as written handouts. Discussions were informal but candid with excellent exchanges and significantly differing views.



Some of the subjects discussed one or more times were Pacific Fishery Management Council actions and decisions, seasons, quotas, allocations, gear conflicts, hatchery versus wild salmon, alleged gear damage to bottom and aquatic life, vessel buy-back, trawl survey results, cooperative research studies, observer program, cruise bid procedures, scientists-commercial fishermen communication, inadequate data, computer models, proposed new research vessel construction, electronic fish catch logbook, canary rockfish bycatch in shrimp trawls, halibut biomass off Oregon and pertinent legislation pending in the Oregon legislature and in Congress.

Major benefits included views being exchanged on current issues and learning from each other; permitting fishermen who don't attend Council meetings to voice opinions and be lis-

See "Coffee," page 5

Exhibit provides groundfish information

By Dr. Bruce McCain

Dr. Bruce McCain is a scientist and Facility Manager at the Newport Research Station, Hatfield Marine Science Center. He also serves as outreach contact for the Northwest Fisheries Science Center.

The much prized sablefish is featured in two, three-minute videos about FRAMD fisheries research. Above, as taken from one of two videos, FRAMD scientist Waldo Wakefield describes the range of this deepwater species.

In an effort to educate the public about its research activities and engage people's interest in groundfish research, the Fisheries Resource Analysis and Monitoring Division (FRAMD) is developing an interactive groundfish exhibit at the Hatfield Marine Science Center's (HMSC) Visitors Center in Newport, Ore.

The Northwest Fisheries Science Center (NWFSC), with funding from the FRAMD, donated the exhibit featuring commercially important groundfish during a ceremony celebrating the designation of the HMSC as a Coastal America, Coastal Ecosystem Learning Center on May 8, 1998. The NWFSC director, Dr. Usha Varanasi, formally presented the exhibit during the ceremonies. It consists of an eight-foot-long, three-foot-wide, and five-foot-high acrylic aquarium with a 720 gallon capacity; a semi-recirculating seawater system that includes a water purification system; two computers with monitors; a passive integrated transponder (PIT) tag system, including tags and scanners.

The purpose of the exhibit is to inform the thousands of annual visitors to the Visitors Center about the research activities of FRAMD investigators and to provide them with information about the commercial importance, life history and status of the stocks of selected groundfish species. Visitors will be able to interact with the exhibit by holding a hand-held scanner

See "Sablefish," page 7

Coffee ~

tened to and heard; developing a friendly and understanding relationship among scientists and fishermen; providing a framework for future communication and cooperation; and demonstrating government is interested in communicating with fishermen informally in a nonstructured, friendly environment.

When the coffee shop closed in May, the sessions were discontinued for lack of a suitable meeting place. Professor Sampson and Marine Sea Grant Extension Agent Hal Weeks subsequently established an office in the Port Commission Office building to serve the same function, but participation was minimal. It is important to have a location that the fishermen are comfortable with and frequent on their own. This could be a coffee shop or other meeting place that caters to them. Common understanding on which scientists will be there and when is essential. An informal friendly atmosphere is helpful. The concept has considerable mutual benefit; however, suitable facilities and additional planning are needed to build on the earlier progress.

'Prototyping' near for Electronic Logbook

The prototype electronic Fish Catch Logbook (EFCL), developed by the Northwest Fisheries Science Center (NWFSC), is designed to simplify commercial fishing logbook data entry, increase the amount and uses of fishery dependent data, aid in data verification and improve access to data.

The EFCL project began in 1997 with funding from the National Performance Review. This is a source of seed money for innovative communication technology projects that serve the public and involve multiple agencies.

The undertaking was in part a response to a request from the West Coast trawl fleet, which asked the NWFSC to develop and field test an electronic system to collect and analyze fish catch and logbook data. The industry was looking for opportunities to improve reliance on logbook data for fishery management.

"The use of logbook data in fishery management has been limited, primarily because of concerns about data verification," says Carol Murray, project director.

Bench testing of the prototype EFCL is nearing completion. It expects to begin prototype trials on vessels soon. Murray says the goal of the

project is to develop an EFCL system and to test it in actual fishing conditions with real data. "To do this we would like the industry to take a lead in recommending vessels to participate in the trials," Murray says.

Testing the software

Testing will involve validating the software components developed by two outside firms, Scientific Fisheries Inc., the NWFSC Cooperative Research and Development Agreement partner, and software contractor ARIS Corp. The onboard application is being constructed by Scientific Fisheries Inc. The central data system and worldwide web application is being developed by ARIS Corp. In addition, fish ticket data collected by participating processors and sampling data collected by participating port biologists will be tested using the web site.

Vessels that participate will need to have equipment on board that includes a:

- Pentium II PC or a laptop computer with at least a 166 Mhz processor; 32 MB of RAM; 250 MB of free hard disk storage space; a CD_ROM player; a Zip drive; a parallel port so that database and log files can be copied to a zip drive for later use; and a Windows 95 or 98 operating system;
- GPS with the ability to transmit through an RS 232 connection using the NMEA 183 protocol;
- stable 120_volt power supply;
- 28.8 Kbps or faster modem capable of connecting to a required cellular phone;
- connection to the Internet through an Internet service provider account, or ISP. Also some experience in the PC and Windows environment will be necessary.

Fishermen participating in the testing will be encouraged to land their catches to processors who are testing the electronic fish ticket.

Possible outcomes

The NWFSC expects the EFCL to allow quicker and more accurate reporting of logbook data and reconciliation with fish ticket information and, eventually, reporting of observer data. It also expects the database to provide confidential access to information that will enable fishers to make fishing business decisions and provide processors with advance notice of vessel catch to improve processing efficiency and marketing. Ultimately, fishery managers will benefit with information to better monitor in-season harvest quotas and determine future quotas.

For more information, contact project consultant Stewart Toshach at the NWFSC, 206-860-5604, stewart.toshach@noaa.gov.

Sablefish are found in cold North Pacific waters from Baja California north through Alaska and the Bering Sea, and then westward to Japan.

Sablefish ~
near a "PIT-tagged" fish of interest. The PIT tag—implanted in the fishes head—when scanned, will activate a computer monitor that will display one of the videos describing the above-mentioned information about that species. A special software program was purchased to enable this interactive process. The exhibit is nearly finished. It already has a starry flounder and a couple of resident sablefish. One sablefish has been named "Scout" by the visitor center's staff because he was the first one to try out the aquarium. The two fish appear to be quite attracted to visitors and tend to spend most of their time cruising back and forth along the front of the aquarium looking out at people looking in. This is important since the tag scanners have a relatively short transmission range.

The initial two videos were developed by McGregor Bay Interactive of Toledo, Ore. We hope to have the exhibit fully operational this summer.

Components of the exhibit have applications for other exhibits within the HMSC Visitors Center as well as for other NWFSC outreach events. The specially designed software program can be used in other interactive exhibits. For example, the visitors' center currently has a display that features ageing structures (otoliths, scales and fin rays) from marine fish that can be examined through a microscope. Our new software will allow a visitor to activate a computer monitor to present a short audio-visual describing the life history, population characteristics, commercial importance of the respective species and the types of studies NWFSC researchers are conducting with that species. In addition, the presentations can be recorded onto standard video cassettes and presented at NWFSC outreach activities, such as Fish Expo, civic events and open houses.

We hope this project will provide significant information about some of our economically important West Coast populations of groundfish. We anticipate it will prove to be entertaining as well as educational to the 200,000 to 300,000 visitors that come to the HMSC Visitors Center each year.

FRAMD

GROUNDFISH RESEARCH

Research and related activities of the Fishery Resource Analysis & Monitoring Division of the Northwest Fisheries Science Center.

FRAMD NWFSC
2723 Montlake Blvd E
Seattle, WA 98112-2013

http://research.nwfsc.noaa.gov/fram/fram.html

Who to contact

Washington:

Dr. Richard Methot, director
FRAMD
Richard.Methot@noaa.gov
206-860-3365

Janet Sears, public affairs
NWFSC
Nwc.Pa.noaa.gov
206-526-6172

Oregon:

Cyreis Schmitt, program manager FRAMD
Cyreis.Schmitt@noaa.gov
541-867-0127

Dr. Bruce McCain, NWFSC point of contact, Newport
bmccain@ sable.nwfsc-hc.noaa.gov
541-867-0346

Jim Bottom, technical editor
FRAMD
Jim.Bottom@noaa.gov
503-463-5639; 541-867-0355

Plan ~

planned for later this summer.

"NMFS wants to work together with agencies and constituents involved with West Coast groundfish to make this into a better plan," says Rick Methot, one of the primary authors of the draft. "We hope that it can serve as a focus and foundation for all future research on West Coast groundfish."

The meetings were attended by fishermen and fishing industry leaders, university scientists, environmental groups and others. A 20-minute presentation of the draft research plan was followed by questions, answers and general comments. Questions and discussions ranged from the cost of a proposed fisheries observer program and the use of marine reserves to general management issues.

The draft describes six basic areas of research for providing fishery managers with information on which to base current and future management decisions. Included are status of stocks, research on socioeconomics, manmade stress, ecosystem and climate, technological innovation, and management support. Each area is addressed in the research plan's "action plan" in two ways. First is short-term progress that could be made on priority topics with current funding and staffing levels. Second is new research that could greatly improve the scientific basis for management decisions but which would require major new funding.

The plan states that if groundfish research is not increased, providing critical information for management on unassessed species, socioeconomics and bycatch will require a radical realignment of present management approaches to research and monitoring efforts. This realignment is likely to result in reduced information on some of the species currently assessed. Further, it would reduce the ability to maintain the current level of certainty and information for management decisions for those species.

For more information and copies of the draft plan, contact the Fisheries Resource Analysis and Monitoring Division, National Marine Fisheries Service, Northwest Fisheries Science Center, 2725 Montlake Blvd. E., Seattle, WA 98112-2013; phone 206-860-3381. Copies are also available by calling the NWFSC Newport Research Station, 541-867-0143, or download a copy at this worldwide web site address: *http://www.nwfsc.noaa.gov/fram/fram.html*.

Canary ~

Commercial landings information was taken from fishery landing receipt data stored in the PacFIN data system. Recreational catch was obtained from recreational fishery sampling programs. Because most rockfish catch is not broken out by species, biological samples taken by port biologists are used to apportion the total rockfish catch into catch-by-species.

In addition, biologists collect fishes' ear bones called "otoliths" to determine the fish's age. These age data provide information on:

- growth rates,
- long-term trends in the proportion of older fish, which is related to the total mortality rate on these older fish, and
- natural fluctuations in the numbers of young fish entering the population each year.

A trawl survey conducted by the National Marine Fisheries Service every third year is the primary source of information on long-term trends in abundance of canary rockfish as well as several other species found on the continental shelf. These catch, age and survey data are used to calibrate a model of the canary rockfish population and its fishery. This "Stock Synthesis" model was developed during the early 1990s to best use data commonly available for West Coast groundfish.

It is clear that more data will be needed to clear up questions surrounding the decline of canary rockfish and other species. NWFSC scientists continue to work to improve their abundance models, collaborate with agencies and constituent groups, and seek other sources of information.