

DIVISION/LABORATORY REPORTS

AUKE BAY LABORATORY (ABL)

Molly Sturdevant Receives Federal Employee of the Year Award



Molly Sturdevant is a science mentor for Alaskan youth.

Molly Sturdevant, a fishery research biologist at ABL, received the Juneau Federal Employee of the Year Award sponsored by the Juneau Federal Executive Association. The award represents a focal point of employee excellence for the many federal agencies and hundreds of federal employees in the Juneau area.

Sturdevant is a 16-year veteran at ABL and works in the Early Ocean Salmon group of ABL's Marine Salmon Interactions program, where she is a leading expert on the food habits and early marine ecology of juvenile salmon and associated fishes, and on marine zooplankton. Sturdevant, a graduate of the University of Alaska, has published in numerous peer-reviewed scientific publications on a variety of projects researching Alaska's marine resources.

As part of her duties, Sturdevant trains scientists, technicians, and graduate students in the identification and ecology of marine zooplankton. She frequently serves as chief scientist aboard NOAA research ships and chartered vessels and also manages the Food Habits and Plankton Analyses Laboratory at ABL.

Sturdevant is a science mentor for community youth, visiting schools to give talks about her job, and participating in "job shadow programs," where students learn about marine science while "shadowing" Sturdevant at work. A mother of two sons who attend Juneau schools, she is also a frequent school volunteer. Sturdevant conducts Plankton Watch workshops for sixth graders in Juneau and Sitka

that teach students about the role of plankton as food for invertebrates, fishes, and whales in marine ecosystems. On a recent holiday to Baja California, she conducted a similar workshop for students in Loreto, Mexico.

For many years Sturdevant has participated in Alaska Sea Week, where students in grades K through 12 visit ABL to learn about marine life and marine ecology in Southeast Alaska. Over the past 10 years, she has also served as a science mentor or judge (sometimes both) for the Southeast Alaska Science Fair at Juneau-Douglas High School. Recently this mentoring included 4 months of work with a local student, often in cold, wind-swept field conditions and involving considerable personal time. The training and experience this student received culminated in an award-winning poster presentation at the science fair.

By Bill Heard

Coral Team Receives NOAA Award

The ABL coral research team, which includes scientists from ABL's Groundfish Assessment and Ocean Carrying Capacity programs, received the NOAA Administrator's Award for their efforts over the past several years documenting and describing deep-sea, coldwater corals and sponges along the Alaska coast, especially in the Aleutian Islands. Team members each received a cash award and a plaque with the inscription, "For the momentous discovery and documentation of abundant deep-sea corals adjacent to the Aleutian Islands, Alaska."

During the coral team's research, Jon Heifetz worked on the distribution of corals reported in fisheries surveys and fisheries bycatch databases. Bob Stone coordinated SCUBA and manned submersible studies of coral habitat and the effects of fishing gear on coral. Bruce Wing assisted in taxonomic studies of the more than 100 documented species of coral, in cooperation with the ADF&G crab fishery observer program. Dean Courtney and Pat Malecha assisted with the SCUBA and manned submersible studies, and fishery surveys.

NOAA Administration honors individuals and groups from each branch of NOAA for exceptional work each year. In 2004, 57 individuals and 25 groups received awards. The National Marine Fisheries Service received 11 individual and 7 group awards in ceremonies held in May in Silver Spring, Maryland.

By Bruce Wing

Marine Salmon Interactions Program

HATCHERY-WILD JUVENILE CHUM SALMON INTERACTIONS IN TAKU INLET

In spring 2004, scientists from the Auke Bay Laboratory's (ABL) Marine Salmon Interactions program, in cooperation with the University of Alaska, the Alaska Department of Fish and Game (ADF&G), and the Douglas Island Pink and Chum (DIPAC) hatchery, began a collaborative project investigating ecological interactions of hatchery and wild juvenile chum salmon in Taku Inlet near Juneau. The research is funded by the Southeast Sustainable Salmon Fund to address the recent decline of wild chum salmon in the Taku River. This decline coincided with increased enhancement of hatchery stocks of chum salmon in waters adjacent to Taku Inlet.

The DIPAC hatchery releases juvenile chum salmon at several locations near Taku Inlet. All of these hatchery-released fish are marked with thermally-induced patterns on their otoliths. Scientists sample juvenile salmon from marine environments and examine the salmon for otolith marks to determine spatial and temporal overlap in hatchery and wild chum salmon stocks during initial marine residency. Subsamples from the hatchery and wild salmon samples are then analyzed for diet content and energetic conditions, providing information used to evaluate competition between the two stock groups.

Project scientists sampled juvenile salmon twice weekly from mid-April until late June using a beach seine in littoral areas and a two-boat "Kodiak" trawl in nearshore waters adjacent to the littoral sites. Waters farther offshore were sampled for juvenile salmon using a larger surface trawl; ADF&G scientists sampled for potential predators of juvenile salmon using small-meshed gill nets. This is the first year of a 2-year field program. Field collections will be repeated in 2005.

By Molly Sturdevant and Alex Wertheimer

HATCHERY REVIEW GROUP VISITS ALASKA

The Hatchery Scientific Review Group, made up of independent scientists, visited Juneau and Anchorage in May 2004 to report on a 3-year study funded by the U.S. Congress to review the status, purpose, and functions of salmon hatcheries in Puget Sound and western Washington State. The study

also explores options for upgrading, improving, and possibly closing some hatcheries in Washington. While in Alaska, the group heard presentations on the background, development, and status of Alaska salmon hatcheries, and on current hatchery and wild stock research by AFSC scientists.

The Hatchery Scientific Review Group visited the ABL on 24 May. ABL scientists Joe Orsi and Jamal Moss presented reviews on marine research on juvenile salmon from hatchery and wild origins in Southeast Alaska and the Gulf of Alaska. On 25 May, the group met with an invited audience in Juneau for additional reviews of salmon hatchery programs in Washington and Alaska. Scientists Alex Wertheimer, Bill Heard, and Frank Thrower of ABL gave respective presentations titled, *The Status of Stocks in Southeast Alaska; Can Wild and Hatchery Salmon Successfully Coexist? Consider the Alaska Model;* and, *An Overview of Steelhead Research at Little Port Walter.*

By Bill Heard

SMALL BOAT SAFETY TRAINING

Nine staff from ABL attended a small boat safety training class in June 2004. The class, titled "Alaska Water Wise—A Course for Alaskan Boaters" was conducted by the Alaska Marine Safety Education Association. The training included 2 days of classroom instruction and 1 day of on-the-water (or in-the-water) instruction. Despite the fact that several ABL staff have operated small boats for many years, the class demonstrated that you can still "teach an old dog new tricks."

The instructor had numerous props and videos that illustrated key points about safety and survival. Several of the videos were of actual boating accidents as they were happening. Class participants discussed what could have been done differently, either to avoid the accident or to enhance chances of survival.

The class was as much a marine survival course as it was about small boats. The instructor used acronyms such as, "Smarter Than Tools You Are Using" (STTYAU) and, "Ration Your Sweat Not Your Water" (RYSNYW) to illustrate critical survival issues. The class also was introduced to the "Survival Rules of Three," which asks, "What must you have to survive or you will die within 3 minutes, 3 hours, 3 days, 3 weeks, or 3 months?"

By Bill Heard

Ocean Carrying Capacity Program

BERING-ALEUTIAN SALMON INTERNATIONAL SURVEY PLANNING MEETING

Jack Helle (group chairman), Ed Farley, and Jim Murphy of ABL attended a BASIS (Bering-Aleutian Salmon International Survey) Working Group meeting in Petropavlovsk, Kamchatka, Russia in May 2004. BASIS is a North Pacific Anadromous Fish Commission (NPAFC) program that coordinates research on salmon in the Bering Sea.

The group discussed the annual report of BASIS activities in 2003 and reviewed 2004 cruise plans for the BASIS research vessels *Sea Storm* (USA), *TINRO* (Russia), and *Kaiyo maru* (Japan). Scientists from the AFSC participate in BASIS cruises aboard the *Sea Storm*, and have also worked aboard the *Kaiyo maru* and the *TINRO*. The group reported that the BASIS web page is now available on the NPAFC website (<http://www.npafc.org/BASIS>); BASIS information is also available on the ABL website (<http://www.afsc.noaa.gov/abl/occ/basis.htm>).

Dr. Shigehiko Urawa gave a presentation titled, The use of Genetic Stock Identification to Determine Distribution, Migration, Early Marine Survival, and Relative Abundance of Chum Salmon in the Bering Sea, summarizing the preliminary results of BASIS research. Highlights from the presentation include: 1) less than 5% of the chum salmon caught by the *Kaiyo maru* during 2002 research were mature, 2) most of the immature chum salmon were distributed north of latitude 58°N, 3) Russian and Japanese stocks dominated the catch and were mainly distributed between longitudes 175°E and 170°W, and 4) western Alaska immature chum salmon stocks were mainly distributed within the offshore regions of the eastern Bering Sea.

Trey Walker of the University of Washington and Jim Murphy of the AFSC discussed a BASIS high-seas tagging project funded by the North Pacific Research Board. Salmon will be tagged in the Bering Sea and Gulf of Alaska in 2004 from the research vessels *Wakatake maru* and *Kaiyo maru*. Murphy described an aluminum “live box” based on a Norwegian design, which will be constructed and evaluated on the *Sea Storm* trawl in 2004. Norwegian researchers have had good success capturing Atlantic salmon suitable for tagging using this device. Usually salmon are descaled during trawling and are not suited for tagging.

By Jack Helle

Habitat Program

PARTNERSHIPS ARE KEY TO THE NUTRITIONAL ECOLOGY LABORATORY

Researchers in ABL's Nutritional Ecology Laboratory examine the lipid dynamics of forage fishes to understand energy perfusion through the Gulf of Alaska and Bering Sea ecosystems. Laboratory scientists use quantitative chemistry to identify where fish obtain energy and how they allocate that energy between growth, reproduction, and storage. The laboratory depends on partners within the AFSC and in other agencies to supply samples. Combining nutritional ecology expertise with systematic field sampling allows researchers to better understand energy acquisition and allocation in wild populations.

The methods used can be applied to numerous research questions—since 2001, the laboratory has worked with a range of partners. A recently completed project with the U.S. Forest Service used fatty acids to trace the flow of energy from marine environments into the tissues of juvenile salmonids reared in fresh water. This work is being expanded in a cooperative study with the University of Alaska and the Kachemak Bay Research Reserve in Homer, Alaska. Work with the Steller Sea Lion Research Initiative has produced a detailed picture of the seasonal variation in energy content of sea lion prey in southeastern Alaska. The data will ultimately be compared with a similar data set developed by the University of Alaska in Kodiak.

One outgrowth of laboratory analysis of seasonal variation in energy content is a bioenergetic model relating growth and energy storage in pollock. The nutritional ecology laboratory assisted the AFSC's Resource Assessment and Conservation Engineering (RACE) Division in describing the proximate composition and energy content of forage species in the Aleutian Islands. A comparison of the nutritional value of Aleutian Islands forage species with those from southeastern Alaska is the subject of a presentation at the upcoming Lowell Wakefield Fisheries Symposium.

A project in conjunction with the ADF&G demonstrated the utility of fatty acid analysis as a tool for separating herring stocks in the northern Gulf of Alaska and Prince William Sound. The *Exxon Valdez* Oilspill Trustee Council is currently reviewing a proposal to continue that work. Earlier work with the council demonstrated the energetic costs

associated with larval metamorphosis in Pacific sand lance and suggested that the costs of metamorphosis may account for spatial variation in the lipid content of newly metamorphosed herring larvae.

Researchers from the nutritional ecology laboratory and the U.S. Fish and Wildlife Service are currently evaluating the energetics of young-of-the-year fish by studying chum salmon fry in the Kuskokwim River and estuary. In 2001, the laboratory partnered with the RACE Division and the Northwest Fisheries Science Center to examine the availability of organochlorines in the Gulf of Alaska and Bering Sea food webs. The data set from this study is currently the largest data set describing organochlorine loads in fish from Alaskan waters, the first report of which will be made at the Lowell Wakefield Fisheries Symposium.

By Ron Heintz

EMIGRANT SALMONID COUNTS AT AUKE CREEK

Through June 2004 at the Auke Creek weir, there were 120 consecutive days of weir operations, and fish counting, sampling, and marking. The weir was installed on 2 March and operated in the downstream mode until 30 June, when the structure was modified to capture upstream migrants. This was the 25th consecutive year of total downstream counts of all emigrant salmonids at Auke Creek.

The 2004 emigration of pink salmon fry was the largest since 1993, and the fifth-highest on record at Auke Creek. The production of pink salmon fry from the 2003 spawners was 32 fry per female spawner, nearly average for Auke Creek. The mid-point of emigration was 12 April (the average is 21 April). Nearly 170,000 pink salmon fry emigrated in 2004, about 55,000 more than the average for 1972-2004. The 2004 emigration is the second-highest number of odd-year brood pink salmon fry since the 1971 brood.

Emigration timing of other salmonids at Auke Creek was 4-8 days earlier than average. The sockeye salmon smolt count was above average, while coho salmon, Dolly Varden, and cutthroat trout counts were below average. The 2003 sockeye salmon smolt count of 21,106 was 4,000 fish above the average for 1980-2004. Yearling smolts accounted for 30% of emigration, and averaged 4.5 g in weight and 81 mm in length; age-2 smolts averaged 11 g and 111 mm. Yearling and age-2 sockeye salmon smolts were above the average size observed over the last two decades.

The coho salmon smolt emigration of 4,581 was the fourth-lowest count on record for Auke Creek. The long-term average for 1980-2004 is 6,181. Auke Lake coho salmon smolt production has been decreasing since 1980. The Dolly Varden count for 2004 of 3,955 was the fourth-lowest on record and the lowest in two decades.

The 1980-2004 average Dolly Varden migration is 6,304; Dolly Varden emigrations have steadily decreased since 1995. A total of 136 cutthroat trout were counted during the downstream migration at Auke Creek, significantly less than the average of 261; cutthroat trout numbers have been decreasing since 1994.

Several cooperative studies are under way at Auke Creek through an agreement with NMFS, ADF&G, and the University of Alaska Fairbanks. Cutthroat trout projects at Auke Creek, tagging and recovery of downstream migrants, and population estimate work in Auke Lake were successfully concluded for the 2004 spring season.

By Jerry Taylor

Groundfish Assessment Program

PACIFIC SLEEPER SHARK ELECTRONIC ARCHIVAL AND ACOUSTIC TAGGING IN UPPER CHATHAM STRAIT, SOUTHEAST ALASKA

Little is known about the life history or ecological role of Pacific sleeper sharks (*Somniosus pacificus*) in the North Pacific Ocean. In an ongoing study of this species in Southeast Alaska, ABL scientists tagged 45 sleeper sharks in upper Chatham Strait with electronic archival tags in 2003, and 23 sharks with acoustic transmitting tags in May 2004. Temperature, depth, and location data from the tags aid in identifying Pacific sleeper shark distribution and habitat utilization in Southeast Alaska and the potential for interactions between Pacific sleeper sharks and other species in this region.

The electronic archival tags were externally mounted, and record temperature and depth every 10 seconds for up to 5 years; data is saved in memory for up to 10 years. Because Pacific sleeper sharks are occasionally captured as bycatch in commercial longline fisheries for halibut and sablefish (blackcod), ABL is offering a \$200 reward for the return of electronic archival tags from the commercial fishery. The ADF&G and commercial longline

fishing organizations in Southeast Alaska have been alerted about the reward program.

The acoustic tags were surgically implanted, and transmit location and depth every 10 seconds for up to 1 year. Data from the acoustic tags is recovered with hydrophones deployed from charter vessels. In June 2004, 13 previously tagged Pacific sleeper sharks were located acoustically and tracked in upper Chatham Strait surveys.

By Dean Courtney

2004 SABLEFISH LONGLINE SURVEY

The AFSC has conducted an annual longline survey of sablefish and other groundfish off Alaska since 1987. The survey is a joint effort involving ABL and the RACE Division. Beginning in 1996, biennial sampling of the Aleutian Islands region and eastern Bering Sea was added to the survey.

The 2004 survey began on 1 June and will end on 1 September using the chartered fishing vessel *Alaskan Leader*. As of July, the survey has sampled the Aleutian Islands and the western Gulf of Alaska. The survey vessel will transit the Gulf of Alaska in early July and resume sampling near Ketchikan on 8 July, and will then move west until the survey concludes in Dutch Harbor. The vessel will be making port calls with changes of scientific personnel in Ketchikan, Yakutat, Cordova, and Kodiak.

Catches in the Aleutian Islands and western Gulf of Alaska have been strong and appear to be similar to catches from 2002 and 2003. Two pods of killer whales took fish from the longline at five stations in the western Gulf near Dutch Harbor, resulting in lower overall catches at those stations. Attempts to elude the whales were unsuccessful; killer whale depredation is common in this area each year.

Detailed analyses of the overall catch will be made following the conclusion of the survey. Abundance information, length frequencies, and age data collected during the survey will be incorporated into the sablefish, Greenland turbot, shortspine thornyhead, and rougheye rockfish assessments.

By Chris Lunsford

SABLEFISH TAG REWARDS

The 13th annual sablefish tag prize drawing was held in May 2004. The drawing is an annual event that encourages reporting of tagged sablefish recoveries. Participants receive a baseball cap and a drawing ticket for each tag returned. A total of

578 tags recovered during 2003 were represented in this year's drawing. Four cash prizes (\$1,000, \$500, and two \$250) were awarded. The drawing winners included a Sitka fisherman, a Seward processor, a Colorado fisherman visiting Alaska, and a processor from a catcher-processor vessel.

As of July, five more sablefish archival tags have been turned in, bringing the total recoveries to 65 since the program started. Three \$500 prizes and two \$200 prizes were awarded for the latest recoveries. The archival tags provide a record of the water temperature and depth experienced by the fish over a 2-year period.

By Nancy Maloney

COMPLETION OF SOUTHEAST ALASKA STELLER SEA LION PREY STUDY

Final sampling for the Southeast Alaska Steller sea lion prey study was concluded during the second quarter of 2004. The study duration was 3 years. ABL scientists J. J. Vollenweider and Lee Hulbert surveyed standard longline stations and collected samples for nutritional analysis aboard the chartered fishing vessel *San Juan* in Frederick Sound in May. Mike Sigler of ABL conducted three acoustic surveys of eulachon in Berners Bay aboard the chartered fishing vessel *Williwaw* during April. The Berners Bay trips were part of a cooperative study with University of British Columbia researchers Mary-Anne Lea and Ben Wilson, who followed sea lions tagged with VHF and satellite depth tags. Now that all field sampling for this study has been completed, analyses and reporting are under way.

By Mike Sigler

NATIONAL MARINE MAMMAL LABORATORY (NMML)

Alaska Ecosystems Research Program

STELLER SEA LION PUP SURVEY CRUISE

The Alaska Ecosystem Program counts Steller sea lion (*Eumetopias jubatus*) pups at rookeries and haulouts in the Aleutian Islands through the eastern Gulf of Alaska to monitor population trends. Specific sites visited alternate between odd and even years to reduce disturbance of the animals. At select

rookeries, pups are handled to assess condition and health status, and some are marked permanently for studies estimating survival and other vital rates. Sites are also observed for the presence of previously marked sea lions.

The Alaska Ecosystems Research Program conducted a Steller sea lion pup survey cruise in the central Aleutian Islands through the eastern Gulf of Alaska from 20 June through 7 July in the 2004 field season. Specific cruise objectives were to count numbers of pups at 22 rookeries and haulouts between Adak Island (in the central Aleutian Islands) and Outer (Pye) Island (in the eastern Gulf of Alaska); handle and sample pups at 11 sites, brand pups at Marmot and Sugarloaf Islands; collect freshly-dead pups from Kasatochi Island for a UAF radionuclide persistence study; collect scats for dietary analysis; and search for previously branded and tagged sea lions. Observations of other marine mammals encountered during transits or near rookeries were recorded and entered onto platform of opportunity forms by ships crew.

Program activities in 2004 year were coordinated with aerial surveys conducted by the Southwest Fisheries Science Center; rookery and haulout observations in the Shumagin Islands by the Aleutians East Borough; field-camp based observations at Ugamak and Marmot Islands, and similar pup monitoring activities in southeast Alaska by the Alaska Department of Fish and Game (ADF&G), and in Russia under contract to North Pacific Wildlife Consultants with NMML and in collaboration with the Alaska Sea Life Center.

By Brian Fadely

California Current Program

SAN MIGUEL ISLAND RESEARCH

Population assessment studies of California sea lions at San Miguel Island, California, began in April and will continue through October 2004. The studies focus on the description of age-specific distribution and estimation of age-specific survival and reproduction. In April, juvenile California sea lions were captured and instrumented with satellite telemetry instruments as part of a study to describe the distribution of different age and sex classes of California sea lions on San Miguel Island. The animals frequented San Miguel Island and foraged in

the Southern California Bight. The study indicates that juveniles and adults feed in different foraging areas.

In early May, a 3-month field season began to continue the long-term studies on the population status of California sea lions. Daily counts of pups and adults indicate that the pup production will remain high in 2004. Resighting effort to determine survival and reproductive rates of branded California sea lions began on 20 May and will continue through August. At the end of June, observers had 3,425 sightings of branded California sea lions representing 676 individuals between ages 1 and 17.

Collections of dead California sea lion pups were conducted in early May to document the effects of domoic acid toxicity on newborn California sea lions as part of the NOAA Ocean and Human Health Initiative research program. Collections of dead pups will continue in July, August, and September to document the level and causes of California sea lion pup mortality.

In May, daily pup counts and resighting effort of tagged adults were conducted for northern fur seals at San Miguel Island, California to assess the population status and survival rates. The pup counts indicate that pup production will be high and may have finally recovered from the significant decline that occurred during the 1997-98 El Niño event.

By Sharon Melin

HARBOR SEAL SURVEYS

The year 2004 is the first year since 1999 that Washington State harbor seals from both the coastal and inland stocks will be counted. Aerial surveys of the coastal harbor seal stock were flown during the June pupping season; surveys of the inland stock will be flown in August. Estimated counts of the coastal stock are 1,600 greater than estimate of K (carrying capacity) in Washington State for 1978-1999. The estimated coastal total of 13, 019 harbor seals is about 15% higher than expected and equal to peak numbers seen in the early 1990s. In 1999, both stocks were very close to the predicted K. Counts from photos of both stocks will be completed in the fall and will determine if the counts are as high as the estimates and if a similar increase has occurred in the inland stock.

By Harriet Huber

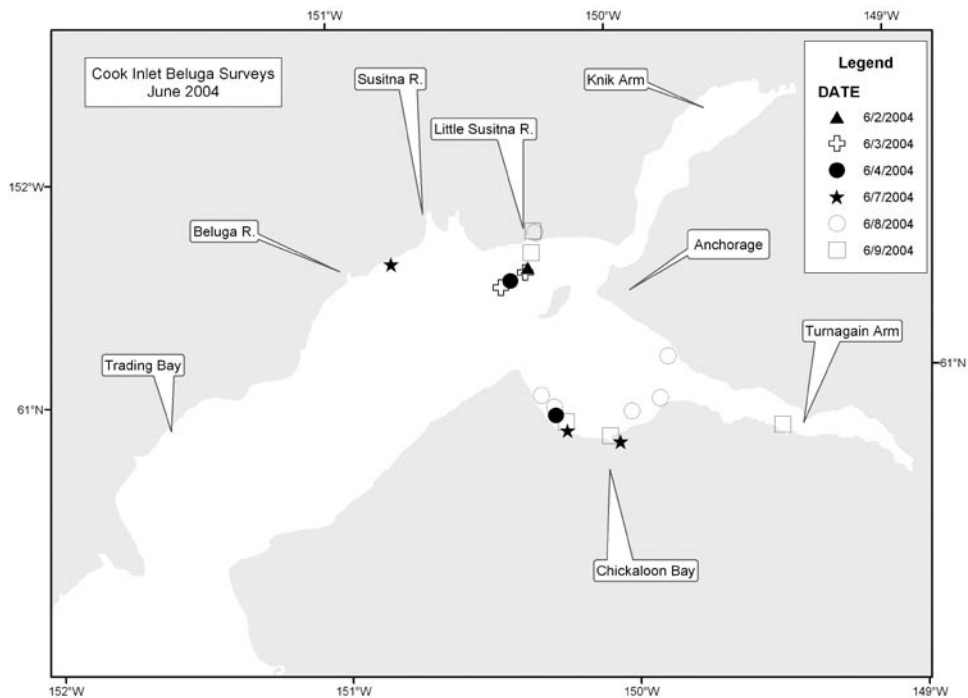


Figure 1. Sightings of beluga whales in Cook Inlet, Alaska, 2-9 June 2004, during the annual aerial surveys, which have been conducted since 1993. Sighting locations are typical for this time of year.

Cetacean Assessment and Ecology Program

COOK INLET BELUGA SURVEY

NOAA Fisheries biologists from the National Marine Mammal Laboratory and the Alaska Regional Office in Anchorage conducted the annual aerial survey of the beluga whale (*Delphinapterus leucas*) population in Cook Inlet, Alaska, from 2 to 9 June 2004 (under Permit 782-1438). All coastal areas and 1,653 km of transects across the inlet were surveyed during 45 flight hours. The surveys were repeated on five separate days in the areas where almost all belugas have been found in the past decade: over shallow waters near river mouths in the northern half of Cook Inlet.

Consistent with the beluga surveys conducted by NOAA Fisheries in Cook Inlet each year since 1993, the 2004 surveys were conducted in a twin-engine, high-wing Aero Commander at an altitude of 244 m and a speed of 185 km/hr. Two observers searched independently on the coastal (left) side of the plane, where virtually all beluga sightings occurred, while a single observer searched on the right side. Every few hours, four biologists rotated through the three observation positions and a data recorder position.

Because belugas in Cook Inlet are usually found in discrete groups, the counting protocol called for multiple aerial passes over each group. Two observers each made four or more independent counts of each group before switching with another pair of observers who also made four or more counts. Therefore, most groups of whales were counted 16 or more times each day.

Belugas were observed near the Little Susitna River (daily median aerial counts of 11-99 whales), in Turnagain Arm (37-50 whales on two days, but none on two other days), and Chickaloon Bay (11-176 whales, the highest numbers ever seen in this area) (Fig. 1). Unlike the previous 1-2 week surveys, in 2004 it was apparent that the whales were moving between the Susitna area and Chickaloon Bay. For the first time since 1995, no belugas were seen in Knik Arm and, consistent with the sighting distribution since 1995, no belugas were found south of the northernmost third of Cook Inlet. Using medians from the observers' aerial estimates (a very rough but quick index of relative abundance, which is not corrected for estimates of whales missed), the sum of the daily counts for June 2004 was 187 belugas. This estimate is not very different from estimates for the past 5 years (174-216 whales), but it is below index counts for years prior to 1998 (264-324 whales).

By Dave Rugh

PHOTOGRAPHING BOWHEAD WHALES DURING THE 2004 SPRING MIGRATION

The NMML provided funds for aerial photography of the Western Arctic stock of bowhead whales (*Balaena mysticetus*) throughout their spring migration past Point Barrow, Alaska. The survey was conducted from 18 April to 7 June 2004, paralleling the project conducted from 12 April to 6 June 2003. Photographs from these two seasons will be examined for identifiable individuals (most bowhead whales have distinctive marks on their dorsal surfaces, perhaps from contacting the underside of sea ice). The rate of reidentification of well-marked individuals seen in both 2003 and 2004 will provide an indication of population size through a mark-recapture type analysis. Similar studies conducted by the NMML between 1985 and 1992 have resulted in abundance estimates very similar to those made by shore-based observers counting the whales as they migrate past the ice edge. Using ice-based counts from 2001, the abundance of this stock of whales is currently estimated to be greater than 10,000.

As in 2003, the survey in 2004 was carried out in an Aero Commander, a twin-engine, high-wing aircraft generally flown at altitudes of 130-170 m (400-500 ft) and a speed of 185 km/hr (100 kt). A handheld, medium-format camera was used to collect 1,443 photographs during the 143 hours of surveys conducted on 41 of the 50 available days, with good aerial photography conditions occurring on 64% of the days. After the whale images have been processed and cataloged, they will be examined for quality and identifiable individuals. Reidentification of individuals between years will help answer questions about abundance, survival rates, calving intervals, and timing within the migration from one year to the next.

All survey activities were coordinated with the NOAA Fisheries Alaska Regional Office, the Alaska Eskimo Whaling Commission (AEWC), and Alaska's North Slope Borough (NSB). The project was conducted under NMML's Cetacean Research Permit 782-1438.

By Dave Rugh

MEETING OF MEXICAN MARINE MAMMAL SOCIETY

Sally Mizroch was invited to give a presentation at the 29th meeting of the Mexican Marine Mammal Society, in La Paz, BCS, Mexico, 2-5 May 2004. The presentation, "Digital databases: Integrating digital still, GPS and whale biopsy data

enhances field and lab analysis," coauthored with Universidad Autónoma de Baja California Sur researcher Úrsula González Peral, described methods for streamlining the analysis of whale biopsy and photo-identification data.

Due to advances in digital technology, it is now possible to analyze photo-identification data in near-real time. By using a suite of inexpensive hardware and software, field researchers can build integrated databases that enhance their ability to correctly identify biopsied individuals. Techniques (developed by NMML researchers Sally Mizroch and Christy Sims) to edit photographic metadata and export the data into an Access database were described. By using a simple data form designed to integrate seamlessly with the metadata automatically collected by digital still cameras, field researchers can collect information, photographs, and biopsy samples during encounters with groups of whales, enter relevant information into the metadata of each digital photograph, and create an integrated database in the field. Position data, collected with handheld GPS units, can also be imported into the Access database to provide the exact locations of group encounters, photographs, and biopsy collections. Because biopsy samples are collected near a whale's dorsal fin and identification photos are usually of the whale's tail flukes, analyzing photo-identification data in the field enhances a researcher's ability to link photographs of a whale's dorsal fin and tail flukes and, thus, accurately identify each biopsied whale. Creating databases in the field also provides the opportunity for less-experienced researchers to improve their skills and enables researchers to begin analyzing their data immediately upon returning to their labs. Examples of field databases, created during humpback whale surveys in Mexico, Hawaii, and Alaska, were used to illustrate the methods described in the presentation.

By Sally Mizroch

CETACEAN SURVEY ABOARD THE MILLER FREEMAN

Three marine mammal observers participated on a cetacean survey from 5 June to 3 July 2004 aboard the NOAA ship *Miller Freeman* as a piggyback project during an acoustic-trawl survey for walleye pollock conducted by the AFSC's Resource Assessment and Conservation Engineering (RACE) Division. The primary objective was to document cetacean (whales and dolphins) distribution in waters of the

southeast Bering Sea shelf and to collect line-transect data for abundance estimation. A secondary objective was to collect photo-identification and biopsy samples from selected species, including humpback and killer whales.

The pollock acoustic study surveys tracklines from near shore to the shelf break, providing an ideal format for a line-transect cetacean survey. Surveys to determine distribution and abundance of cetaceans are costly and, therefore, are often confined to coastal waters where the logistics are most practical, or to areas of the ocean where marine mammal mortality associated with commercial fishing is particularly high. The shelf waters of the Bering Sea have not met either criteria and so are comparatively under-sampled for cetaceans. The opportunity to use the *Miller Freeman* as a survey platform is, therefore, very beneficial to our studies. Multiple years of data are providing a clearer picture of cetacean distribution and abundance in the eastern Bering Sea.

The cetacean survey was conducted from the flying bridge of the 215-ft long *Miller Freeman*. Two observers searched through 25x150 power binoculars at starboard and port stations. Observers were at an eye height of approximately 12 m, with ship speed roughly 11 kts during surveys. A data recorder searched the trackline with naked eye, using Fujinon 7x50 hand-held binoculars to confirm sightings. The observers rotated positions every half hour during a 2-hour shift, followed by a half hour break. The survey was suspended for meals, fishing operations, inclement weather, and when light levels were too low for efficient observations. If time permitted,

the survey was suspended when humpback whales or killer whales were sighted to conduct sampling for photo-identification and biopsy collection.

The survey included the shelf waters of the eastern Bering Sea (Fig. 2). Analyses of data from 6 to 30 June yielded a total of 2,032 km of trackline surveyed with 93 cetacean sightings (896 individuals). An additional eight cetacean sightings were made (32 individuals) during off effort periods. Species included harbor porpoise, Dall's porpoise, Pacific white-sided dolphins, killer whales, minke whales, fin whales, and humpback whales (Table 1, Figs. 2 and 3). Pacific white-sided dolphins were seen only once in a very large school on the north side of the Alaska Peninsula, near an area where they have been seen on past surveys. Harbor porpoise were seen only four times, in a small area in the southern middle shelf area, while Dall's porpoise distribution was more widespread across the more southern half of the survey area. Killer whales were seen predominantly around the Pribilof Islands, or near Unimak Pass. The six minke whale sightings were spread out across the western half of the survey area near the 100 m depth contour. Fin whales were seen only near the eastern edge of the survey, with none seen along the shelf break where the species has been common during past surveys. Humpback whale sightings were spread out, with most seen near shore from Akutan Island and west along the Alaska Peninsula. The most northerly sighting was a humpback whale approximately 300 km north of the Pribilof Islands.

The ship was stopped 11 times to collect photographs and biopsy samples; seven times for kill-

Table 1. Number of cetacean sightings and individuals observed during the 2004 *Miller Freeman* survey.

Species	Sightings		Individuals		Average group size
	On effort	Off effort	On effort	Off effort	
Harbor porpoise	4	0	10	0	2.5
Dall's porpoise	26	1	148	10	5.9
Pacific white-sided dolphin	1	0	450	0	450
Killer whale	8	2	71	13	8.4
Minke whale	6	0	8	0	1.3
Fin whale	3	1	7	2	2.25
Humpback whale	20	0	164	0	8.2
Unidentified whale	13	3	17	6	1.4
Unidentified dolphin	12	1	21	1	1.7

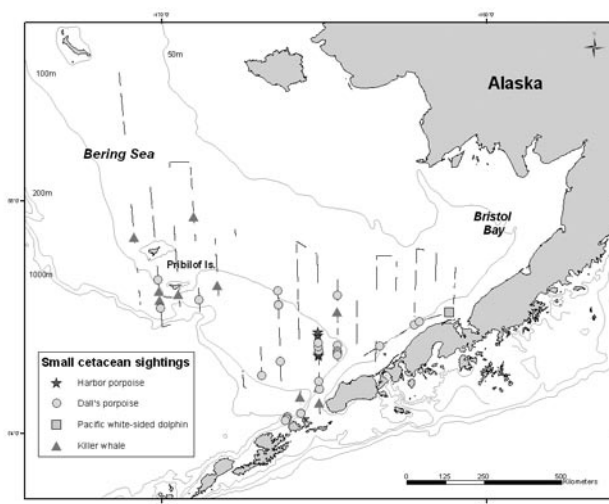


Figure 2. Completed track line and small cetacean sightings.

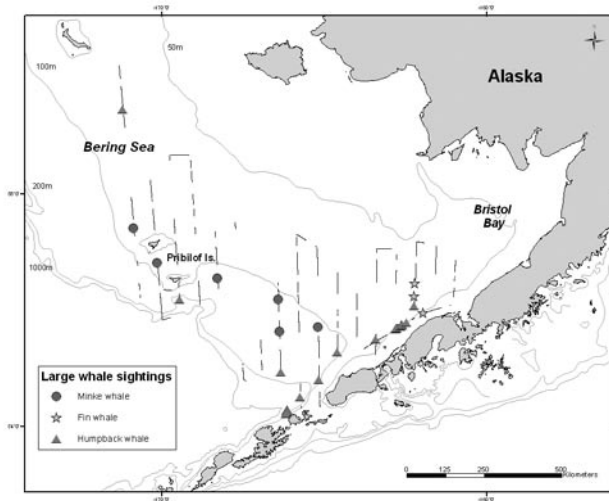


Figure 3. Completed trackline and whale sightings.

er whales and four times for humpback whales. Photographs from these encounters will be analyzed to identify individuals and then matched to existing catalogues to look at movements and to be included in ongoing mark/recapture studies. Biopsy samples will be used for stock determination.

By Janice Waite

Polar Ecosystems Program

HARBOR SEAL SURVEYS AND TIME-LAPSE CAMERA DEPLOYMENTS IN COOK INLET

The Polar Ecosystems Program (PEP) conducted seasonal aerial surveys of harbor seals in southern Cook Inlet (south of Nikiski) and the Barren Islands during April and June 2004. The surveys were conducted as part of a study of harbor seals in Cook

Inlet, Alaska, under an Interagency Agreement between the Department of the Interior's Minerals Management Service (MMS) and NOAA Fisheries. Counts of seals recorded in digital photographs from the two surveys are under way.

In May, PEP deployed 10 time-lapse camera systems in southern Cook Inlet, expanding the coverage of a study described in previous *AFSC Quarterly Reports* (April - June 2003, October - December 2003, and January - March 2004). The cameras will provide hourly photographs for monitoring the numbers of harbor seals hauled out on shore throughout the year. Counts of the seals in the photographs will support a detailed investigation of factors influencing the haul-out behavior of harbor seals and will help to reduce uncertainty in estimates of population size obtained by aerial surveys.

Two of the new cameras were deployed at a seal haul-out site near Anchor Point, and eight cameras were deployed at two sites at Augustine Island. Cameras were mounted on fiberglass or wooden posts anchored by steel cable attached to earth anchors, which were driven into the dirt at each site by hand. To prevent power-related problems that occurred at the previous deployment at Aurora Rock, no more than three cameras were powered by one set of batteries. Further, the power source for each set of cameras was increased from 9V to 12V, and no two cameras were scheduled to take pictures at the same time (cameras were offset from each other by 2 minutes). All cameras were scheduled to take 19 pictures/day, providing more complete coverage of the longer summer day-length. Cameras will be returned to the "winter" schedule of 9 pictures/day when they are visited for maintenance and recovery of images in August.

By Mike Simpkins, Peter Boveng, and Robert Montgomery

USING GEOREFERENCED IMAGES TO STUDY HARBOR SEALS ON FLOATING ICE IN A TIDEWATER GLACIAL FJORD

The Polar Ecosystems Program (PEP) completed 3 months of aerial harbor seal surveys during pupping (from May to July) in Disenchantment Bay, Alaska. These studies expand on those begun in 2002 to understand the relationships between harbor seals and the natural and anthropogenic factors of their environment including season, ice cover, and cruise ship visitation. This year, new techniques were employed that improve on pre-

vious data collection and allow for more detailed analyses.

A GPS-linked digital still camera that pointed downward from the belly of a DHC-Beaver aircraft was used as the primary means of sampling the distribution and abundance of harbor seals on floating ice. During each survey the camera recorded about 1,500 nonoverlapping images organized in 15 standard transects over ice-covered areas of Disenchantment Bay. Over the 12 weeks of the study, 21 surveys were flown on days that provided the highest contrast in ship visitation – which ranged from zero to five ships daily. Seven comparable surveys were flown in nearby Icy Bay, which reportedly is not visited by cruise ships. By using customized programs in conjunction with GIS software, images were batch processed and georeferenced to create a noncontiguous mosaic which will enable observers to “walk through” the transects, search for, and map seal groups – even individuals within groups. By analyzing high quality, still images within a GIS framework, seal detection is improved and the mapping of seal distributions is more precise and less prone to recording error than conventional video analysis (i.e., the technique used in 2002). Apart from this greater accuracy, the improved imagery will enable observers to discern size classes of seals from aerial photography and, in turn, allow testing of hypotheses relating to possible shifts in the structure of glacial fjord populations.

By John Jansen and Shawn Dable

RESOURCE ASSESSMENT & CONSERVATION ENGINEERING (RACE) DIVISION

Midwater Assessment & Conservation Engineering Program

WALLEYE POLLOCK SURVEY

On 4 June 2004, the Midwater Assessment and Conservation Engineering (MACE) program began an echo integration-trawl survey of walleye pollock (*Theragra chalcogramma*) on the eastern Bering Sea shelf aboard the NOAA ship *Miller Freeman*. The survey began in Kodiak, Alaska, and will cover the U.S. exclusive economic zone (EEZ) waters from Port Moller, Alaska, to the U.S./Russia Convention

Line. Also, the United States has applied for but not yet received permission from the Russian government to survey in the Russian EEZ. The survey will end on August 3 in Kodiak. Acoustic data and trawl catch information collected during the survey will be used to determine the distribution, biomass, and biological composition of walleye pollock on the eastern Bering Sea shelf and slope. Other cruise objectives are the collection of pollock target strength data, calibration of the scientific acoustic systems, testing of an opening/closing coded system controlled with an acoustic link, and the collection of physical oceanographic data.

The first leg covered the Bering Sea shelf west to about the Pribilof Islands. Preliminary results show that the majority of the pollock are between 40 and 60 cm fork length with a modal length of 44 cm. Few pollock less than 40 cm were observed.

By Michael Guttormsen

RESOURCE ECOLOGY & FISHERIES MANAGEMENT (REFM) DIVISION

Age & Growth Program

Estimated production figures for 1 January through 30 June 2004.	
Species	Number Aged
Northern rocksole	311
Yellowfin sole	605
Arrowtooth flounder	3,396
Walleye pollock	8,668
Pacific cod	707
Sablefish	104
Atka mackerel	61
Pacific ocean perch	401
Northern rockfish	465
Rougheye rockfish	669
Light dusky rockfish	349
Dark dusky rockfish	120

Total production figures were 15,856 with 4,746 test ages and 38 examined and determined to be unageable.

By Dan Kimura

Economic & Social Sciences Research Program

ECONOMIC DATA COLLECTION PROGRAM

Center economists continued working with Alaska Regional Office and Pacific States Marine Fisheries Commission (PSMFC) staff to implement the economic data collection program that will be an integral part of the BSAI Crab Rationalization Program. They assisted in completing the following:

- The historic and annual Economic Data Report forms for catcher vessels, catcher-processors, shoreside processors, and floating processors;
- The draft regulations and preamble for the data collection program;
- The cooperative agreement under which PSMFC will collect the data; and
- The terms of reference for the data collection program.

FISHING COMMUNITIES

Drs. Jennifer Sepez (AFSC) and Karma Norman of the Northwest Fisheries Science Center (NWFSC) have initiated a joint west coast Fisheries Science Centers project to develop profiles of fishing communities in the Western United States (see feature article in this issue). They will build on a similar project for fishing communities in Alaska. The AFSC is involved in this project because there are fishing communities outside of Alaska that are substantially dependent on or substantially engaged in fisheries off Alaska.

OTHER ONGOING ACTIVITIES

Program staff have been involved in ongoing efforts to do the following:

- Implement the National Bycatch Strategy;
- Estimate the non-consumptive value of Steller sea lions;
- Develop regional economic impact models;
- Assess the economic effects of the Bering Sea-Aleutian Islands pollock fishery cooperatives;
- Implement improved electronic reporting of fisheries data;
- Establish an improved program for observer funding and deployment in the Alaska groundfish fisheries;
- Explore the feasibility of using economic incentives to protect essential fish habitat;

- Plan and implement projects that are part of the NMFS Fisheries Information System (FIS);
- Explore alternative management approaches for nontarget species taken as bycatch in the BSAI and GOA groundfish fisheries; and
- Summarize fisheries data for NMFS, NPFMC, industry, environmental organizations, and other stakeholders.

By Joe Terry

Status of Stocks & Multispecies Assessment Program

CALIBRATION OF SIMRAD ES60 ECHOSOUNDERS

Commercial echosounder technology has advanced to the point where there is little difference in quality between scientific echosounders and those used by the commercial fishing industry during fishing operations. The AFSC in cooperation with the fishing industry and the Pollock Conservation Cooperative Research Center (PCCRC) has begun a project to collect and store acoustics data collected by the fishing fleet during fishing operations. These data will be used to investigate intra-annual movement and potential localized depletion of pollock and Pacific whiting due to commercial fishing.

The first phase of the project was to design and implement a system which would collect data from the fishing vessels with little to no impact on fishing operations. Since January 2002, we have successfully collected 1.2 terra-bytes of raw acoustic data from eight commercial fishing vessels equipped with SIMRAD ES60 echosounders operating in the Bering Sea pollock and West Coast Pacific



Figure 1. The 272 foot, 3,480 ton, factory trawler *American Dynasty*.

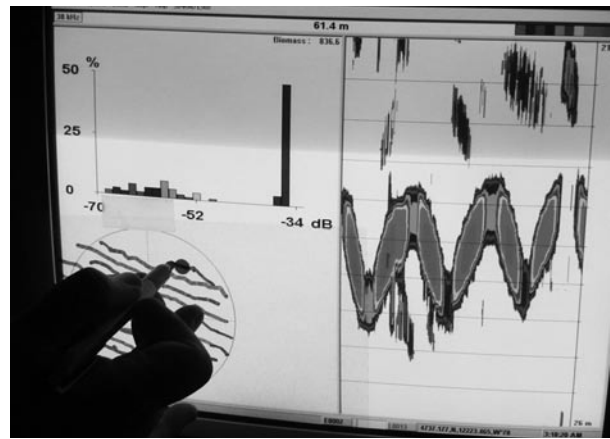
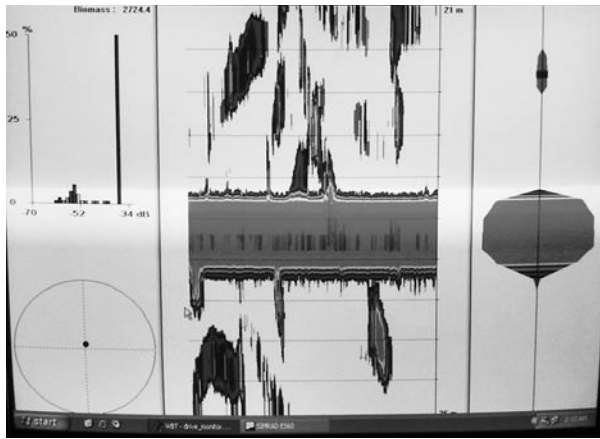


Figure 2. On-axis (left) and quadrants (right) data recording during calibration.

whiting fisheries. These data are from uncalibrated echosounders and, therefore, cannot be used for quantitative biomass estimations.

The second phase of this project is to test whether we can successfully calibrate an ES60 echosounder to within acceptable error bounds. On 18-19 June 2004, we conducted a calibration study in Elliott Bay, Washington, aboard the *American Dynasty*, a 272 foot, 3,480 ton, factory trawler (Fig. 1). The calibration study was made possible through funding by the Pacific Whiting Conservation Cooperative (PWCC), cooperation by American Seafoods, and technical support from SIMRAD, the AFSC, and the NWFSC.

Preliminary work for the calibration began on 26 May 2004 when we conducted a site visit aboard the *American Dynasty* to determine the optimum placement of the calibration equipment. We used downriggers equipped with line counters and 100 lb Spectra line and modified their bases to fit onto the railings of the vessel.

On 9 June 2004, we employed a commercial diver to locate the transducer on the bottom of the vessel and provide coordinates for the placement of the calibration sphere using the modified downriggers. The calibration team was made up of five scientists from the AFSC: Steve Barbeaux, Martin Dorn, Matt Kookesh (Status of Stocks and Multispecies Assessments Program), Chris Wilson, and Alex DeRobertis (MACE Program), one scientist from the NWFSC, Guy Fleischer (Fisheries Resource Analysis and Monitoring Division), and one scientist from the PWCCRC, Vidar Westpestad.

The team boarded the *American Dynasty* on the evening of 18 June at the Rainier fuel dock while the vessel was taking on fuel. We selected the Port of Seattle designated commercial anchorage area in Smith Cove on the north end of Elliott Bay for the

calibration site. Weather for the calibration was near perfect with little wind (<5mph) and a slack high tide with a mean difference during the calibration of less than 2 feet. Upon entering Smith Cove we determined that the amount of acoustic interference was within tolerance limits. We deployed a 60 mm copper sphere using three of the modified downriggers and followed the standard calibration methods for the calibration of acoustic survey echosounders (Fig. 2). We collected both on-axis and four quadrant data. Recording began at 2:45 AM and finished at 4:25 AM. The vessel returned to Pier 90 in Seattle at 6:00 AM.

We are currently analyzing the calibration data. Another calibration exercise aboard the *American Dynasty* is being scheduled for later in the summer in order to verify the stability of the commercial transducer. If these calibrations prove successful, we will conduct similar calibrations over the next year on the other commercial fishing vessels in our study.

By Steve Barbeaux and Martin Dorn

UPDATE ON PACIFIC COD LOCALIZED DEPLETION STUDY

NOAA Fisheries scientists successfully completed fieldwork in this year's localized fishing depletion experiment in Alaska's 'cod alley' near Unimak Island. At issue is whether commercial trawl fisheries affect food availability for endangered Steller sea lions by creating a localized depletion of Pacific cod.

Researchers designed the localized depletion experiment in 2002 and 2003 under the Steller Sea Lion Research Initiative to test for the presence of localized depletion effects from the winter trawl fishery on seasonal aggregations of Pacific cod. The experimental design uses the 10 nmi, no-trawl

boundary around Cape Sarichef on Unimak Island to define “treatment” (subject to heavy trawl fishing during January-March) and “control” areas (open to fixed gear, but closed to trawling). Both zones intersect a shelf area at 40-50 fathoms that has historically been a popular cod trawling ground.

Researchers conducted surveys from a chartered fishing vessel both before the trawl opening in January and after the main trawling season in late March. Researchers collected samples in January and March 2004 at 80 study stations, 40 inside the no-trawl zone and 40 outside the boundary. The experiment uses modified pot gear on short (4-8 hours) soaks to measure local cod abundance. The goal of the experiment is a statistical test of whether the local abundance in the trawled area declines relative to the control area.

The localized depletion experiment was also conducted in 2003. Results for that year were inconclusive because weather and mechanical problems prevented collection of an adequate sample size in January. This past winter, both the January and March cruises succeeded in sampling a full array of stations. Each station was sampled on 3-5 different days in order to help smooth over short-term and tide-based variability. Researchers also collected biological data and specimens being used in studies of genetic stock structure and reproductive biology.

Future plans call for a repeat of the experiment in 2005 and 2006 to test results over year-to-year variability in weather, fishing, and the timing of cod spawning. Continuation of both the study and the special closure are contingent upon continued funding of the study.

The North Pacific Fishery Management Council approved a special 2-week closure of the experimental area in support of this research in fall 2002. The experimental area is to be closed to all fishing 15-31 March during the years when the experiment is to be implemented (i.e., 2003 to 2006). The Council’s Scientific and Statistical Committee reviewed the study design, and industry representatives cooperated in planning the closure request.

Researchers are also conducting a cod tagging study in the Cape Sarichef area, in order to learn more about the short-term and seasonal movements of Pacific cod. Response to the cod tagging study has also been very positive, with over 1,000 tags returned to the Alaska Fisheries Science Center.

Pacific cod tags are loop tags covered in either orange or hot-pink plastic and imprinted with a return address. The reward for returning a cod tag,

along with capture information, is a sharp-looking black baseball cap embroidered with a custom “Cod Alley” design created by artist Ray Troll.

A limited number of electronic data storage tags, which have a cash reward of \$200, have also been released. Results of the tagging study are currently being analyzed. It is expected that these results will both aid in interpretation of the local abundance data and provide new information about seasonal movements of cod on and around their spawning grounds.

Principal Investigators M. Elizabeth Conners and Peter Munro of the Alaska Fisheries Science Center presented the results of this winter’s experiment to the North Pacific Fishery Management Council at the Council’s summer meeting in Portland, Oregon in June 2004.

A detailed account of this research, from its beginning through 2003, is given in AFSC Processed Report 2004-04, “Pacific Cod Pot Studies 2000–2003”. The document is available on the AFSC website at http://www.afsc.noaa.gov/refm/stocks/fit/pot_cod.htm

For further details, please contact Libby Logerwell, Fisheries Interaction Team Leader: libby.logerwell@noaa.gov; Phone: 206 526 4231/ Fax: 206 526 6723.

By Peter Munro

Resource Ecology & Ecosystem Modeling Program Program

FISH STOMACH COLLECTION AND LAB ANALYSIS

Laboratory analysis was performed on 2,028 groundfish stomachs from the eastern Bering Sea and 3,187 stomachs from the Aleutian Islands region. Observers returned 1,257 stomachs from the Bering Sea during this quarter. A total of 21,772 new data records were added to the groundfish food habits database.

By Troy Buckley and Geoff Lang

ANALYZING GROUND FISH STOMACH CONTENTS AT SEA

This year, the Resource Ecology and Ecosystem Modeling (REEM) Program is experimenting with performing detailed analysis of groundfish stomach contents at sea instead of the usual practice of returning stomach samples back to the lab for analysis. Personnel participating in the bottom trawl surveys of the Aleutian Islands and upper continental slope

of the eastern Bering Sea are equipped with motion compensating scales (that measure to the nearest 0.5 g) and other equipment to make this at-sea analysis feasible. The goal is to produce data that retain the most important detailed aspects of laboratory analysis, such as identification of commercially important prey to the species level, while reducing the costs associated with buckets, chemicals, bags, storage, shipping and laboratory analysis. To accomplish this, the minimum identification standards have been adjusted to require less detail, especially for small invertebrates; prey that aren't identifiable at-sea to the minimum standard are being preserved and returned to the lab. A cursory examination of the data collected during the first leg of each survey indicates that sample sizes obtained are 20% lower than the number of samples collected using traditional methods in previous years. After the completion of the field season, the sample sizes and taxonomic detail obtained will be compared with those from the more traditional collection and analysis methods, and a decision will be made whether to continue at-sea analysis. In any event, detailed stomach content analysis in the lab will still be necessary when addressing more complex ecological questions that require analyzing small invertebrate prey to more detailed taxonomic levels.

By Troy Buckley

SURPLUS PRODUCTION IN MARINE ECOSYSTEMS

The question of the amount of "surplus" production available in marine ecosystems is a critical one for fisheries management. On one hand, catching a fish makes it unavailable to predators. In a tightly connected ecosystem, there may be little overall energy surplus. On the other hand, the removal of large fish leads to younger and possibly more energy-efficient fish populations. While humans cannot control the interactions in an ecosystem, modeling these shifts of energy flow is an important step to understanding the overall yields that might be expected from ecosystems, especially if maintaining the health of top predators such as marine mammals is a management priority.

"Reconciling ecosystem-level surplus production predictions between Ecosim and bioenergetics models" by Kerim Aydin reviews the energetic assumptions most commonly used in ecosystem models and explores the energetic implications of model predictions while suggesting model improvements for quantifying the energetic shifts that might be

expected to occur through fishing. Specifically, the paper suggests that the biomass dynamics model Ecosim has a tendency to underestimate the dietary requirements of large, slow-growing, older fish in unfished ecosystems, and may, therefore, overestimate the biomasses of top predator populations that were supportable by ecosystems before fishing began. Some relatively simple bias correction formulas for Ecosim, based on the expanding the model to take life-history strategies into account using von Bertalanffy growth parameters, are derived, tested, and recommended.

The paper was recently accepted for publication in the *African Journal of Marine Science*.

By Kerim Aydin

SEABIRD-FISHERIES INTERACTION RESEARCH

Two field activities were implemented in the third quarter of 2004 to study seabird mortality and seabird pelagic distribution. The first was a special project for North Pacific groundfish observers. In their normal duties on commercial trawl vessels, observers record any seabirds recovered while sampling the catch. Observers have also recorded, in anecdotal notes, that seabird mortalities occur from interactions with the trawl main cables or trawl sonar cables. These interactions and mortalities are not recorded in a systematic way, so we cannot make estimates of this additional source of mortality. To address this issue, a pilot project had been completed by four observers in January through March 2004 to capture this information while not disrupting normal sampling duties. Based on comments from these observers and other reviewers, project instructions were revised in June and the work was expanded such that most observers on trawl vessels will collect this information in the latter half of 2004.

The second project, implemented in May, will increase our understanding of seabird distribution and habitat use in pelagic waters of the Bering Sea and Aleutian Islands. This project was an expansion of the stationary seabird surveys developed by the Washington Sea Grant Program for use in long-line surveys carried out by the International Pacific Halibut Commission, Alaska Department of Fish and Game, and NOAA Fisheries. That project is in its third year, and the 2002 data report is available from Washington Sea Grant. The surveys have yielded valuable information on seabird distribution and relative abundance. To increase the time and area coverage of these surveys, the protocols were

revised for use on trawl vessels and implemented on Alaska Fisheries Science Center summer research charters. Five vessels will complete three legs each, covering the Bering Sea shelf, Bering Sea slope, and Aleutian Islands. At each station, if weather permits, a seabird survey will be completed and numbers of birds by species or species groups within a specific distance from the vessel recorded. These data will add greatly to our increasing understanding of seabird distribution, abundance, and habitat use in these waters.

By Shannon Fitzgerald

TESTING THE STABILITY OF THE SUITABILITY COEFFICIENTS FROM THE EASTERN BERING SEA MULTISPECIES VIRTUAL POPULATION ANALYSIS

Suitability coefficients are important for the estimation of predation mortality M_2 in the multispecies virtual population analysis (MSVPA) and the multispecies forecasting model (MSFOR) models. Testing the assumption of the stability of the suitability coefficients is important to assess the robustness of the predictions made with MSFOR. We used different statistical methods to partially test this assumption. The comparison of the estimates from two different sets of data suggested that sample sizes greater than 200 reduce the differences between the two types of estimates. In a second approach, we contrasted the residual variances of partial data sets with the results from the fit of a combined data set. Results suggested a small effect (~10.8 %) of variation in stomach contents among years on suitability estimates. The comparison of the fitted means of the suitability coefficients associated with each predator species suggest that only 13 of the 50 pair-wise contrasts were significantly different ($\alpha = 0.05$). In general, results suggested that the predator preferences and prey vulnerabilities remained stable over time. Therefore, MSFOR could be considered as a tool for providing advice to fisheries managers within a multispecies context.

By Jesús Jurado-Molina and Patricia Livingston

INCORPORATING PREDATION INTERACTIONS IN A STATISTICAL CATCH-AT-AGE MODEL FOR A PREDATOR-PREY SYSTEM IN THE EASTERN BERING SEA

Multispecies virtual population analysis (MSVPA) has been used to model groundfish predation interactions in the eastern Bering Sea. This model incorporates predation mortality, M_2 , into

the virtual population estimation process. However, this model framework lacks the statistical assumptions now commonly used in single-species assessment modeling in which statistical fitting of parameters is accomplished by considering how errors enter into the model and multiple data sources are used to estimate parameters. In this work, a two-species system (walleye pollock and Pacific cod) was derived to incorporate the predation equations from MSVPA into a multispecies statistical catch-at-age model (MSM). The MSM is a complex model that estimates population numbers and predation mortality based on catch-at-age data, relative indexes of abundance, predator annual ration and predator stomach contents using estimation procedures for the statistical part and the predation mortality. MSM statistically estimates population parameters such as numbers at age and fishing mortality rates using either an optimization algorithm (Newton-Raphson for example) or Bayesian methods and an internal algorithm for the estimation of the predation mortality.

Results suggest that the multispecies statistical model reproduced most of the suitability coefficients (Fig. 1) and predation mortalities estimated by MSVPA and the adult population estimates from the single-species stock assessment. MSM also provides a measure of the uncertainty associated with these parameters, which is not available with the current MSVPA technology.

MSM is an important advancement in providing advice to fisheries managers because it incorporates the current tools used in stock assessment such as Bayesian methods and decision analysis into a multispecies context, helping to establish useful scenarios for management in the eastern Bering Sea. Future

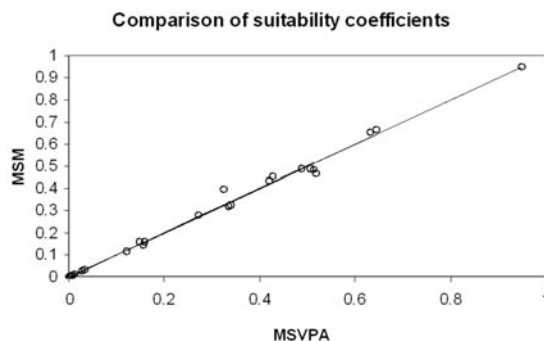


Figure 1. Comparison of estimates of average suitability coefficients for walleye pollock as predator from the multispecies virtual population analysis and the multispecies statistical model.

improvements to the model will include adding the full suite of groundfish predators presently modeled in the eastern Bering Sea MSVPA and incorporating stomach content data into the statistical estimation process.

By Jesús Jurado-Molina and Patricia Livingston

U.S. North Pacific Groundfish Observer Program

CHANGES TO FUNDING AND DEPLOYMENT SYSTEM

The North Pacific Fishery Management Council and NMFS continued developing an analysis for a fishery management plan (FMP) amendment to restructure the funding and deployment systems in the Observer Program to better ensure ongoing collection and quality observer data. The FMP amendment has several fee options. These collected fees combined with possible federal dollars would allow NMFS to contract directly for observer services. The FMP amendment also includes a new deployment structure which would do away with the current 0%, 30%, and 100% observer coverage categories. Vessels and shore plants would be required to carry observers when they were provided by NMFS. NMFS would determine when and where to deploy observers based on data collection and monitoring needs.

The alternatives within the analysis of the FMP amendment consist of various combinations of vessels and shoreside processors in both the Gulf of Alaska and Bering Sea-Aleutian Islands. The Council's Observer Advisory Committee (OAC) is currently wrestling with many questions and issues pertaining to the various alternatives. Discussions at the OAC meeting in March 2004 centered on the problems associated with simultaneous operation of two separate observer funding and deployment systems (old and new) and the so far unknown costs associated with observer compensation and overtime pay under federal contracts. The Council added two more suboptions to the analysis at its June 2004 meeting. Review of the initial draft analysis by the Council is currently scheduled for October 2004.

INCREASE IN DEBRIEFINGS

Fifty percent of the observer debriefings in the first 6 months of this year have been conducted at the Observer Program's Anchorage office. This represents a 10% increase over previous years. Observer providers make the decision to debrief an observer in either Seattle or Anchorage, so this increase is under their control alone. This increased level of debriefing coupled with over 50% of observer training and briefing occurring at the University of Alaska's Observer Training Center in Anchorage indicates the importance of the Observer Program's presence in Anchorage. The presence of Observer Program staff in Alaska with offices in Anchorage, Dutch Harbor, and Kodiak has become increasingly important for the overall success of the Observer Program's mission.

OIG REPORT

The Department of Commerce Office of Inspector General's Office of Inspections and Program Evaluations (OIG) completed a review of 7 of the 14 Observer Programs in the United States including the North Pacific Groundfish Observer Program. The final report was made public in March 2004. The review was meant to determine whether the seven observer programs are meeting data collection needs, how NMFS ensures that observer data is of high quality, and how well the programs' missions and objectives are communicated.

The findings and directions of the OIG were that NMFS 1) should explore "best" data quality assurance practices across programs; 2) needs to ensure that the vessel selection processes used to place observers on ships result in data that is representative of the fishing effort; 3) needs to take actions to help maintain an experienced corps of observers; 4) should measure and monitor performance across all programs in order to improve regional observer program accountability; 5) should develop a national outreach strategy to better communicate the mission and goals of the observer program to the fishing industry.

The complete report can be found at http://www.oig.doc.gov/oig/reports/audit_inspection_and_evaluation_reports/index.html

By Bob Maier