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SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - APRIL 1983
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SOUTHWEST FISHERIES CENTER
LA JOLLA, CALIFORNIA

HONOLULU LABORATORY
LA JOLLA LABORATORY
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PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - APRIL 1983

STATUS OF PUBLICATIONS

Published

Brill, Richard W. 1983. Covering it all. [Review.] Environ. Biol. Fish. 8:79-80.

Matsumoto, Walter M. 1982. The status of the squid fisheries in the United States of America. (Summ.) In Indo-Pacific Fishery Commission (IPFC), Report of the third session of the Standing Committee on Resources Research and Development. Sydney, Australia, 28 April - 4 May 1982, p. 135. FAO Fish. Rep. (275).

Nelson, Craig S. and David M. Husby. 1983. Climatology of surface heat fluxes over the California Current region. NOAA Tech. Rep. NMFS-SSRF-763, 155 p.

Historical surface marine weather observations are used to compute large-scale atmosphere-ocean heat exchange components over the California Current region. Heat exchange components are summarized by 1° square areas and long-term months, and major features of the monthly distributions are described. The accuracy of the derived air-sea interaction variables and methods of computation are discussed.

The region off the west coast of the United States and Baja California is characterized by net annual heat transfer from atmosphere to ocean. Net oceanic heat gain reaches a maximum during summer off Cape Mendocino. Near the coast, surface heat flux is determined by a balance between incoming solar radiation and effective back radiation. In the offshore regions, high cloudiness reduces the magnitude of the short-wave radiative flux, and latent heat flux produces the largest heat loss. The

principal seasonal and spatial variations in air-sea heat transfer are a consequence of coastal upwelling which contributes to relatively low cloudiness and high incident solar radiation near the coast, suppression of evaporative heat loss, and reversal of the sensible heat flux. Simplified heat budget calculations demonstrate the importance of advective processes in maintaining the seasonal heat balance in coastal upwelling regions. Nonseasonal fluctuations are evident in time series of heat exchange processes, but low frequency components are not well described by the surface marine data used in this study.

Polovina, Jeffrey J., Stephen Ralston, and Jerry A. Wetherall. 1982. Approaches to resource assessment for lobster, bottom fish, monk seal, and green turtle stocks in the Northwestern Hawaiian Islands. In Indo-Pacific Fishery Commission (IPFC), Report of the third session of the Standing Committee on Resources Research and Development. Sydney, Australia, 28 April - 4 May 1982, p. 74-78. FAO Fish. Rep. (275).

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Queenth, Martina K.K., and Richard W. Brill. 1983. Operations and procedures manual for visiting scientists at the Kewalo Research Facility. SWFC Admin. Rep. H-83-07.

Translation

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Approved by Center Director

Cass, Virginia L. Exploitation of California sea lions prior to 1950. For consideration for publication in Marine Fisheries Review.

Echeverria, T., and W.H. Lenarz. Length relationships in the rockfishes (Pisces: Scorpaenidae; Sebastes) off California.

Gomez, Edgardo D., and George H. Balazs. Marine turtle stamps - promoting conservation. CDC Newls.

Polacheck, Tom. The sampling distribution of age-specific survival estimates from an age distribution. For consideration for publication in the Journal of Wildlife Management.

Polovina, Jeffrey J. The tropical ecosystem biomass budget model and its application to the Northwestern Hawaiian Islands. Coral Reefs.

Squire, James L., Jr. Warm water and the prospects for southern California recreational fishing in 1983. For consideration for publication in Marine Fisheries Review.

Theilacker, Gail H. and Amy S. Kimball. Laboratory-cultured prey for larval fish; width-weight relation and caloric values for a rotifer and young stages of a harpacticoid copepod. For consideration for publication in Aquaculture.

Uchida, Richard N. Summary of environmental and fishing information on Guam and the Northern Mariana Islands: A review of the plankton communities and fishery resources of Guam and the Commonwealth of the Northern Mariana Islands. NOAA Tech. Memo., NMFS, NOAA-TM-NMFS-SWFC-

Walker, Michael M., Joseph L. Kirschvink, and Andrew E. Dizon. Magnetoreception and biomineralization of magnetite: Fish. In J.L. Kirschvink, D.S. Jones, and B.J. MacFadden (editors), Chapter for "Magnetite biomineralization and magnetoreception in living organisms: A new biomagnetism."

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Research Cruise Data From Marianas Analyzed

Dr. Jeffrey J. Polovina, Leader of the Resource Assessment Investigation of the Mariana Archipelago, reports that preliminary results have been obtained in the analysis of deepwater shrimp and bottom fish data from the Marianas field work in 1982. The catch rates for Heterocarpus laevigatus, the deepwater shrimp of primary commercial value, ranged from an average of 0.6 kg per trap at a small bank north of Guam to 6.7 kg per trap at a seamount in the northwestern part of the chain. The mean catch rate for the archipelago was 2.7 kg per trap. The shrimp sampling gear consisted of a string of five traps with 36-m (20-fm) separation between traps. The mean variation in catch rate around an island or bank was about three times the mean variation between traps within a string, whereas the variation in catch rates between islands and banks was about 30 times the mean variation between traps within a string or about 10 times the mean variation in catch around an island or bank.

The islands and banks can be divided into three groups based on their geological history. The variation in catch rate within these three groups was about one-half the overall variation in catch rate. The oldest group (40 million years old) is composed of islands and banks at the southern end of the archipelago including Guam, Rota, Tinian, and Saipan. This group had a mean shrimp catch rate of 1.7 kg per trap, which was the lowest of the three groups. The seamounts to the west of the main island chain, the West Marianas Ridge, were formed about 20 million years ago. The mean catch rate in this group was 4.6 kg per trap which was the highest for the three groups. The youngest group is composed of the islands north of Saipan, which were formed about 2 million years ago and are still volcanically active. The mean shrimp catch rate for this group was 2.6 kg per trap.

Growth of Marianas Snapper Estimated

Dr. Stephen Ralston, Fishery Biologist, reports that based on the examination of otoliths, the first estimate of the growth of the snapper, Pristipomoides zonatus, from the Marianas has been obtained. This snapper (common name = gindai) is the most important bottom fish species in the Marianas.

Research assistant Happy A. Williams helped Ralston by preparing and reading otolith sections for daily growth increments and recording increment thickness at various otolith lengths. Ralston used a novel method to estimate K in the von Bertalanffy growth equation. He points out that increment thickness can be used as a direct measure of otolith growth rate as long as a 1:1 relationship is maintained between increment and days. Based on previous

work, this relationship is thought to be maintained through the immature phase of P. zonatus. Otolith growth rate and otolith length data were then numerically integrated over the first 20 cm (fork length) or the prereproductive range of growth. The resulting estimates of age at length class midpoints were then fitted to the von Bertalanffy curve which gave a K of 0.23 $year^{-1}$. The data fitted the model very well (r^2 = 99.6%) even though L had been estimated by independent size composition data. The estimate of K also seems to be very compatible with the results of lutjanid growth studies in the literature.

Baitfish Workshop Held at Kewalo Research Facility

In response to concerns expressed by the Hawaiian skipjack tuna industry, a baitfish workshop sponsored by the Southwest Fisheries Center (SWFC) Honolulu Laboratory and Division of Aquatic Resources (HDAR) was held at the Kewalo Research Facility. Over 70 individuals representing the fishing industry, various governmental and private research agencies, and the University of Hawaii attended the workshop. Laboratory Director Richard S. Shomura chaired the proceedings. The purpose of the workshop was to review the current critical shortage of bait in the pole-and-line fishery and to identify possible solutions.

Eight informal presentations were made on the historical trends and the status of the baitfish fishery, substitute bait, habitat enhancement, and economic considerations. Richard N. Uchida, Leader of the Insular Ecosystem Program, made a presentation on the status of the Hawaiian baitfish fishery. The data showed that for the decade 1960-69, the nehu catch fluctuated between 22,000 and 37,000 buckets and averaged 32,300 buckets. In the decade that followed the catches rose an average of 21%, fluctuating between 33,000 and 44,000 buckets and averaging 39,200 buckets. The 1980-81 catch, however, averaged only 26,500 buckets.

Bait catching practices, according to Uchida, have changed over the years in that the catch of night bait, which peaked in 1965, has declined steadily and at this time hardly contributes to the statewide nehu catches. Day bait-fishing intensity, on the other hand, rose sharply in 1968 and remained at very high levels until 1980 when effort dropped to pre-1968 levels.

Uchida also noted that although catch per day has remained relatively level at Pearl Harbor in 1960-81, Kaneohe Bay indices showed a rising trend until 1973 and a steady downward trend thereafter despite the continuously increasing effort until 1977.

FISHERY MANAGEMENT RESEARCH PROGRAM

Reports Being Prepared for May Council Meetings

Thomas S. Hida, Acting Leader of the Fishery Management Research Program, reports that personnel in the program are summarizing various data for reports to be submitted to the Western Pacific Regional Fishery Management Council (Council) for its May meetings. Research assistants James C. Cooper, Wesley K. Higuchi, Rachel S. H. Louie, and Nathaniel T. Shippen are assisting Samuel G. Pooley, Industry Economist, in summarizing various Hawaii catch report data and fish dealer data. Research assistant Bernard M. Ito is updating the 1982 spiny lobster catch data for another report.

University Economist to Spend Summer at the Honolulu Laboratory

Industry economist Samuel Pooley reports that Dr. Linda L. Hudgins of the University of Notre Dame will be a Visiting Faculty Fellow at the Honolulu Laboratory this summer. Dr. Hudgins will work on an economic forecasting model of tuna markets in Hawaii. Her work may also be extended to bottom fishes.

Vessels Readying for Central Pacific Albacore Fishery

Research assistant Bernard Ito reports that fishery biologists Robert N. Nishimoto and Tony Majors of the La Jolla Laboratory have been sending supplies and gear for placement on albacore boats that will be fishing off Midway this season. Tags and XBTs were received via the NOAA research vessel Townsend Cromwell which returned to Honolulu on April 25.

Two Hawaii-based boats, the Archer and Pacific Pioneer, have been awarded contracts to fish. The Archer will fish for 30 days west of long. 175°W and the Pacific Pioneer will be longlining for albacore. Ito reports that two other boats, the Marine Star and Heide, are already underway to the fishing grounds. The Heide left Honolulu on April 27. Four more albacore boats are now based in Honolulu, bringing the total albacore boats to 14. It is estimated that approximately 45 boats may be fishing off Midway this year.

Hawaii Landings of Skipjack Tuna Below Long-term Average

The April 1983 Hawaii landings of skipjack tuna were estimated at 32 metric tons (MT), which is 44 MT below the April 1982 landings and 172 MT below the 1964-80 long-term average for April. The cumulative landings from January through April were estimated at 138 MT which is 82 MT below the 1982 landings for the same period and 450 MT below the 1964-80 long-term average for the same period.

PELAGIC RESOURCES INVESTIGATION

Researchers Continue Tuna Behavioral Experiments

Dr. Richard W. Brill, Leader of the Experimental Ecology of Tunas Program, reports that various experiments are continuing at the Kewalo Research Facility. Michael M. Walker, University of Hawaii graduate student, is continuing histological studies to identify the nerves innervating the suspected magnetic receptor organ in yellowfin tuna, Thunnus albacares.

Research assistant Martina K.K. Queenth is continuing behavioral experiments to determine if kawakawa, Euthynnus affinis, can detect changes in the earth's magnetic field. Of the two fish tested so far, only one has shown a weak and inconsistent ability to discriminate changes in the magnetic field. In other behavioral experiments Dr. Kim Holland, Hawaii Institute of Marine Biology, University of Hawaii, has completed a series of odor preference tests on kawakawa. The prey-odor-preference hierarchy of kawakawa appears to be different from that of yellowfin tuna in that kawakawa respond equally well to all the prey odors tested. Further odor testing with yellowfin tuna and bigeye tuna, T. obesus will be continued.

Dr. Brill continued a series of experiments on the standard metabolic rate, i.e., metabolic rate at zero overt muscular activity, and the effect of temperature on the standard metabolic rate of skipjack tuna, Katsuwonus pelamis, yellowfin and bigeye tunas, and kawakawa. Results so far show that the standard metabolic rate of all four species are similar, but unlike the active metabolic rate, is temperature dependent.

Thomas K. Kazama, Fishery Biologist, has been continuing experiments to test the effect of thyroxine on survival and growth of larval mahimahi, Coryphaena hippurus. Techniques developed in these experiments should be useful for larval skipjack tuna rearing experiments scheduled for this summer. Sharon D. Hendrix, University of Hawaii graduate student, has been continuing an analysis of otoliths from laboratory reared larval mahimahi. Preliminary examinations have shown that the otoliths from fed larvae are larger than those from starved fish. Therefore, otoliths may provide a means of assessing the condition of larvae collected from wild populations.

Lt. (jg) J. Scott Ferguson, NOAA Corps, reports that the rewiring of the 12- and 120-V electrical systems on the RV Kaahele'ale is now nearly complete. The remaining work should be completed in time for the tuna tracking project scheduled to begin in July.

DATA MANAGEMENT AND TECHNICAL SERVICES

Word Processing System Changeover Completed

Fletcher V. Riggs, Chief of the Data Management and Technical Services (DMTS) reports that the transition of word processing operations from the East-West Center's (EWC) PDP-11/70 (using WORD-11) to the Honolulu Laboratory's new Molecular microcomputer (using WordStar) has been completed. Connections with the EWC system were terminated on April 2. During the week before April 2 all word processing documents on the EWC system which were incomplete or for other reasons required preservation were copied to 9-track magnetic tape. In addition, those documents requiring immediate transfer to the new system were also copied to 8-inch floppy diskettes. At the same time a general introduction and software training session was conducted at the Laboratory by QSA, the distributor of the system.

Hence, the Honolulu Laboratory began April with a new word processing system, and the remainder of the month was spent adjusting to the new system. Various changes were made on the Mime-2A and Digital VT100 CRT's as well as the NEC Spinwriter 7720 to meet new communications protocol requirements, and special patches had to be installed in the WordStar program to successfully use the VT100 CRT. The general response of the Honolulu Laboratory clerical staff to the new system and WordStar has been favorable.

A major item which still requires further attention is the incorporation of files transferred from the EWC system (running under RSTS/E) into the new Honolulu Laboratory system (running under CP/M) in a form readily usable by WordStar. The problem of transferring files between different computers (and operating systems) on 8-inch diskettes has been solved through the development of software for the molecular system to read diskettes written in the IBM 3740 Standard Data Exchange format. Whereas the transferred files are usable by WordStar, they still require considerable modification before full advantage can be taken of its text processing features. Software is currently being developed to transform these files into a more compatible format.

Other DMTS development projects which are currently underway or scheduled for the very near future are the installation of a Cipher Data Unit 9-track tape drive for Molecular system backup and data transfer purposes, installation of additional software and documentation on the Molecular for expanded use of the system beyond word processing, establishing a 3780 communications link between the Mohawk data entry system and the University of Hawaii IBM 370, and the addition of a DEC LA120 terminal as a second system printer for the Molecular.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

COASTAL EASTERN PACIFIC POPULATION BIOLOGY OF FISHES

Sardines Return to the La Jolla Laboratory After 10 Years

Fishery biologist Dr. John Hunter reports that fishery biologist Roderick Leong has received a shipment of live California sardines caught by Roy Everingham. The fish have been stocked in the Marine Aquarium at the Southwest Fisheries Center. These are the first sardines that have been available for research at the La Jolla Laboratory for more than 10 years.

Leong plans to bring the sardines into reproductive condition by manipulation of water temperature and day length, and to spawn them using hormone injections. The first experiment planned after spawning has become routine will be to establish histological criteria for ageing the post-ovulatory follicles, and assess classification accuracy. This analysis is essential to the estimation of spawning biomass of sardines by the egg production method, a technique which will be employed when the population increases to a size at which population estimation is practical. Long-term work will also involve comparative ecological studies on sardine and anchovy larvae.

Research on White Seabass larvae Continues

The brood stock of white seabass maintained by Roderick Leong, Fishery Biologist, has spawned 19 times since January 5, 1983. Spawning is cyclic, with the fish in one holding tank spawning at about 2-week intervals. The size of the spawning batch is about 1×10^6 eggs per female per spawning.

A succession of the spawning batches of white seabass is being reared and various basic culture and ecological data collected. Research on culture technology is currently being conducted as part of a Master's project by Refik Orhun, a San Diego State University graduate student. At present, hundred of post-metamorphic juvenile white seabass which have been reared from eggs are being maintained in the aquarium for research on juvenile growth rates.

In related work, fishery biologist Carol Kimbrell has just completed three experiments on the efficiency of yolk absorption by white seabass larvae. Larval white seabass were sampled at 12-hour intervals for a period of 80 to 120 hours, depending on temperature. At each sampling interval, groups of larvae, some of which had their yolk sac removed and others with the

yolk sac present, were weighed, and the rates of yolk utilization and embryonic growth estimated by regression analysis (r^2 for the regressions ranged from 0.91 to 0.99). The ratio of the slopes of the regression equations are a measure of the efficiency of yolk utilization on a mass basis and will be converted to caloric efficiencies at a later date. The results were as follows:

15°C - 80% efficiency
17°C - 73% efficiency
19°C - 72% efficiency

These studies represent the initial step in collection of essential early life history data on this valuable commercial and recreational fish.

Myoglobin Concentration May Indicate Activity Level

Sandy Kaupp, Staff Research Associate from the University of California, San Diego, working with fishery biologist Dr. John Hunter, has recently reviewed the results of one aspect of their continuing investigations of the energetics of swimming anchovies a study on changes in red muscle myoglobin concentration with conditioning. Fresh from the field (average standard length of about 10 cm), 1000 northern anchovy were forced to swim at approximately 0.9 body length per second (BL/S) for 6 hours a day for 6 weeks in the swimming flume at the Southwest Fisheries Center's La Jolla Laboratory. The duration and intensity of swimming were then increased to 8 hours for 5 weeks, then to 10 hours for 1 week, and to 1.2 BL/S. During the entire 3 months of swimming, the fish were fed enough to incur slight growth; the fish grew very little in length, although their weight per unit length did increase considerably.

The fish from the field had a red muscle myoglobin content of 37.4 mg/g w. wt. of red muscle (95% C.I. $\pm$ 20.3; n=70). This was maintained with the 6 hours a day of exercise, i.e., 33.5 mg/g w. wt. (95% C.I. $\pm$ 16.8; n=25; no change was seen during the 6 week period). This concentration of myoglobin increased two fold with the increased duration and intensity of forced swimming to 8 or 10 hours per day, i.e., 76.4 mg/g w. wt. red muscle (95% C.I. $\pm$ 19.7; n=23), again, there were no differences seen from 1.5 weeks after the transition to the longer period of forced swimming and the cessation of forced swimming. Fifty-five days after the cessation of forced swimming four fish were analyzed; the concentration of myoglobin had decreased to the original levels present when the fish were taken from the field, 41.2 mg/g w. wt. (95% C.I. $\pm$ 44.7; n=4). Thus, the aerobic activity level of the fish appears to dictate the myoglobin level maintained in the red muscles of the nothern anchovy.

The results indicate that the myoglobin concentration in the red muscles may be a useful index of the activity level sustained by fish in the sea. If this conclusion is substantiated by further tests, it may be possible to use myoglobin concentration to estimate past activity levels and thereby construct an activity budget for sea-caught fish. This would be of great value in assessment of the ecological relations of the anchovy populations.

California Current Velocities Estimated

National Research Council research associate James Power has been working on development of estimates of surface current velocities in the California Current for the larval anchovy drift simulation model. The current estimates are being derived from three types of data: seasonal mean dynamic heights at 166 stations and standard depths in the CalCOFI grid have been obtained from oceanographer Larry Eber. These data are used to compute geostrophic velocity estimates, and are the same data used in preparing the Lynn et al. CalCOFI Atlas No. 30. The raw CalCOFI hydrographic data has also been obtained from Larry Eber, and means have been computed for an additional 23 stations not included in the Lynn et al. summary. The simulation model will have a grid spacing of 20 nautical miles, and since the CalCOFI grid (and Eber data) is coarser than this it is necessary to interpolate to a finer grid.

Considerable effort was spent in investigating the technique of orthogonal polynomials in several variables, which could be used to generate a predictive equation yielding dynamic heights at grid nodes as a funcion of CalCOFI line and station. Dr. Power believed that such an approach, which takes into account the two-dimensional trend of the dynamic height surface, would yield good estimates at all grid nodes. The multivariate orthogonal polynomial software was developed, and while the predictive equation reproduces the observed data exactly, estimates computed at other grid points give anomalous results. This appears to occur because of the regular spacing of the CalCOFI data and the lack of any constraints on the polynomials. The literature on orthogonal polynomials indicates that the polynomials can be constrained to avoid this problem (by specifying values and derivatives at specific points), but because the possible results and benefits of such an approach are uncertain the effort has been abandoned. Work is proceeding on a linear interpolation approach.

Raw data of north and east wind observations have been provided by Commander Craig Nelson of the Pacific Environmental Group. These data have been partitioned by month, and the software has been written to compute means, standard errors, and sample sizes of east and north wind stresses and friction velocities at each of the model's grid interfaces. The wind stress estimates are used to compute the Ekman drift volume transport, and the friction velocities can be used to estimate the depth of the Ekman layer, so that mean velocity estimate for the Ekman layer can be computed.

Ship's drift data have also been provided by Nelson. These data are being summarized (means, etc.) in a way similar to the wind data, and will be used for comparative purposes.

All wind stress and ship's drift computations have been completed for April data, and the results are being examined to determine the best way to combine the data into a good estimate of the average April surface current velocities in the California Current.

COASTAL EASTERN PACIFIC FISHERIES ENVIRONMENT INVESTIGATIONS

Albacore Longline Fishing Report Completed

Five chartered fishing vessels with fishery biologists Ron Dotson and Bob Nishimoto and biological technician Dimitry Abramenkoff on board conducted exploratory operations for albacore tuna in an area approximately 1000 to 2000 miles west of Pt. Arguello, California, during November-December 1982. A total of 96 longline sets was made on the survey. Each of the vessels typically set 800 to 1400 hooks at targeted depths of 250 to 300 feet in and about the thermocline. A total of 51,377 pounds of albacore and 2,783 pounds of bigeye and yellowfin tuna were caught. Approximately one-third of the total albacore landings (by weight) were fish taken on trolling gear (mostly in transit to the longline fishing areas). Individually, the vessel landings ranged from 8,276 to 14,255 pounds of all tunas combined. Daily longline catches ranged from 0 to 84 albacore per vessel. The mean catch rate of albacore for all vessels was about 1.5 fish/100 hooks (1.6 if other tunas are included). The average catch rate among vessels ranged from about 1.0 to 2.9 albacore/100 hooks.

There was a significant loss of fish due to tangled gangions and/or lost hooks by some vessels. The loss of fish due to tangled gangions, approximately 20% of one vessels's catch, is believed to have resulted from the use of "fixed" gangion type of longline gear. Vessels using snap-on gangions with swivels experienced only about a 5% fish loss due to tangles. The fish loss due to lost hooks, 25 and 29% of the catch for two vessels, was traced to slghtly oversized nicropress sleeves used in attaching hooks to the gangions which allowed the monofilament nylon gangion material to pull out and the hook to be lost.

Experiments showed that higher catch rates were made using 400 pound test monofilament nylon line for main line than 1/4-inch polypropylene line. The mean catch rate for 17 sets (1085 hooks) using monofilament nylon was 4.2 fish/100 hooks and for 17 sets (9363 hooks) using polypropylene was 2.6 fish/100 hooks.

Measurements of the amount of sag in the longline gear after it has been set showed that there may be considerable sag in the main line - as much as 25% of the main line length between floats. Because of the excessive sag, it is believed that the majority of the hooks on most sets fished below the targeted depth of the thermocline where it has been recently shown that albacore generally reside.

Inclement weather conditions drastically reduced effective fishing effort. During the survey the winds were in excess of 20 knots for 53% of the days the vessels operated. On a number of days the winds exceeded 45-50 knots. Most of the rough seas and high winds were associated with Hurricane Ewa, the first hurricane to hit the Hawaiian Islands since the early 1950's. The path followed by Ewa passed over the area where the exploratory albacore longline operations were planned. This prevented vessels from operating in the planned area except for 7 days. Albacore catch rates during the limited days

that the boats were able to operate in the targeted area averaged over 4 fish/100 hooks as opposed to about 1 fish/100 hooks on other days. The rough weather conditions also limited the amount of gear that the fishermen could fish effectively. In addition, adverse weather conditions prevented acoustic tracking experiments by NMFS scientists to investigate the swimming depths and ocean temperature relationships of albacore during the longline survey.

COMMERICAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT

Second Draft of Anchovy Management Plan Prepared

The second draft of the revised Anchovy Management Plan prepared this month by industry economists Dan Huppert and Cynthia Thompson and fishery biologists Alec MacCall and Richard Methot was distributed to the Pacific Fishery Management Council and its committees on April 15, 1983. The major changes in this draft deal with the economic analysis of the proposed regulations and inclusion of material that make the draft document appropriate as an Environmental Impact Assessment and Regulatory Impact Review.

Pelagic Beam Trawl Proposal Studied

On April 20, John Lund and Henry Shek, Engineers with the Pacific Marine Center in Seattle, Washington, met with personnel from the Southwest Fisheries Center and the NOAA research vessel, David Starr Jordan, to discuss a new sampler proposed by fishery biologist Dr. Paul Smith.

The sampler is to have a heavy rigid frame with a 2 m by 4 m mouth opening and a net constructed of 6 mm mesh. It will be towed from a boom mounted near the bow of the vessel. From this position, the bottom, mid-depth, and surface all can be sampled without having to tow the sampler in water severely disturbed by the towing vessel. The major points discussed at this meeting concerned vessel safety and methods of handling a net frame that will weigh over 1 ton. It was decided that preliminary deployment of the sampler should be from the fantail of the vessel. This will greatly ease handling of the sampler and will enable further engineering data to be collected before modifications to the bow of the vessel are made.

La Jolla Biologist Attends FAO Meeting in Costa Rica

Fishery biologist Alec MacCall attended a Food and Agriculture Organization (FAO)-sponsored "Expert consultation to examine changes in abundance and species composition of neritic fish stocks" held April 18-29 in San Jose, Costa Rica. During the first week 65 papers were presented, representing a wide variety of resource and management experiences from about 20 countries. During the second week, four working groups were convened to review biological, physical, socio-economic, and management aspects of variability. Reports of the working groups are nearly complete and will be

published by FAO. The papers presented at the consultation will be published by the IOC (Intergovernmental Oceanographic Commission).

Oceanic Fisheries Resources Division

MARINE MAMMAL ASSESSMENT

Determination Made of Relative Dolphin Species Proportions in the ETP

Drs. Jay Barlow and Rennie Holt, Operations Research Analysts, have been examining dolphin sighting data in order to determine the relative proportions of the various species found in the eastern tropical Pacific (ETP). This information will be used to prorate the estimates of total dolphin abundance in order to obtain population sizes. Populations sizes are, of course, necessary for determining the status of the populations, as well as for the estimation of sustainable incidental harvests.

As has been noted by others, Barlow and Holt have found differences in the species compositions observed from tuna and research vessels. Tuna vessel observers typically record more observations of spotted dolphins and fewer observations of striped dolphins, possibly due to many factors, including differences in areas searched, differences in search patterns, or even random sighting error. A relatively new statistical procedure known as a "bootstrap" was employed to determine whether the species composition observed from these two observation platforms are significantly different. Preliminary results have shown that the differences between tuna and research vessel sightings are unlikely to have arisen by random error. Work in progress is designed to determine which of these data sources can be considered more reliable.

Biased Mortality Rates Examined in Marine Mammals

Operations research analyst Jay Barlow has also been investigating how lack of precision in age estimation may be affecting estimation of mortality rates. Mortality is frequently calculated from a population's age frequency distribution. Studies underway in the marine mammal group are determining the age distributions of spotted and spinner dolphins from tooth layers. Barlow's study was prompted by the observation of variability between tooth readers and within replicates by the same reader (work of operations research analyst Steve Reilly, zoologist Aleta Hohn, and wildlife biologist Al Myrick). The problem of lack of precision in age determination is not, of course, limited to dolphins, so this study is of general value in mortality estimation for fish, whales, pinnipeds, and terrestrial mammals.

In a manuscript being prepared for publication, Barlow considers a limited set of conditions: constant mortality with age, unbiased age

determinations, and variability in age estimation that increases with age. Given these conditions, he shows the Chapman-Robson mortality estimator to be biased only when the first age class(es) are excluded. Figure 1 depicts the magnitude of bias for a range of survival rates. In general, when survival rates are high (low mortality, such as with dolphins) the bias will tend to be small.

Although the Chapman-Robson mortality estimator is unbiased when all age classes are included, this would not be true for other methods. In particular, methods that estimate age specific survival rates are likely to give a distorted view of how mortality varies with age.

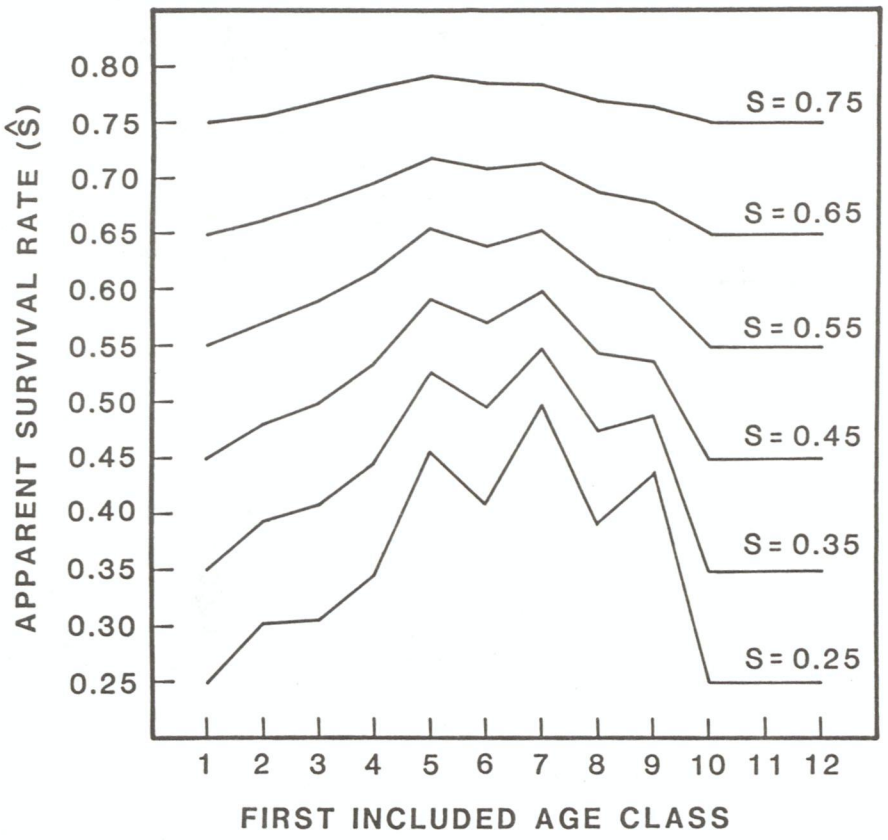


Figure 1: Apparent survival rates from the Chapman-Robson method as a function of the first age class to be included in the estimation. Each line represents a different value of the true survival rate, s. Errors in age determination are given in the manuscript by Barlow.

R/V David Starr Jordan Returns from
Cruise to the South Pacific

On April 13, the NOAA Research Vessel David Starr Jordan returned from a marine mammal survey cruise to the central and south Pacific. The cruise which departed San Diego on January 12, called at Callao, Peru (LEG I) and Papeete, Tahiti in French Polynesia (LEG II), returning to San Diego, April 12 (LEG III). Fishery biologist Dr. Wes Parks was Chief Scientist for the cruise and Cruise Leader for LEGS II and III. Operations research analyst Dr. Jay Barlow was Cruise Leader on LEG I. Porpoise observers James Cotton, Jack Doxey, Michael Graybill, Michael Henry, Robert Pitman, Gregory Yee, all from the SWFC, and Michael Marsh of SIO, participated on all three legs of the cruise.

The survey area is approximately the southern boundary of the tropical tuna/dolphin fishery in the eastern Pacific Ocean and roughly coincident with the southern boundary of the known ranges of stocks of dolphin associated with this fishery. To enable comparison of data collected from the survey area to data from more northern areas and to data collected in previous years, density, size and species composition of dolphin schools in the central area of the fishery (the "calibration area") was also surveyed.

The survey was conducted by maintaining a visual watch using two 25-power binoculars mounted on the two sides of the flying bridge of the Jordan. The binoculars were mounted on pedestals at a height of approximately 35 feet above the water giving a maximum ship-to-horizon sighting distance of approximately 6 nautical miles.

Two teams, made up of three observers each, stood watch, rotating 2 hours on and 2 hours off watch. During a watch the three team members rotated every 15 minutes among positions at the port binocular, the starboard binocular and the recorder station. The observer at the port binocular was responsible for surveying the area between 0 and 90° left; the observer at the starboard binocular for the area between 0 and 90° right. Watch was maintained during daylight hours (approximately 0600 to 1800) during all non-rain weather conditions.

On sighting a school of marine mammals certain information describing the sighting was recorded (e.g., time and position of the vessel, values of environmental parameters at the time of sighting, sighting cue and bearing and distance to the school). The bearing from the vessel to the sighted school was recorded by both the recorder as read by the observer from the azimuth ring on the binocular mount and by a computer (the Computer Assisted Sighting Technique (CAST) system) from a bearing encoder housed in the mount. Distance to the sighted school was recorded by the recorder as a reticle distance read from a reticle mounted in the binocular eyepiece.

Once a dolphin school had been sighted and tracked for approximately 5 minutes the Jordan diverted from the survey track line and approached the school whereupon estimates of school size and species composition were made.

The second objective of the cruise was to investigate sighting methodology including testing the CAST system and gathering information on the effects of watch length on results of sighting. The CAST system, recently developed to more precisely measure bearing to a sighted school, was tested. CAST records the bearing to a sighting as read by an encoder in the binocular mounts. CAST converts bearing into a compass direction using information from the ship's gyro compass and corrects this direction for vessel pitch and roll using information from a pitch and roll sensor. In addition, CAST keeps extensive tape records of binocular bearing by binocular position, date and time and records the identities of personnel at the three watch stations.

The third objective of the cruise was to gather data on the effect of porpoise avoidance of vessels. For this part, the NOAA research vessel, Surveyor, with its helicopter was used to observe porpoise school response to the approaching vessels. Results from this portion of the cruise will be reported at a later date.

Gathering data on the effect of watch length, begun on previous marine mammal cruises, continued during LEG I. Preliminary analysis of data previously gathered suggested that a 2 hours on, 2 hours off rotation of teams was optimum. To confirm this finding, watch lengths were varied among 1, 2, and 3 hours. For 1 and 2 hour periods observers rotated between watch stations (port binocular, starboard binocular, and recorder) every 15 minutes. For the 3 hour watch length observers rotated every 30 minutes.

Preliminary calculation indicates that 343 schools of marine mammals, containing an estimated 13,011 animals, were sighted. Of total schools sighted, 50% were seen on LEG I, 16% on LEG II and 34% on LEG III. Seventy-two percent of all schools sighted (248 schools, estimated 12,739 animals) contained dolphin (Table 1). An additional 24% (82 schools, 205 animals) were of whales and 1% (3 schools, 3 animals) were of pinnipeds (Tables 2 and 3). Of the total, 3% of schools sighted were of undetermined identity.

The CAST system is a continuing developmental project and, as such, was not expected to operate flawlessly throughout the entire cruise. Indeed, difficulties with system software developed immediately prior to the start of the cruise, delaying the Jordan's departure for 2 days. Anticipating possible difficulties with CAST and anticipating that these difficulties were most likely to occur on the middle leg of the cruise, an electronics technician boarded the Jordan for LEG II to maintain the system as necessary.

Scientific crew pose on deck of Jordan. From left: Bob Pitman, Mike Henry, Greg Yee, Mike Graybill, Jack Doxy, and Jim Cotton. In the foreground is Dr. Wes Parks, Cruise Leader. Missing from this photograph are Jay Barlow and Mike Marsh, scientists who also participated in the Jordan cruise.

Table 1. Preliminary summary statistics of sightings of marine mammal schools containing dolphins (order cetacea, suborder odontoceti, family delphinidae), Cruise DS83-01.

School type	Species	Leg 1		Leg 2		Leg 3		Total	
		Number of		Number of		Number of		Number of	
		schools	animals	schools	animals	schools	animals	schools	animals
Pure dolphin	*Delphinus delphis*	20	2285	2	951	8	1111	30	4347
	Globicephala macrorhynchus	5	56	1	1	0	0	6	57
	Grampus griseus	14	118	3	16	4	19	21	153
	Lagenorhynchus obliquidens	2	18	0	0	3	20	5	38
	Orcinus orca	0	0	0	0	1	2	1	2
	Peponocephala electra	0	0	0	0	2	97	2	97
	Pseudorca crassidens	0	0	1	1	0	0	1	1
	Stenella attenuata	9	635	6	418	7	353	22	1406
	S. coeruleoalba	16	1056	3	154	4	169	23	1379
	S. longirostris	3	216	0	0	7	365	10	581
	Steno bredanensis	4	20	0	0	2	11	6	31
	Tursiops truncatus	8	82	3	22	3	58	14	162
	Unidentified delphinid	34	240	17	145	18	278	69	663
	Total	115	4726	36	1708	59	2483	210	8917
Mixed dolphin	*Delphinus delphis* + *Stenella coeruleoalba*	1	139	0	0	0	0	1	139

Table 1. Continued

School type	Species	Leg 1 Number of schools	Leg 1 Number of animals	Leg 2 Number of schools	Leg 2 Number of animals	Leg 3 Number of schools	Leg 3 Number of animals	Total Number of schools	Total Number of animals
	D. delphis + *G. griseus*	2	225	0	0	0	0	2	225
	D. delphis + Unidentified delphinid	1	10	0	0	0	0	1	10
	D. delphis + *L. obliquidens* + *S. attenuata*	1	393	0	0	0	0	1	393
	G. macrorhynchus + *T. truncatus*	5	118	1	12	0	0	6	130
	G. griseus + *T. truncatus*	1	93	0	0	0	0	1	93
	G. griseus + Unidentified Delphinid	1	10	0	0	0	0	1	10
	S. attenuata + *S. longirostris*	6	573	0	0	13	2039	19	2612
	S. attenuata + *T. truncatus*	0	0	0	0	1	40	1	40
	S. coeruleoalba + *T. truncatus*	1	102	0	0	0	0	1	102
	S. bredanensis + *T. truncatus*	0	0	0	0	1	11	1	11
	Total	19	1663	1	12	15	2090	35	3765
Total	Dolphin	134	6389	37	1720	74	4573	245	12682
Mixed dolphin and other marine mammals									
	D. delphis + *Megaptera novaeangliae*	0	0	0	0	1	19	1	19
	T. truncatus + *M. novaeangliae*	0	0	0	0	1	22	1	22
	T. truncatus + *Physeter macrocephalus*	1	16	0	0	0	0	1	16
	Total	1	16	0	0	2	41	3	57
Total all schools with at least some dolphin		135	6405	37	1720	76	4614	248	12739

Table 2. Preliminary summary statistics of sightings of marine mammal schools containing cetacea other than Delphinids, Cruise DS83-01.

Sub-order	Family	Species	Leg 1		Leg 2		Leg 3		Total	
			Number of		Number of		Number of		Number of	
			schools	animals	schools	animals	schools	animals	schools	animals
Mysticeti	Balaenopteridae	*Balaenoptera edeni*	0	0	1	2	2	2	3	4
		B. musculus	0	0	0	0	1	12	1	12
		B. species	0	0	2	3	0	0	2	3
		Megaptera novaeangliae	0	0	0	0	1	2	1	2
		Unidentified	0	0	1	1	2	3	3	4
		Mixed *B. musculus* + *M. novaeangliae*	0	0	0	0	1	5	1	5
		Total	0	0	4	6	7	24	11	30
	Eschrichtidae	*Eschrichtius robustus*	4	32	0	0	1	1	5	33
		Total	4	32	4	6	8	25	16	63
Odontocete	Physeteridae	*Kogia simus*	0	0	0	0	7	9	7	9
		K. species	0	0	0	0	3	5	3	5
		Physeter macrocephalus	3	17	7	33	4	14	14	64
		Total	3	17	7	33	14	28	24	78
Unidentified whale			28	34	4	5	9	13	41	52
Mixed *B. musculus* + Unidentified W			0	0	0	0	1	12	1	12
Total			35	83	15	44	32	78	82	205

Table 3. Preliminary summary statistics of sightings of marine mammal schools other than those in the order Cetacea, Cruise DS83-01. All schools were in the order Pinnipedea.

Species	Leg 1		Leg 2		Leg 3		Total	
	Number of		Number of		Number of		Number of	
	schools	animals	schools	animals	schools	animals	schools	animals
Mirounga angustirostris	0	0	0	0	1	1	1	1
Zalophus californianus	0	0	0	0	2	2	2	2
Total	0	0	0	0	3	3	3	3

In cooperation with NOAA's Atlantic Oceanographic and Meteorological Laboratories (AOML) and the University of California's Scripps Institution of Oceanography (SIO) and in support of future marine mammal/environment analyses, a greater than usual number of environmental observations were made. This extra effort was aimed at gathering data on the anomalous warming of the eastern tropical Pacific Ocean (El Niño). AOML provided computer assisted XBT data recording equipment and additional XBT probes. SIO provided the services of a technician to make and record the extra observations. As weather permitted, observations were made every 6 hours. Specific observations made included vertical temperature (XBT), surface temperature and salinity, surface chlorophyl content, wind speed and direction, swell height and direction and cloud type and degree of cover. Results include 307 observations of vertical and surface temperature, surface salinity and meteorological features and 336 discrete chlorophyl measurements.

MARINE MAMMAL BIOLOGY PROGRAM

Scats Evaluated as Indicators of Sea Lion Food Habits

The potentially competitive relationship between marine mammals and commercial fisheries has generated an interest in the feeding habits of marine mammals. In the case of the California sea lion, scat (fecal) samples provide an accessible and abundant source of food habit information. The remains in the scats of the hard parts of prey (i.e., fish otoliths or squid beaks) can usually be identified to species and used to determine their percentage contribution to the sea lion's diet. Current work by the staff of the Coastal Marine Mammal project involves collecting and analyzing scat samples from San Clemente Island, San Nicolas Island, and beginning this summer, Santa Barbara Island.

The manner in which food items in the diet are enumerated must be carefully chosen to avoid misleading results. Diet can be quantified either by numbers of prey or volume of prey. When scats are analyzed, number of hard parts or biomass estimates of the prey species could be used. Previous food habit studies based on scat samples have used number, but biomass estimates can also be made by converting, with a regression equation, hard part size measurements into body weight of the prey. Although estimates based on number are easier to obtain, biomass estimates are better indicators of prey importance since they more closely reflect, given similar caloric densities, the relative energetic contribution to the sea lion's diet. Though biomass is the more desirable parameter, if the individuals from the different prey species have similar weights, prey species' importance based on both biomass and number should give similar results. If this is the case, number can be used as an accurate estimator of importance and it is the easiest to obtain. If, however, the prey species are different sizes then enumeration by number can produce a misleading value by overemphasizing the importance of small prey items. Other possible sources of error must also be evaluated. Factors which may cause an underestimate of number and/or biomass and include complete

digestion, partial digestion, and regurgitation of fish otoliths or squid beaks.

Multispecies Stock Assessment Project Started

A new task was started this fiscal year in the Oceanic Fisheries Resources Division, whose purpose is to examine the feasibility of a multispecies approach to the management of upper trophic level pelagic populations of the eastern Pacific, and to conduct related research. Activities this first year are progressing on a modest level, with no permanent staff assigned full-time to the task. Dr. Steve Reilly, Operations Research Analyst, is coordinating the task's activities with advice from biological technician Lisa Ankenbrandt and fishery biologists David Au, Norman Bartoo, Andrew Dizon, and John Graves and operations research analyst Rennie Holt and Jay Barlow of the Oceanic Division and fishery biologist Richard Methot of the Coastal Division and Robert Olson of Inter-American Tropical Tuna Commission. John Hedgepeth, Biological Technician, was recently hired for the task.

Available information suggests that squids are an abundant and ecologically important resource in the oceanic eastern Pacific. However, very little is known on the details of squid population biology, primarily because they are not easily accessible to traditional fisheries research methods. The task is focusing, in part, on squids this year, to assemble available information, and investigate feasible avenues to address management-related issues. In the processes we hope to learn more about squids as a resource, and as an important component of upper trophic level dynamics. Various modeling efforts are in progress or planned as means of integrating available data and developing insights.

Among other specific activities, John Hedgepeth is preparing an annotated bibliography on squid assessment worldwide and distribution/abundance in the eastern tropical Pacific. When this is complete, he and Steve Reilly will produce a review paper on squid assessment, with reference to applications for the oceanic eastern Pacific.

Squid sampling gear is being assembled and tested on an opportunistic basis. The Honolulu Laboratory generously loaned two commercial squid jigging machines. Jay Barlow obtained 13 new weatherproof, high intensity flood lamps from Defense Department surplus, free of charge. These will be installed on the research vessel, Jordan, and tested on a piggy-back basis during the coastal marine mammal and albacore cruises this summer.

While it is probably premature to plan on quantitative results from squid jigging during this summer's albacore cruise, Steve Reilly and Norman Bartoo will take the opportunity to compare the composition of squids captured by the automatic jigging machines to stomach contents of albacore and other fishes captured in the experimental gillnets, and by the line jigs. Stomach contents of the squids will also be examined.

Lt. Douglas Hennick of the NOAA Corps will be attached to the multispecies task for the summer. Lt. Hennick will address the operational aspects of sampling for squids using platforms and equipment now or potentially available to the SWFC, i.e., the David Starr Jordan jigging machines, gillnets, sonar, etc. He is also interested in the potential for a photometer system for squid censusing, and will investigate possibilities along those lines.

Lisa Ankenbrandt is summarizing the food habits of tunas in the eastern tropical Pacific, with special reference to cephalopods. In cooperation with Robert Olson of IATTC, Ankenbrandt is summarizing published and unpublished data, the later from stomachs collected by the IATTC.

Andrew Dizon and John Graves are examining the feasibility of using the mtDNA technique for study of squid populations. If a pilot study in progress proves positive, they will go on to examine the relatedness of Dosidicus gigas from the northern and southern parts of their range.

Sea birds are major consumers of squids, and are often seen in association with tunas and cetaceans. Current plans are to have a contractor prepare an atlas of sea bird distribution in the eastern tropical Pacific. The atlas will be based on data collected on 12 cruises to the area, amounting to over 2-1/2 years at sea, during which bird sightings data were systematically collected.

Steve Reilly is investigating the relationships of large-scale patterns of cetacean distribution and environmental conditions. To represent the environment, summaries of 16 variables by 1° squares/months have been prepared under contract by Roger Baur of Compass Systems, Inc., of San Diego, California. The area covered by the master file delivered includes the entire Pacific between 50°N and 30°S. The data were extracted from files compiled by the Navy Fleet Numerical Weather Central in Monterey. To include multivariate analyses of cetacean distribution, Reilly has selected a window of data covering roughly the eastern tropical Pacific. The cetacean data have been collected during research and tuna vessel cruises over the past 10 years. As the modeling effort progresses and data become available, future analyses may include distribution and abundance data on fish, birds, and other upper trophic level taxa.

Dr. Elizabeth Vetter of the University of Georgia is planning to join the task this summer as a National Research Council/NOAA Fellow. Dr. Vetter, a Systems Ecologist, plans to conduct a modeling study on comparative bioenergetics of tunas and porpoises of the mixed species aggregations of the ETP. Two structurally similar mathematical models will be developed to describe the comparative bioenergetics of the tunas and porpoise. Each model will combine physiological and behavioral information with data (from comparative studies where necessary) on activity levels, feeding preferences, stock densities and environmental conditions. Model outputs will include estimates of the total energy flux required by each group to maintain various growth rates and stock densities, and perhaps include the relative caloric input values from components of the forage base. As new data become available, model parameter estimates can be refined without altering the basic structure of the models. Thus the utility of the models will be unrestricted

by the existing data; as the data base grows, the information can be used without reconfiguring the models.

TUNA AND BILLFISH RESOURCES PROGRAM

Sample of Cetacean Tissue Obtained for mtDNA Analysis

Fishery biologist Dr. Andy Dizon and National Research Council research associate Dr. John Graves this month continued their work on stock analysis, using a technique in which mitochondrial DNA (mtDNA) is examined as a measure of relatedness.

In order to use mtDNA as a tool for measuring genetic relatedness of individuals and stocks, one must either purify mtDNA (1%) from the nuclear DNA (99%) directly or resort to a more complicated method which enables visualization of the mtDNA against a background of nuclear DNA. The disadvantage of the former method is that it requires very fresh specimens. However, the latter method requires that some purified mtDNA be used to act as a hybridization probe to bond with the sample mtDNA. The probe mtDNA can be from a closely related form. For instance, for the tuna investigations, hybridization probes from Pacific mackerel mtDNA are used.

In addition, purified mtDNA from a cetacean is required to prepare hybridization probes for Stenella population studies. But fresh or fresh frozen cetacean tissue is difficult to obtain. However, fishery biologist Larry Hansen of the Coastal Marine Mammal Program was able to obtain a limited quantity of liver for testing from a stranded common dolphin who died on the beach.

In addition, Barbara Kuljis, a marine mammal biologist from Hawaii, was able to arrange collection and shipment of a pilot whale placenta from Sea Life Park, Inc., Hawaii. Kuljis and Ingrid Kang, Sea Life Park, have been monitoring the Park's collection of cetaceans for this eventuality for the last 4 months. Normally no attempt is made to retrieve the placenta until perhaps days after the birth. Due to the cooperation and alertness of Park personnel and Kuljis, the pilot whale placenta was collected and frozen within an hour of its expulsion.

Manuscript Submitted on the "El Niño" Episode

Due to the interest in the abnormal warming in the eastern tropical Pacific, or El Niño episode, and its effects on the waters off California, a manuscript was prepared which reviews the results of previous, similar events on the local fisheries. The manuscript, "Warm water and southern California recreational fishing: a brief review and prospects for 1983", by fishery biologist Jim Squire, was accepted for publication in Marine Fisheries Review.

Recreational fishermen can expect to see changes in both the type and abundance of fish available off the southern California coast and further north, if current conditions persist. Squire recently examined historical records of fish catches from the years prior to, during, and following El Niño which occurred in 1957-58, 1972-73, and 1976-77. Squire believes that if conditions similar to those of 1957-58 continue to develop off the northeast Pacific coast, anglers can expect:

- Catches of yellowtail should increase substantially.
- Catches of Pacific barracuda will increase in 1983.
- Because the stock size of the white seabass is currently quite low, the total number of fish caught in 1983 will likely remain small, although El Niño conditions may bring a slight increase in catch.
- The recreational albacore fishery will probably see a decline in catch if the influence of El Niño remains evident during the summer and fall of 1983.

Squire also points out that if El Niño conditions persist, tropical fish species may begin to appear off the California coast.

Billfish Newsletter Issued

The 1983 Billfish Newsletter was issued to all billfish anglers tagging and releasing billfish and to those responding to the 1981 Pacific Billfish Angler Survey. The 1982 Survey forms were distributed with the Newsletter and are now being returned. The survey forms will also be mailed, with the International Game Fish Association newsletter "Marine Angler."

Data Files Obtained from International Commission for the Conservation of Atlantic Tunas

The staff of the Multi-species Data Management and Fisheries Monitoring Program received a number of data files from the International Commission for the Conservation of Atlantic Tunas (ICCAT) during this past month: 1) Japanese longline catch and effort data for the Atlantic in 1981, which have been keypunched and edited; 2) revised French - Ivory Coast - Senegalese catch and effort data for 1969 to 1981, and revised Spanish catch and effort data for 1978 to 1981, which are currently being analyzed by program leader Al Coan; 3) five tapes of length frequency data for yellowfin, skipjack, albacore, and bigeye tunas, which have been converted to NMFS format and are being added to our data bases (making them as extensive as ICCAT's data bases for those four species) by biological technician Tod Foster.

Port Sampler Visits Southwest Fisheries Center

Biological technician Eugene Holzapfel, who conducts the NMFS Atlantic tuna import sampling program in Mayaguez, Puerto Rico, visited the Southwest

Fisheries Center during the week of April 4. Holzapfel and biological technician Tod Foster are preparing a manuscript describing the results of length frequency and species composition sampling in Puerto Rico during 1982.

Holzapfel also met with division chief Gary Sakagawa, mathematician Al Coan, and members of the Tuna/Billfish Resources Program to discuss sampling priorities in Puerto Rico.

Final sampling results obtained by Holzapfel in Puerto Rico in 1982 are summarized in the table below. Samples received between January 1 and April 30, 1983 include one yellowfin, one skipjack, and one bigeye tuna length frequency sample.

	Species and gear	# of sample	# of fish sampled	Tonnage sampled (MT)
	Yellowfin			
	Baitboat	28	2140	310.2
	Purse seine	38	3120	2467.1
	Unknown	12	973	263.0
	Longline	1	89	67.0
Total		79	6322	3107.3
	Skipjack			
	Baitboat	25	1266	1951.0
	Purse seine	17	854	4862.2
	Unknown	4	203	940.2
Total		46	2323	7753.4
	Bigeye			
	Baitboat	6	234	9.7
	Purse seine	21	753	735.4
	Unknown	4	107	155.1
Total		31	1094	900.2
	Albacore			
	Longline	2	100	536.2
	Blackfin			
	Baitboat	1	50	6.1
	Black Skipjack			
	Purse seine	2	100	___

Albacore Model Modified

Several modifications to the North Pacific Albacore Simulation Model have recently been completed, according to fishery biologist Earl Weber. The computer model is now capable of simulating population events of unlimited duration using multiple year repetitions of various combinations of migration, fishing effort, natural mortality and recruitment patterns.

In order to test the validity of the simulation model, Weber and his co-worker, computer assistant Susan Chivers, recently added a subroutine which enables comparisons of the predicted catch of the model in each stratum (year, month, area, gear and age) with the actual, observed catch in that stratum, and calculates the percent error. Another modification has been made which utilizes a back calculation method to calculate what the catchability coefficients for all types of gear in all strata would have to have been for the model to perfectly predict the catch in those strata. These modifications permit multiple year simulations, facilitate testing and interpretation of model output and provide a means of generating parameter estimates to be used as input in subsequent simulations. The model is currently being used to study migration patterns of North Pacific albacore by Weber and Chivers.

Preparations Underway for Albacore Sampling Cruise

Preparations for the albacore population sampling cruise scheduled to take place in August 1983 began this month. The primary cruise objective is to sample the underlying population structure of albacore entering the commercial fishery with passive gear. Four specially designed research gillnets (each with seven different mesh sizes) will be fished at each of eight different depth strata, both day and night. In addition, the echo sounder onboard the NOAA research vessel, David Starr Jordan, will be used to record relative amounts of fish in the vicinity of the sampling nets.

Cruise participants and other interested constituents met several times in March and April to discuss ways to ensure maximum benefit from the sampling design, operating procedures, data collection, analysis, ancillary research opportunities and public relations. The cruise announcement was released (copies available from fishery biologist Dr. Norm Bartoo) and all major purchases completed this month. The first of the four sampling nets has been received and will undergo field evaluation prior to ordering construction of the final three nets.

TIBURON LABORATORY

PHYSIOLOGICAL ECOLOGY INVESTIGATION

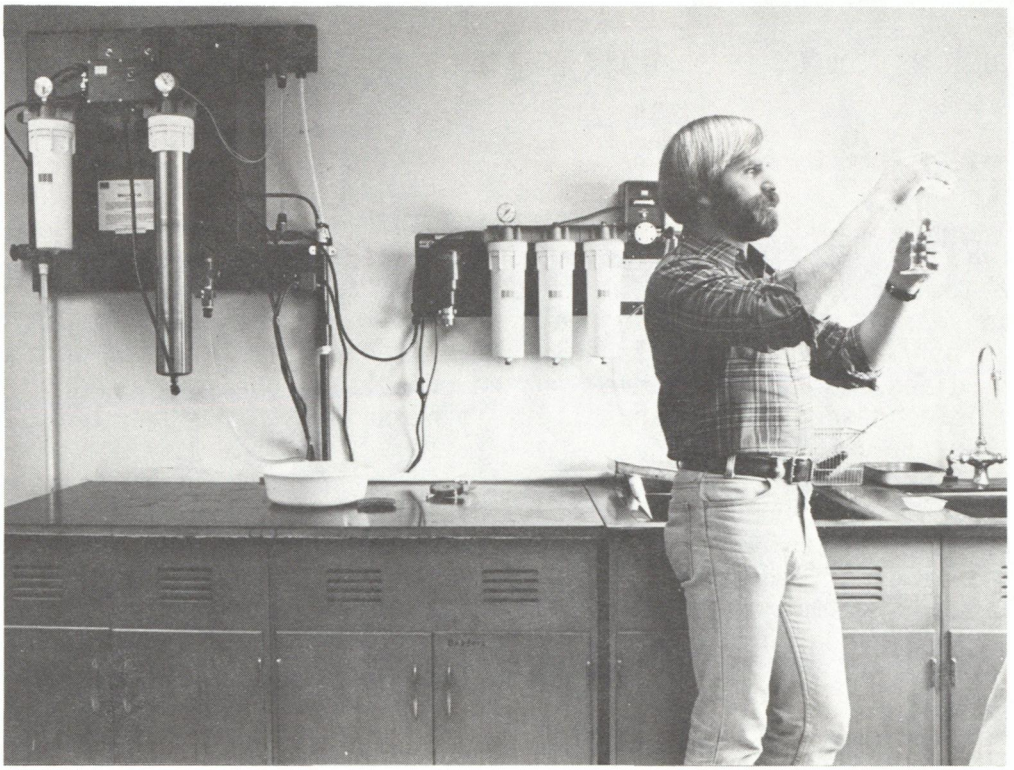
Health of Striped Bass Assessed

In April of every year since 1978, the Physiological Ecology Investigation (PEI) team has assessed the health of striped bass as the fish prepare to spawn in the San Francisco Bay-Delta. Data on fish collected in previous years showed that the health of the fish was deleteriously affected and that poorer health was strongly correlated with pollutants and parasites. Both field and laboratory studies on the effects of pollutants on striped bass are now being described in manuscripts to be submitted for publication.

This April, as a part of the continuing cooperative effort to assess the striped bass fishery, the PEI staff is assisting California Department of Fish and Game (CDF&G) staff members in their preparation for the yearly monitoring of prespawning striped bass. A proposal was submitted to the California State Water Resources Control Board by CDF&G for the continuation of this study, based on recommendations provided by the PEI team in an earlier report.

On April 20, the team met with David Kholhorst, Barry Collins, Jim White and other members of CDF&G at their field base on the San Joaquin River at Antioch, California. While biological technician Brian Jarvis went with the striped bass tagging crew on the Striper II, fishery biologist Dr. Jeannette Whipple and data clerk Rahel Fischer set up an autopsy laboratory at the Delta base. When the vessel returned with fish, a training session was held on procedures for assessing the health of the bass and for preparation of selected tissue subsamples for histology and pollutant analyses. Training sessions continued through Friday, April 22, until examples of most types of fish (male, females, lesioned, etc.) were examined. Dr. Whipple and research chemist Pete Benville will continue to periodically assist CDF&G at their Stockton laboratory in implementing the procedures for monitoring striped bass.

Dr. R. Bruce MacFarlane, Oceanographer, is developing methods for the investigation of alterations of energy metabolism in relation to various nutritional conditions and diets. The methods will be developed using high performance liquid chromatography and include techniques for measurement of adenine and guanine nucleotides in fish tissues.



Dr. R. Bruce MacFarlane, preparing reagent with Milli-Q water for use in high performance liquid chromatography of nucleotides in fish tissues.

FISH COMMUNITIES INVESTIGATION

Impact of Winter Storms Evidenced in Nearshore Environment

The past winter has seen some of the severest weather to hit the Mendocino, California coast during this century. During their regular quarterly monitoring of the near-shore habitats this month, investigation leader Dr. Edmund Hobson, with fishery biologists Tony Chess and Dan Howard, documented many of the effects of this weather. Apart from the absence of the kelp beds, which are casualties of winter storms during most years, the rocky seafloor itself was transformed, with boulders up to 4 m in diameter displaced, and bedrock exposed where extensive sand patches had been before. Probably because the turbulent storm seas carried this sand, the substrate has been severely scoured, and many of the macroinvertebrates that usually populate these habitats were absent, or present only in sharply reduced numbers. Rock surfaces were bare of the epicrustose algae and invertebrates that normally proliferate there, and a dense covering of fuzzy, epibenthic

diatoms (Biddulphia sp.) grew in their place. Furthermore, the benthic fishes that normally occur in this habitat, especially the various cottids, were virtually absent. Even the perennial alga, Laminovia dentigera, which is especially adapted to surge-swept conditions, was reduced in numbers. A qauntified account of these changes will result from the routine collections and visual counts that were made.

Model Developed for More Effective Multispecies Management

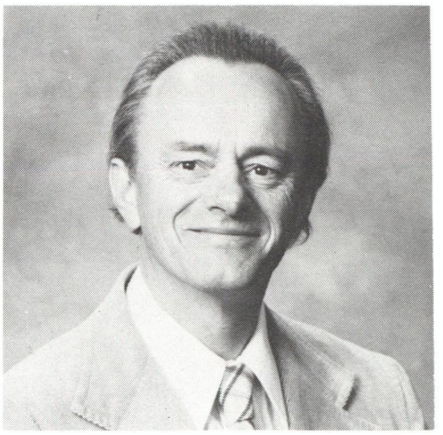
The need to move from a single species concept to an ecosystem approach has become apparent in fishery management in the last 10 years. As one approach to this problem, fishery biologist Peter Adams has constructed a feeding dynamics model to evaluate the relative efficiency of a number of different harvesting strategies.

The structure of the model is a semi-Markov process developed from optimal foraging theory. The model is of the nearshore Catalina kelp fish community and is based on data collected by fishery biologists Edmund Hobson and Tony Chess. The construction of a multispecies harvesting plan was surprisingly difficult and obviously will be even more difficult in natural communites. The plan was over 900% more efficient in reaching management goals than one in which only one species was harvested, but only 50% more efficient than an approximation of the harvesting that is going on in southern California sport fisheries. In addition, when one species is harvested, other species show some increases in diet quality, a result similar to that demonstrated by other ecosystem models; however, what is different from other models is that these increases in the diet quality of other species are not directly reversible through harvesting pressure. These modeling results differ from other modeling studies in several aspects, most of which are due to the use of stochastic rather than deterministic mechanisms in the model.

PACIFIC ENVIRONMENTAL GROUP

PEG Chief Gunter Seckel Retires

On April 2, Gunter R. Seckel, Chief of the Pacific Environmental Group at Monterey, California, retired after more than 30 years of government service. Born in Osnabruck, Germany, Mr. Seckel was educated in the U.S., receiving a B.S. in Physics and an M.S. in Oceanography from the University of Washington.



Mr. Seckel began his federal government career as a research oceanographer in 1953 with the Honolulu Laboratory, ultimately advancing to Chief of the Oceanography Program at the facility. In 1970, Mr. Seckel transferred to the Pacific Environmental Group in Monterey as the Leader of the Ocean Modeling and Forecasting Task. In 1977, he was named Chief, Pacific Environmental Group.

During his career in government, Mr. Seckel authored or co-authored more than 31 publications and 18 scientific papers presented at meetings or in unpublished reports in the fields of physical oceanography, climatic oceanography, and air-sea interactions.

Mr. Seckel and his wife, Anita, plan to travel after his retirement, although he also has plans to continue independent research and writing.

New CalFIN Entry Format Designed

Statistician Donna Mallicoate and fishery biologist Dick Parrish have been working with Rick Klingbeil of the California Department of Fish and Game (CDF&G) and Susan Picquelle of the La Jolla Laboratory to design a new format for entry of sardine, jack mackerel and Pacific mackerel biological and landings data into the California Fisheries Information Network (CalFIN). PEG's biological technician, Janet Mason, is now entering data for the first 3 months of 1982 into a microcomputer as a trial of the new format. Mallicoate has reformatted Pacific mackerel data for 1979-81 into the new format and Klingbeil will provide missing landings data and sardine and jack mackerel data for these same years. If the new format proves successful, CDF&G will take over the routine data entry on their microcomputers. The combined data set will be available both to the National Marine Fisheries Service for biological studies and to CDF&G for management and enforcement purposes.

FISHERIES INFORMATION SYSTEMS AND AUTOMATIC DATA PROCESSING

CalFIN Update

Two of the files (boarding and violations) have been modified by John Davies, SWFC employee stationed at the Southwest Region (SWR), for the Enforcement Information System. The boarding file was modified so that the SWFC enforcement system codes are now consistent with the NMFS, HQ codes. The violation file was expanded to include several new items dealing with the outcome of a case (fines paid, time served, etc.). Entry programs have been changed accordingly and a new user's manual has been distributed to California Fish and Game offices. This month the SWR received an OKIDATA printer to hook up to the La Jolla standard microcomputer. Initially the microcomputer has been used for word processing purposes, but some economic data will be put on the system.

The tuna fleet file has been updated for 1983 and the SWR has produced first quarter reports on status of the fleet. The Market News tuna landings file has been modified to use the vessel ID from the managements tuna fleet file. In this way the management staff at the SWR can use the two files in combination to get an idea of catch/effort involved in tuna operations. The 1978 and 1981 California Fish and Game data have been loaded onto the University of California, San Diego (UCSD) VAX system. Using DATATRIEVE on a file that large seems to be prohibitive, so the SWFC is considering using FORTRAN programs to deal with the larger files and DATATRIEVE for small subjects.

WPACFIN Update

David C. Hamm, Computer Systems Analyst, reports continued progress in data collecting activities for the Western Pacific Fishery Information Network (WPACFIN) in American Samoa, Guam, Commonwealth of the Northern Mariana Islands (CNMI), and Hawaii. Under a contract issued by the Council, data collecting activities have begun in Manua, American Samoa.

In Guam the data collecting and processing activities of the Division of Aquatic and Wildlife Resources are continuing on schedule, and the Guam Fishermen's Coop has made progress in collecting fishing data and is ready to start collecting socio-economic data from local fishermen. The current work is being done under a contract with the Council. Coop landings data for 1982 and corrected and updated data for 1979-81 will be available to WPACFIN by mid-May. Hamm investigated the hard disk systems available for the Apple microcomputer. A hard disk system is needed in Guam to help improve the efficiency of processing the relatively large data bases.

Data collecting activities are going well in CNMI. Reports are beginning to come in from the newly implemented logbook system for offshore fishermen. The contract for operating the new fisheries processing facility in Garapan

which includes data collecting and reporting requirements has been awarded. Hamm prepared a new report format for the major historical landings data base, and summarized existing CNMI data for 1976-81.

The deadline for the contract on a study of the data collecting and processing system of HDAR has been extended to the end of the fiscal year. The consultant hired by HDAR will return to Hawaii in mid-May to continue work on the project. Recent changes in HDAR's system have created a need to make fairly extensive modifications in the draft final report submitted several months ago. A schedule for completion of the new draft report has not been agreed upon at present.

Hamm has also been working closely with the Southwest Region Western Pacific Program Office personnel in selecting a microcomputer for Palau that will be compatible with other WPACFIN hardware. Hamm will be testing the equipment before it is shipped to Palau, and will be training their staff on the use of the computer and associated software. Implementation is scheduled for June.

ADP Operations

Dorothy Roll, Computer Systems Analyst, reports that the purchase of a Tele Video 800A work station for the Tiburon Laboratory has been approved by the ADP Procurement reviewers in Washington, DC. This work station will allow two users simultaneously on their existing Tele Video 806 multi-user computer system.

Two procurement requests were submitted to Washington, DC, for approval processing. They are: 1) a KAYPRO II computer for the Pacific Environmental Group in Monterey, California. This portable CP/M based microcomputer will allow access to Fleet Numerical Oceanographic Center's mainframe during non-working hours when computer resources are under-utilized, and 2) a 20 megabyte hard disk for the Western Pacific Fishery Information Network (WPACFIN) project in the Honolulu Laboratory. The hard disk will upgrade the field data collection and data handling capabilities of the microcomputer system, which is located in Guam.

The contract specialist in the WASC office in Seattle, Washington, informed the SWFC that the approved Molecular Super Microcomputer 64X for the La Jolla Laboratory must be placed on open market bid. The solicitation package was sent out in mid-April to the vendors. QSA in San Diego was the sole source vendor for the Molecular Super Microcomputer 64X to be installed in the Honolulu Laboratory. The justification was based on their having the two required software packages: 1) the interface for the Cipher Data Unit, the 9-track 1600 bpi tape drive, with the 64X, and 2) the communication package to link the 64X with host computers.

Word Processing System Evaluated

The word processing committee (Jack Brown and Julie Shoemaker from the Coastal Fisheries Resources Division, Andy Dizon and Frances Begley from the

Oceanic Fisheries Resources Division, Fred Kellenberger, Robert Nydam, Lorraine Prescott and Dorothy Roll from the Data Management and Technical Support Group) met on April 28. Kellenberger showed how the word processing microcomputers would interface with the Molecular Super microcomputer 64X, the core of the multi-user microcomputer network. The committee agreed to the purchase of 3 La Jolla standard microcomputers. The unit located in the Technical Support Group would support 3 terminals; the unit in OFRD, 3 terminals; the unit in CFRD, 2 terminals. WordStar has been selected as the word processing software for use by the secretarial staff because many of the scientists are producing their reports and memos under WordStar.

In order to evaluate CRT terminals to be used by the secretarial staff for word processing, vendors were invited to present the capabilities of their WordStar compatible CRT terminals to the secretarial staff and interested scientific/technical staff. Two vendors responded to our request: Human Design Systems, Inc., showed their AVT Concept Display terminal, which features the new "easy on the eyes" amber screen. CTI Data presented the WYSE terminal with the WordStar proms. Both vendors left their units on site for a week for evaluation by the secretarial staff.

Susan Iacometti, Computer Systems Programmer, has been assigned as the consultant on WordStar. She developed an evaluation form and procedures for the secretaries to enter a text file on the demonstration CRT models, which were connected to the La Jolla standard microcomputer. The secretaries have selected the AVT Concept Display terminal as the best terminal meeting their needs. Their selection was based on the touch of the keyboard and the amber screen. The AVT terminal is VT100 compatible, can display 132 columns without scrolling, and features 8 pages of display memory. The 24+ function keys can be programmed to simplify frequently used WordStar commands.

Iacometti is testing the transfer of text from a WORDSTAR file to UCSD's CATT. Type set with different fonts is a capability available on the CATT system. She is also providing consulting services to Milton Lopez of the Inter-American Tropical Tuna Commission (IATTC) on UCSD's CATT system. IATTC is considering CATT as the word processing system to be used by their secretaries.

Microcomputer Committee Meets

The microcomputer committee met on April 26 to review the status of the Center's microcomputer systems. In attendance were mathematician Al Coan, fishery biologist Rick Methot (substituting for Rich Charter) and electronics engineer Jack Brown, data manager Fred Kellenberger, computer programmer analyst Robert Nydam, and computer systems analyst Dorothy Roll from Data Management/ADP. Mr. Kellenberger presented the multi-user microcomputer network architecture. The chart showed the Molecular Super microcomputer 64X as the core of the network. Linked to the Super microcomputer 64X is a proposed 68000 unit; the committee prefers the assembling of components by Jack Brown to produce a 68000 microprocessor for evaluation.

* * * * * * * * * *

Computer programmer analyst Bob Nydam continues to modify the programs in the Financial Reporting System (FRS) to generate reports reflecting the new labor object classes. His other activities include the routine "hands-on" maintenance of the eight La Jolla standard microcomputers located in the La Jolla Laboratory and remote maintenance by telephone of the La Jolla standards microcomputer located in the Tiburon Laboratory and the Regional Office in Terminal Island.

* * * * * * * * * *

Richard Charter, Data Manager of the Coastal Fisheries Resources Division, and computer systems analyst Dorothy Roll drafted the hardware and software requirements to update the CalCOFI data management system. The draft included the cost estimate for manpower to develop software and computer hardware to upgrade data entry in the laboratory and data collection aboard ship. The goal of the update is to have the CalCOFI system accessible to users in the academic community.

* * * * * * * * * *

In preparation for the processing of the coastwide data files, Ms. Iacometti is testing tape routines on UCSD's VAX 11/780. Because of the large data volume to be manipulated, she is consulting with Jerry Fitzsimmon of UCSD's Computer Center on SWFC's disk storage requirements.

* * * * * * * * * *

The feasibility study for converting the SWFC's telephone system at the La Jolla complex to UCSD's CENTREX system is being conducted by Pauline McCoy from UCSD's telecommunication services. Computer systems analyst Dorothy Roll is assisting Ms. McCoy in surveying the equipment requirements by interviewing the NMFS division chiefs, task leaders, and representatives for all other agencies residing in the buildings. Ms. McCoy will submit a cost estimate for the conversion.

MISCELLANEOUS

PUBLIC AFFAIRS

Honolulu Laboratory

April 5 - George H. Balazs spoke on "Ecology of sea turtles" to Dr. Richard Brock's Zoology 201 (Introduction to Marine Biology) class at the University of Hawaii.

La Jolla Laboratory

April 8 - Industry economist Dan Huppert gave a lecture on fisheries economics to Dr. Dave Farris' class at San Diego State University.

15 - Dr. Izadore Barrett, center director, presented a 2-hour lecture and discussion on fishery management to Dr. Farris' fisheries class at San Diego State University.

20 - A TV documentary featuring the work of Dr. Mike Laurs on satellite applications to fisheries was shown on public television channel 15 in San Diego.

21 - Twenty-five students from the Greater San Diego Science and Engineering Fair toured the La Jolla Laboratory. Dr. Mike Laurs was their host and featured speaker.

22 - Fishery research biologist Dr. Angeles Alvariño presented a lecture to students and faculty on "Plankton Indicators, Ocean Dynamics and Fisheries" at the University of San Diego.

28 - Computer systems analyst Dorothy Roll participated on the Marine Sciences Panel during Career Day at Torrey Pines High School in Del Mar on April 28. She gave an overview of the activities at the SWFC and the career opportunities in federal fisheries research. The other panelist, Dr. Art Barnett, represented the private sector of marine sciences research. The purpose of career day is to acquaint students with the wide variety of job opportunities and to advise them on preparatory courses for the occupations.

HONORS AND AWARDS

Honolulu Laboratory

April 5 - Laboratory Director Shomura presented length-of-service pins to the following employees:

Walter M. Matsumoto	- 35 years
Howard O. Yoshida	- 30 years
Ray F. Sumida	- 20 years
William G. Gilmartin	- 15 years

- Sharon Hendrix, University of Hawaii graduate student, won one of three "Best Paper" awards at the 8th Annual Albert L. Tester Memorial Symposium held at the University of Hawaii on April 7 and 8. The Symposium is sponsored by the University of Hawaii Zoology Department. Hendrix's paper was entitled, "Some aspects of the early life history of mahimahi (Coryphaena hippurus) reared in the laboratory," and was based on research conducted at the Honolulu Laboratory's Kewalo Research Facility.

SEMINARS

Honolulu Laboratory

April 1 - Dr. Kim Holland, Hawaii Institute of Marine Biology, University of Hawaii, spoke on "Responses of captive and wild tuna to prey odors."

29 - Sandy Kaupp, SWFC La Jolla Laboratory, spoke on "Sensitivity to ultraviolet radiation of larval fishes from the Los Angeles Bight (California) area."

La Jolla Laboratory

April 7 - Dr. I.G. Priede, University of Aberdeen, Scotland, presented a lecture on "Application of biotelemetry techniques to the study of fish behavior and physioloy in the wild."

19 - Wildlife biologist Dr. Douglas P. DeMaster gave a seminar entitled "Marine mammals: If only they were good to eat."

Tiburon Laboratory

April 12 - A cooperative effort of the Tiburon Center for Environmental Studies, San Francisco State University and the Tiburon Laboratory presented a seminar with guest speaker Dr. Steven Obreski, Marine Ecologist, who spoke on "Crab larval development in Tomales Bay."

TRAINING

La Jolla Laboratory

April 4 - Chuck Oliver, Fishery Biologist, "InterFORTRAN Programming," University of California, San Diego.

- Virginia Hostler, Administrative Officer, "EEO Network," Naval Ocean Systems Center, San Diego, California.

- Al Myrick, Frances Begley, Frank Ralston, Bill Perrin, and Rennie Holt, "EEO Network," San Diego.

- Dave Holts, Fishery Biologist, "Statistical and Mathematical Analyses," University of California, San Diego.

5 - Tom Tumosa, Biological Technician, "Data Programming Concepts," University of California, San Diego.

VISITORS

Honolulu Laboratory

April 7 - James Peter, Honolulu, Hawaii.

8 - Francis M. Fukuhara, Seattle, Washington.

- Richard Boy, NOAA Data Buoy Office, NSTL Station, Mississippi.

11 - Peter T. Wilson, Kula, Maui.

14 - Deborah L. Telford, Narrangansett Laboratory, NMFS, Rhode Island.

La Jolla Laboratory

April 15 - Capitan de Fragate J.M. Ribera Urruti, Second Commander of the Spanish Royal Navy Vessel Juan Sebastian Elcano, visited the Center the 15th of April, to discuss some points of interest on tuna fisheries. He also met with Dr. Angeles Alvariño to discuss the importance of oceanographic studies for naval officers, and the particular value of plankton studies.

19 - Mr. Steinar Olsen, Director of the Fishing Gear and Methods Division, Institute of Fisheries Technology, Bergen, Norway, visited the Center for discussions with Mr. Carr, Dr. Dizon and others.

25 - Mr. Bill Gordon, Assistant Administrator for Fisheries, Washington, DC, visited the Center.

- Sharon Lundin, Chief, Employee Services Branch, WASC, was at the Center to present an Administrative Seminar.

28 - Kenneth W. Cox, Fisheries and Oceans, Canada, Ottawa, Ontario. Bob Wowchuck, Fisheries and Oceans Canada, Vancouver, BC.

Tiburon Laboratory

April 7 - Frank Henry, CDF&G, Monterey, California.

20 - Richard Shomura, Honolulu Laboratory, SWFC, met with Norman Abramson and Jeannette Whipple on research methods for studying thermal effects.

27 - Pete Kondrashoff, FMA, San Francisco, California, Ronald Arika, San Francisco, California, and Rick Drews, Belvedere, California.

MEETINGS AND TRAVEL

Honolulu Laboratory

April 4 - Richard S. Shomura, Laboratory Director, attended the blessing and commissioning ceremony for the 400-ft fiberglass pipe constructed by Hawaiian Dredging and Construction Company under contract to NOAA (for the U.S. Department of Energy) for the Ocean Thermal Energy Conversion (OTEC) program.

5 - Richard Shomura called a general staff meeting to discuss the organization of the Honolulu Laboratory.

6 - Richard Shomura and Mary Lynne Godfrey, Adminsitrative Officer, attended a merit pay workshop conducted by the Office of Personnel Management at the Hilton Hawaiian Village Hotel.

7 - Richard Uchida attended the 25th meeting of the Coordinating Council on Research--Northwestern Hawaiian Islands held at the Honolulu Laboratory.

14 - Richard Shomura and Henry M. Sakuda, Director, HDAR, convened a baitfish workshop at the Kewalo Research Facility.

15 - Richard Shomura participated in the Hawaii Fisheries Coordinating Council meeting.

18-19 - Richard Shomura participated in the Hawaii Undersea Research Laboratory science review panel meeting at the Naval Ocean Systems Center, Hawaii Laboratory, Kaneohe Marine Corps Station.

19-20 - Richard Shomura traveled to California to attend the Center Management Meeting, a recreational symposium and the Marine Fisheries Advisory Committee (MAFAC) meeting.

21-22 - Dr. Robert A. Skillman and Samuel G. Pooley attended the Council's SSC meeting in the Sea Grant conference room at the University of Hawaii.

25 - Dr. Skillman departed Honolulu for the Philippines on an AID Fisheries Technical Assistance Program assignment. He will be in the Philippines for 6-weeks.

La Jolla Laboratory

April 11-13 - Izadore Barrett traveled to Washington, DC, to attend a Research Council Meeting.

11-14 - Fred Kellenberger and Ben Remington traveled to Washington, DC, to participate in A-76 discussions.

12-29 - Jack Metoyer went to sea aboard the Townsend Cromwell to assist in the collecting of young jack mackerel.

April 12-May 2 - Nancy Lo and Gail Theilacker went to sea aboard the Townsend Cromwell to collect young jack mackerel.

April 14-18 - Chuck Oliver traveled to San Clemente Island to continue studies on pinnipeds.

18 - Dr. Huppert traveled to the University of Southern California for a Fisheries Economics Workshop.

April 18-29 - Alec MacCall traveled to San Jose, Costa Rica, for an FAO-sponsored Expert Consultation.

24-29 - Barb Engstrand traveled to San Francisco, California, to attend a training course in "Research and Development Contracting."

24-30 - Rennie Holt traveled to Santa Cruz, California, to attend the Seventh Meeting of US-USSR Marine Mammal Project.

25 - William Gordon, Assistant Administrator for Fisheries, NOAA, was at the La Jolla Laboratory. Gordon was briefed by Mike Laurs and Jim Squire on El Niño research. He also met with the senior staff, and with the staff of both the Oceanic and Coastal Fisheries Resources Divisions.

27 - A Marine Fisheries Advisory Committee (MAFAC) Habitat Conservation Subcommittee meeting was held at the La Jolla Laboratory.

- A MAFAC Marine Recreational Fishing Subcommittee meeting was held at the La Jolla Laboratory.

28-29 - The Marine Fisheries Advisory Committee meeting was held at Scripps Institution of Oceanography, La Jolla. On April 29, some MAFAC members visited the SWFC for an introductory lecture by Director Barrett and a tour of the research facilities.

- Rick Methot traveled to Sacramento, California, to attend a CDF&G Commission meeting and to Los Angeles, California, to attend a workshop in applied statistics.

- Susan Picquelle traveled to Los Angeles to attend a workshop in applied statistics.

Tiburon Laboratory

April 5-6 - Sus Kato traveled to Ft. Bragg and Bodega Bay to talk with fishermen about fishing methods for squid and spot prawn.

19-22 - Ted Hobson, Tony Chess and Dan Howard traveled to Mendocino for quarterly collection and monitoring of habitats.

20-22 - Jeannette Whipple and Brian Jarvis traveled to Antioch to supervise monitoring techniques on striped bass to CDF&G.

21-22 - Norman Abramson attended a Center Management Meeting in La Jolla, California.

24-27 - Ed Ueber traveled to La Jolla to attend an economist meeting and Marine Recreational Fishery Symposium.

April 26-
May 1 - Tina Echeverria traveled to Seattle, Washington, to attend a workshop on age determination of rockfish.

April 26-28 - Groundfish Management Team of the Pacific Fishery Management Council. Dr. William Lenarz, Leader of the Rockfish Analysis Task, reports that the Groundfish Management Team of the PFMC met at the Tiburon Laboratory, April 26-28. During the meeting, the team prepared nine amendments to the plan, discussed the status of the sablefish fishery, developed methodology for catch projections, and discussed a proposal for a holistic approach to groundfish management and research. Dr. Lenarz, fishery biologist on the Rockfish Analysis Task, and Ms. Candis Cooperrider, biologist on the Rockfish Analysis Task, presented their assessment of the widow rockfish fishery. Their report was accepted with minor revisions. Dr. Lenarz was appointed to chair a committee composed of biologists from the three states and an economist from the SWR. The assignment of the committee is to prepare a status report on black rockfish. Black rockfish are an important target of recreational fishermen north of San Francisco and have recently been subjected to increased fishing pressure from commercial fishermen. The report is due October 1983.

Pacific Environmental Group

April 15-30 - Dr. Richard H. Parrish and Andrew Bakun traveled to San Jose, Costa Rica to participate in a joint FAO-IOC sponsored workshop: "Expert consultation to examine changes in abundance and species composition of neritic fish stocks."

PERSONNEL ACTIONS

Honolulu Laboratory

April 1 - Steven H. Kramer, Biological Technician - Resignation.

4 - Lance S. Asagi, Biological Aid - Conversion to Temporary Appointment.

- Elizabeth K. Buelna, Biological Aid - Full-Time Temporary Appointment.

- Robert J. Morrow, Biological Aid - Full-Time Temporary Appointment.

- David E. Nelson, Biological Aid - Full-Time Temporary Appointment.

7 - Ruth L. Ittner, Biological Technician - Resignation.

La Jolla Laboratory

April 4 - Lisa Lau, Junior Fellow - Leave Without Pay.

- Sandy Hawes, Biological Technician - Change to Full-Time Appointment.

16 - Carol Miller, Computer Clerk - Termination of Appointment.

19 - Michael Graybill, Biological Technician - Resignation.

- Gregory Yee, Jim Cotton, Robert Pitman, Michael Henry, Conrad Doxey, Biological Technicians - Termination.

22 - Gary Friedrichsen, Biological Technician - Termination.

29 - Leroy Millerd, Clerk - Termination of Appointment.

Tiburon Laboratory

April 18 - Kathryn Barry, Biological Aid - Temporary Appointment.

- Steven J. Pace, Biological Aid - Temporary Appointment.

26 - John Patrick Chioda, Laborer - Temporary Appointment.

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