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MONTHLY REPORT - FEBRUARY 1978

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NOAA/NMFS

SOUTHWEST FISHERIES CENTER
La Jolla, California

Honolulu Laboratory
La Jolla Laboratory
Tiburon Laboratory
Pacific Environmental Group

MONTHLY REPORT - FEBRUARY 1978

STATUS OF PUBLICATIONS

Published

Squire, James L. 1977. Surface currents as determined by drift card releases over the Continental Shelf off Central and Southern California. NOAA Technicial Report NMFS SSRF-718, 12 p.

During March 1964 through February 1966, 8,320 plastic drift cards were released at selected points from an aircraft to measure surface current drift over two areas: from the coast to about 48 n.mi. off central California between Point Arena and Point Sur; and from the coast to about 90 n.mi. off southern California between Point Arguello and Punta Salsipuedes, Baja California, Mexico. The recovery rate was 3.5% in the central area and 5.7% in the southern area. An average 79.4% of the recoveries were found within 2 weeks following the date of release. Results lend support to studies concluded by earlier investigators. The distribution of the directions from which drift cards were returned increased the evidence for the presence of an eddy off the coast between San Francisco and Monterey Bay during May through July, and of the large gyre and associated southern California countercurrent south of Point Conception during April through August and to a lesser extent in October and December.

Vlymen, William J. 1977. A mathematical model of the relationship between larval anchovy (Engraulis mordax) growth, prey microdistribution, and larval behavior. Environmental Biology of Fishes 2(3): 211-233.

This report does not constitute publication and is for information only.

A prey concentration dependent random walk model of feeding behavior in larval anchovy based on behavioral experiments was used in conjunction with an experimentally verified Markov chain prey attack rate model to evaluate the relationship between anchovy larval growth from 0.4 to 2.0 cm at various levels of contagion and temperature in the food prey environment. Contagion was regarded as being decribed by the negative binomial distribution while the actual prey particle size distribution was taken from actual prey particle surveys in areas where anchovy larvae are found. Other important physiological parameters necessary for the construction of the model are taken from existing literature and a description of the complete computer integration of the various submodels presented. Results demonstrate the extreme importance of food microstructure geometry and behavior in the growth rates and growth curves of the anchovy larvae. In particular extremely nonlinear growth rates as functions of contagion are observed in the model with the highest growth rates not occurring at the highest level of prey contagion. The implications these results have in explaining current paradoxes between laboratory-grown larval anchovy prey concentration requirements and those found in the ocean are discussed. Also, the relationship between physical oceanography and larval survival is discussed in light of the results in addition to the need for a more detailed understanding of food prey microstructure in larval ecology.

Squire, James L. Jr., and Susan E. Smith. 1977. Anglers' Guide to the United States Pacific Coast. U.S. Dep. of Commer., NOAA, Natl. Mar. Fish. Serv. Available from the Superintendent of Documents, Washington, D.C., Stock No. 003-020-00113-1, 139 p.

This book provides comprehensive coverage of marine recreational fishing along the coasts of California, Oregon, Washington, Alaska, Hawaii, American Samoa and Guam. Of particular interest are the forty fishing maps that outline fishing grounds (offshore and shoreline areas) and pinpoint angler facilities (sportfishing boats, skiff rentals, lauching sites, fishing piers and jetties). The Guide also includes illustrated descriptions of all the major marine game fishes that occur in the areas covered.

Approved by the Center Director

Sumida, B.Y., E.H. Ahlstrom, and H.G. Moser. Early development of eastern North Pacific pleuronectid flatfishes of the genera Pleuronichthys and Hypsopsetta, with comparative notes on the bothid, Hippoglossina stomata (Pisces, Pleuronectiformes)." For publication in the Fishery Bulletin, U.S.

Uchiyama, James H., and Paul Struhsaker. Age and growth of skipjack tuna, Katsuwonus pelamis, and yellowfin tuna, Thunnus albacares, as indicated by daily growth increments of sagittae. For publication in Fishery Bulletin, U.S.

HONOLULU LABORATORY

RESOURCE ASSESSMENT AND DEVELOPMENT INVESTIGATIONS

Reports Prepared for Fishery Meetings

Dr. Robert A. Skillman, Leader, Resource Monitoring and Assessment Task, and Fletcher V. Riggs, Fishery Biologist at the Honolulu Laboratory, prepared several administrative reports on tuna fisheries in Hawaii and American Samoa for presentation at the Indo-Pacific Fishery Commission (IPFC) 18th Session and Symposium and the 10th Technical Meeting on Fisheries of the South Pacific Commission (SPC). The IPFC sessions will be held in Manila, Philippines from March 1 to 9 and the SPC meetings in Noumea, New Caledonia from March 13 to 17. Richard Shomura, Laboratory Director, and Dr. Jerry Wetherall, Fishery Biologist, will be attending the meetings.

The first report, "Descriptive statistics on the size composition of skipjack tuna, Katsuwonus pelamis, landed in the Hawaiian pole-and-line fishery, 1946-77" presents mean, maximum, and minimum fork length statistics of skipjack tuna (1) by quarters from 1946 to 1976 to show long-term trends, (2) by quarters averaged over all years to show seasonal trends, and (3) by months within the third quarter to show the trend within the best fishing season. Histograms of 4-cm fork length groups are presented by quarters for 1952, 1962, 1972, and 1976 and by months for 1974, 1975, 1976 and 1977 to show the size-group or modal group composition of the landings.

The second report, "Historical trends in catch, fishing effort, and catch per unit effort in the Hawaiian fishery for skipjack tuna, Katsuwonus pelamis, 1948-76," presents total catch and estimates of catch per standard day fished and of relative fishing intensity for 1948-76. Also presented is information on seasonal trends in catch for the 1948-76 period, the best year in the fishery (1965), and the poorest year in the fishery (1975). Because no relationship between the estimate of relative abundance and estimates of relative fishing intensity is discernible, no effect of the fishery on the stock could be shown.

The third report, "Recent trends in catch, fishing effort, and catch per unit effort for the South Pacific albacore fishery based in American Samoa, 1954-76," presents catch data on albacore, yellowfin tuna, bigeye tuna and billfishes for 1954-76 by national origin of the fleet and for the total fleet. Also included are statistics on metric tons per day fished, and number of fish per 100 hooks for albacore, yellowfin tuna, and bigeye tuna, and information on number of vessels, trips, and days fished. The fishery reached a peak in 1973 when 30,148 metric tons of

albacore were landed and fell to a low in 1975 when only 7,840 metric tons were landed. There has been a striking 76.0% reduction in the relative abundance of the albacore stock in the last 20 years. A generalized production model assessment of the status of the South Pacific albacore fishery (Skillman, R. A. 1975. An assessment of the South Pacific albacore, Thunnus alalunga, fishery, 1953-72. Marine Fisheries Review, Vol. 27, No. 3) indicated that optimum catch per unit effort to maintain maximum sustainable yield was about 0.79 metric ton per day. This level of relative abundance was surpassed by the fishery in about 1970. The precipitous decline in relative abundance indicates that the albacore stock has been overfished and should be allowed to rebuild. The decline in the index of relative abundance during the southern winter fishery for small albacore may indicate that the adult stock has been reduced to such an extent that recruitment has been impaired.

Billfish Planning Team Meets with Advisory Sub-Panel

Dr. Jerry Wetherall, Leader Fishery Management Research Task at the Honolulu Laboratory, reported that the Billfish Planning Team and the Advisory Sub-Panel of the Western Pacific Regional Fishery Management Council (WPRFMC) had their first joint meeting in February. The meeting was co-chaired by James W. Sutherland, Chairman of the Advisory Panel and R. Shomura, a member of the Planning Team.

The purpose of the meeting was to generate a discussion on Pacific billfish management policy issues and to obtain an expression of views by members of the Sub-Panel. Because this was the first formal meeting of the Sub-Panel as a group, the meeting included an orientation period wherein explanations on how the Advisory Sub-Panel fits into the Council's organization and its functions and responsibilities, as stated in the Advisory Panel's charter, were given. Following the introductory remarks an interesting and lively discussion ensued, which included many expressions of opinions, particularly from the recreational fisheries-oriented members of the Sub-Panel. The views expressed by the Advisory Sub-Panel will be taken into consideration by the Planning Team in drafting the billfish Fishery Management Plan (FMP). Fishery Management Research Task members on the Planning Team, in addition to Dr. Wetherall, include Dr. Michael Adams, Industry Economist, Dr. Roy Mendelssohn, Operations Research Analyst; and Howard Yoshida, Fishery Biologist. Heeny Yuen, Leader of the Honolulu Laboratory's Recreational Fisheries Task, is also a member of the Planning Team.

Tagging Data Show Spiny Lobsters Do Not Move Much

James H. Uchiyama, Fishery Biologist at Honolulu, continued to analyze tagging data to determine growth rates and movements of the spiny lobster, Panulirus marginatus, in the Northwestern Hawaiian Islands (NWHI). Of 5,598 spiny lobsters tagged to date, 115 have been recovered. In general,

the data show limited movement of 9.3 km (5 nautical miles) or less for 92% of the recaptured lobsters and slow growth of about 0.5-1 mm per month among the specimens for which absolute growth rates could be determined. The size of the tagged lobsters that were recaptured varied from 68.0 to 118.0 cm in carapace length and most were just slightly under the legal size of 8.25 cm. Most of the tag recoveries were made within 90 days after release.

Plans Being Completed for Research Cruise to the Western Pacific

Richard N. Uchida, Leader, Insular Resources Task at the Honolulu Laboratory, drafted preliminary Cruise Instructions for Cruise 78-02 of the Townsend Cromwell, which will be operating in the western Pacific around Guam and the Northern Mariana Islands from May 5 to July 13, 1978. In making preparation for the cruise, Mr. Uchida recently visited Guam and Saipan to discuss resource development problems with fishery officials from these areas. The primary mission of the cruise will be to investigate and identify nearshore marine resources which have potential for development. Copies of the preliminary Cruise Instructions have been sent to cruise participants in Guam and the Northern Mariana Islands for review.

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Dr. Skillman provided the Honolulu Laboratory Director's Office information on catch and catch per unit effort from the Palau skipjack tuna fishery and on the recapture around Hawaii of skipjack tuna tagged in the eastern and western Pacific. Skillman also prepared for the Office of Marine Resources, Government of American Samoa, the first quarterly reports for the South Pacific albacore fishery covering the period 1976-77. This reports summarizes by 5° of latitude and longitude information on catch, fishing effort, and catch per unit effort for all major species in the fishery. The data for 1976 may be considered complete whereas those for 1977, especially the later months, are not complete.

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Skillman worked with the ADP group, Mary Lynne Godfrey, Administrative Officer, and Bob Jablonski, Potomac Research Incorporated, on the SWFC's new automated financial reporting system (FRS). The FRS has now been implemented at the Honolulu Laboratory and various problems in entering data into and extracting reports from the system have been resolved. Ray Sumida, Research Assistant, and Skillman worked with Chet Greenberg, Potomac Research Incorporated, and the Insular Resources Task staff in setting up the Fishery Information System, Honolulu, Insular Resources (FISHIR).

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The Honolulu Laboratory Vessel Committee, chaired by Skillman, met to draw up a preliminary FY 1980 cruise schedule for the Townsend Cromwell. This schedule will be prepared for submission to NOS.

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R. Uchida completed revising two manuscrips, "Synopsis of biological data on frigate mackerels, genus Auxis" and "The fish resources of the western central Pacific islands."

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Messrs. José Enitan and Jeff Sampaga, Research Assistants, continued aging Decapterus sp. and started processing otoliths collected from two species of snappers, Pristipomoides sieboldii and Etelis marshi. Robert B. Moffitt, Research Assistant, also spent some time aging goatfish, Parupeneus porphyreus. Moffitt departed during the month to serve as an observer on the Easy Rider, which will be fishing in NWHI waters. Paul M. Shiota, Research Assistant, continued volumizing and sorting plankton samples collected on Townsend Cromwell Cruise 77-02.

Skipjack Tuna Landings Slightly Above Long-Term Average

The January 30 to February 26, 1978 Hawaii landings of skipjack tuna were estimated at 123 metric tons (MT), which is 97 MT below the February 1977 landings and 20 MT greater than the 1948-77 long-term average for the same period. The cumulative landings from January through February were estimated at 375 MT, which is 405 MT below last year's landings for the same period and 126 MT above the 1948-77 long-term average.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

LARVAL FISHES, COASTAL EAST PACIFIC

Incidence of Cannibalism on Eggs and Larvae

Dr. John Hunter, Fishery Biologist, assisted by Carol Sanchez at the La Jolla Laboratory, report that they have completed their analysis of stomach contents of about 300 anchovy collected in March 1976 and March 1977. These fish were examined to determine the incidence of cannibalism on eggs and larvae. The average frequency of occurrence of anchovy eggs in stomachs was 44% and did not vary significantly among years. Most of

the anchovy stomachs contained only a few eggs; only 2% of the anchovies examined accounted for over 60% of the eggs found in stomachs. The maximum number of eggs found in an anchovy stomach was 730 eggs. The average number of eggs per fish in a sample increased with the density of eggs in the sea. The mean number of eggs per fish was 1.0 at a mean density of 20 eggs/m^3 whereas it was 40 at a mean density of 200 eggs/m^3.

With a daily consumption rate of 40 eggs per fish, and assuming 10-20% of the females spawn per night in a school with a sex ratio of 0.5, producing 574 eggs/gram/spawning female, the proportion of a night's spawn that is consumed is 6-12%. More accurate estimates will be possible when the sexual composition and proportion of spawning females are estimated from gonad histology studies. In addition, adjustment of observed ration by gut clearance rates will aslo alter this projection.

Anchovy larvae occurred in the stomachs at a much lower frequency. Only two stomachs contained anchovy larvae; one of these had 21 larvae. One of the largest and the only measurable specimen was 17 mm. The low incidence of cannibalism on larvae relative to eggs is probably misleading. Eggs are much more resistent to digestion and are identifiable in the stomach for much longer periods. Laboratory measurements indicate that about 8 hours are required for complete gastric evacuation of anchovy eggs, whereas less than 1% of first-feeding anchovy larvae (4 mm) can be identified after 30 minutes.

Study Continues on Histological and Morphological Characteristics of Feeding & Starving Fish Larvae

Fishery Biologist G. Theilacker of the La Jolla Laboratory, is continuing to study the histological and morphological characteristics of feeding and starving larval fish. These characteristics will be used as indicators to estimate larval fish starvation in the sea and ultimately to estimate survival.

Feeding, starvation, and delayed feeding experiments are now in progress with northern anchovy larvae to test the multivariate morphometric technique that was used successfully to identify condition of jack mackerel larvae. Two experiments have been completed, and the results show that the onset of feeding of northern anchovy reared at 15.5°C occurred four days after hatching (Day 4), and that it coincided with yolk absorption. Even if feeding was delayed up to 3 days after yolk absorption, the addition of food stimulated feeding and the larvae survived for two weeks, whereupon the experiments were ended. A few larvae ate after starving for four days, however, there were no survivors three days later (Day 11). These results were surprising since earlier experiments with northern anchovy larvae determined the "point of irreversible starvation" to be 1.5 days after yolk absorption at 15.0°C. Survival in these experiments was about 50%, the same as the fed controls, for the duration of the

study (12 days). In these earlier experiments, larvae did feed after 2.5 days of starvation, however, the larvae were all dead by Day 6 (the same as the starved controls).

The rearing tank size in the present experiments is larger (100 L) than in the earlier experiments (10 L), and container size does have an affect on fish larvae. Theilacker has found faster growth rates for anchovy larvae in large tanks than in small tanks. In recent jack mackerel rearing experiments, the larvae also grew faster in large than in small tanks. Feeding jack mackerel were in better condition in the large than in the small tanks (determined by grading histological indicators of condition) and starving larvae were in poorer condition in small than in the large tanks.

Dr. R. Owen, Oceanographer at the La Jolla Laboratory, prepared and presented a paper, "Oceanographic and climatic factors in relation to biogeography and ecology," February 27 at a multidisciplinary symposium on the California islands, sponsored by Santa Barbara's Museum of Natural History. Owen's paper described physics of the California Current system as it affects land and ocean productivity, species diversity and distribution of populations of organisms through interaction with the atmosphere and with the islands and banks of the region.

A written version is in preparation for inclusion in the Symposium Proceedings to be published as a book by University of California Press.

MULTISPECIES, COASTAL E. PACIFIC (CalCOFI)

Fishes Reared to Obtain Developmental Series

The main activities carried out by the Multispecies, Coastal E. Pacific (CalCOFI) program at La Jolla at present are identification and enumeration of fish eggs and larvae from CalCOFI Collections, assembling data for a CalCOFI Atlas dealing with the distribution and relative abundance of rockfishes (Sebastes spp.), identification and enumeration of several species of rockfishes from past CalCOFI collections, work on a manuscript dealing with the development and importance of the caudal fin complex in larval fish taxonomy, and rearing of fish eggs and larvae to obtain additional developmental series of inshore fishes.

At the present time, two species of rockfish, two kinds of flatfishes and two croakers (Sciaendiae) are being reared in the experimental aquarium at the La Jolla Laboratory. Dr. G. Moser is directing this effort assisted by Fishery Biologist J. Butler.

Larvae of rockfishes were obtained from pregnant females. A few larvae of Sebastes rufus, the bank rockfish, are still alive as of this writing (March 7) from a female collected on February 1. Rockfish larvae are very slow growing and these 5-week old specimens are just beginning to form their caudal fins. A second group of rockfish larvae from Sebastes dalli, the calico rockfish, collected on Febraury 24 is feeding on wild plankton. This species has shown the lowest mortality of any rockfish reared thus far by this group.

Series of Paralichthys californicus, the California halibut, and Hypsopsetta guttulata, the diamond turbot, were collected as eggs on February 23. The Hypsopsetta hatched at 2.0 mm on February 25 and have grown to 3.7 mm on March 6. The Paralichthys also hatched at 2.0 mm and have grown to 4.0 mm on March 6. Although many eggs of Citharichthys sand dabs, were also collected and put in the rearing tanks, the larvae from these eggs have all died.

Two types of sciaenids, croakers, are being reared, a lightly pigmented form and a more heavily pigmented form. The latter has only a few specimens and may not provide a complete series at this time. The sciaenid eggs also were obtained in plankton hauls made on February 25.

Several techniques are being used to obtain specimens for rearing. Larvae of rockfish are obtained by fishing for pregnant females, eggs of flatfish and sciaenids can be obtained by hauling plankton nets, but many inshore fishes are demersal spawners or nest builders and their eggs have to be obtained by divers. Of the latter group, eggs and larvae of two species of Hypsoblennius, blennies, have been successfully reared.

SURVEY SYSTEMS DEVELOPMENT AND EVALUATION PROGRAM

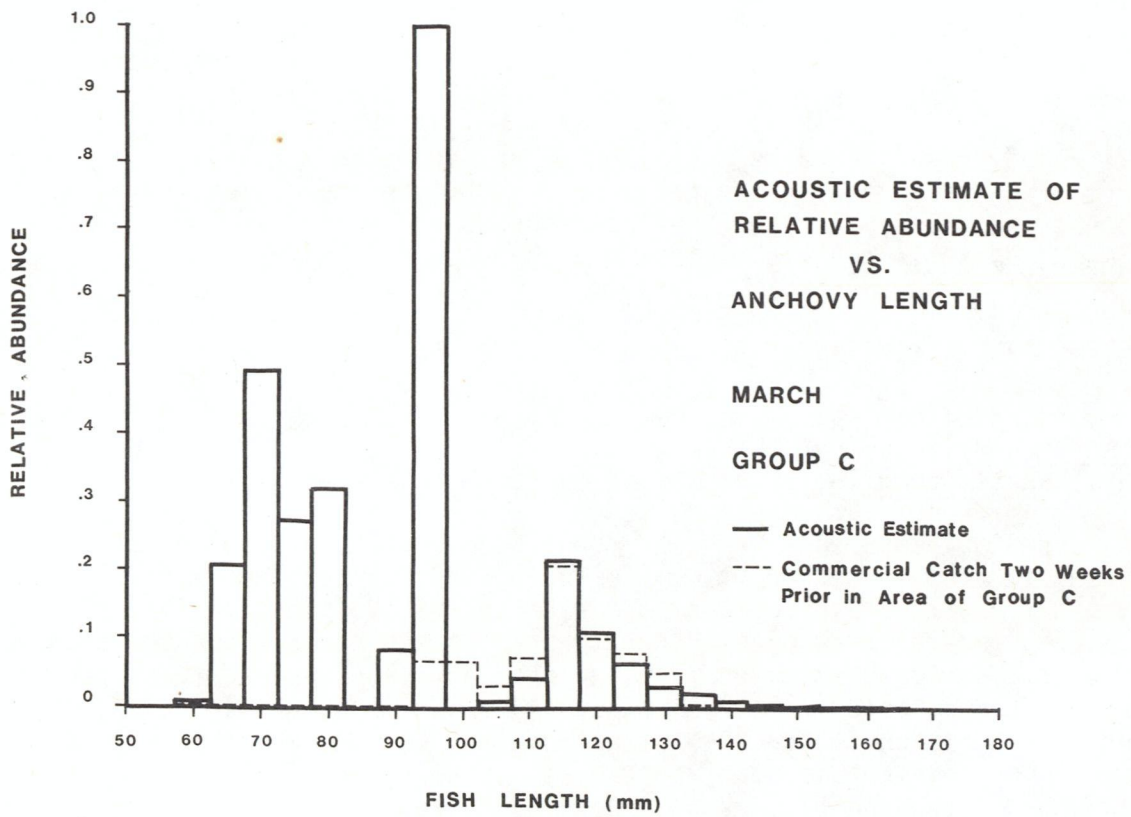
Contractor Concludes that Acoustic Resonance Surveys can Be Added to Sonar Mapping Systems

Acoustic resonance surveys can now be added to sonar-mapping systems according to a contract report delivered to La Jolla Laboratory Program Leader, Dr. Paul E Smith, by contractor Dr. D. Van Holliday of Tracor Inc. in February. In the past, there was no way to compare the spawning biomass time series, estimated from egg and larva surveys, to the biomass surveys of the schooled northern anchovy by sonar mapping. This was because, in addition to the identification problem, the sonar mapping process could not distinguish the massive pre-spawning population from the less abundant spawning biomass. It now may be feasible by an acoustic

resonance survey to distinguish the pre-spawning population from the spawning biomass over the entire central subpopulation area of the northern anchovy. The acoustic resonance pre-recruit surveys may also yield data on the magnitude of the anchovy year-class during the first year of life.

About 10% of the schooled targets were non-resonant. This would be expected from schooling organisms without swim bladders such as squid and Pacific mackerel. There were also large numbers of dispersed and aggregated resonance targets which were much larger than the northern anchovy.

Probably the most interesting aspect of the study is the degree to which late larvae of anchovy dominate the resonance in spring and summer. The sample volume for resonance analysis was set to 10 million cubic meters per sample to accommodate the abundance of juvenile and adult anchovy (40 to 160 mm). This volume, of course, also contained great numbers of late larvae (10-40 mm) as demonstrated by the catches from 0 to 70 m of bladder-bearing anchovy larvae by the oblique bongo and in the surface-skimming manta net. This is the first practical survey use of the nighttime air-bladder filling behavior of the anchovy described for the genus by Uotani (1973) and analyzed for the northern anchovy by Hunter and Sanchez (1976) of the La Jolla Laboratory.



RELATIVE ABUNDANCE VS. FISH LENGTH FOR GROUP C

COMMERCIAL AND RECREATIONAL FISHERIES RESEARCH FOR MANAGEMENT PROGRAM

New Procedure for Estimating Spawning Biomass of Anchovies Under Development at Center

A new procedure for estimating spawning biomass of anchovies is being developed at the SWFC. The key feature of the new approach, estimation of time of spawning from samples of female fish, was proposed at an informal workshop at La Jolla last November on anchovy spawning frequency, where it was suggested that post-spawning follicle degeneration would be a key to identifying spawning times for individual fish. To follow up on this idea, Dr. Steve Goldberg, visiting scientist at La Jolla from Whittier College, was asked to undertake the appropriate physiological research.

Goldberg has found, through histological examinations, that post-ovulatory follicle degeneration in the female anchovy is a unique, identifiable condition. The state of the follicles rapidly changes with elapsed time following spawning. Nearly all post-spawning fish are recognized as such within 24 hours of spawning, but after 72 hours only 20 percent of the female fish tested were identified as post-spawning. Future research on this identification method will attempt to distinguish the state of follicles of elapsed times 0 and 24 from elapsed times 24 and 72.

To exploit this new information the following spawning biomass estimation equation was formulated by Statistician Keith Parker:

$$S = P \cdot (a \cdot b \cdot c)^{-1} d,$$

where P is production of eggs by spawning female fish;

a is the fecundity in eggs/gram of female;

b is the fraction of mature females spawning in weight;

c is the fraction of the adult spawning biomass which is female; and

d is the length of time during which the post-ovulatory follicle degeneration is distinguished.

The production of eggs, P, is calculated from standing crop of larvae and larva mortality rates, both of which are estimated from CalCOFI-type plankton surveys. The fecundity, a, has been estimated. The fraction of females spawning, b, has never before been estimated, but it appears that midwater trawl samples could be used in conjunction with the follicle examination technqiue to estimate this important parameter. The ratio of males to females is presently assumed to be 1:1, but further research may

prove this assumption to be false. The length of time during which the post-spawning follicle state is discernible from all other states of follicle development and degeneration, d, will be more precisely estimated from laboratory studies.

Parker organized a workshop in February to discuss the feasibility of the new estimation model, ongoing laboratory work with respect to follicle examination, and future research needs. The results of the workshop are:

1. The model appears to be estimable and feasible. The accuracy and precision of the resulting estimates remains a concern, however, and should be examined through analysis of historical data and specially designed trial surveys.

2. Ongoing laboratory work will attempt to produce a better knowledge of the accuracy and precision inherent in estimating the parameter, d.

3. Future research needs include:

   a. field sampling with midwater trawls of female anchovies;

   b. laboratory analysis to classify female anchovy into spawning classes;

   c. sampling of anchovy larvae to test methods for making production estimates.

A first look at the practical problems in using this type of biomass estimation method will be taken this year when 1978 CalCOFI larval samples will be combined with examination of California Department of Fish and Game midwater trawl samples. This experiment could be useful in designing future surveys.

Anchovy Fishery May Affect Brown Pelicans

A new predator/prey issue has arisen with regard to the northern anchovy fishery. Dr. Dan Anderson, UC Davis, has shown the possibility of the anchovy's importance to the reproductive success of brown pelicans (*Pelicanus occidentalis californicus*). Of particular concern are the hard-pressed breeding colonies on the fringe of the pelican's range at Anacapa Island and Isla Coronado del Norte. In the summer of 1976, ornithologists observed starvation in the chicks and fledglings of brown pelicans and in the western gulls of the Channel Islands. Although it is unclear that the abundance of anchovy or the anchovy fishery were directly related to this starvation, the Fish and Wildlife Service (FWS) has decided that there is a possibility that the Anchovy Fishery Management

Plan may have an adverse impact on the brown pelican, an endangered species. FWS has consequently announced that it intends to invoke Section 7 (Interagency Consultation) of the Endangered Species Act of 1973.

Requirements for complying with Section 7 have only recently been published, and the impact of the Section 7 action on the anchovy management process, therefore, remains obscure. To clarify points, a meeting was arranged at Santa Barbara on February 28. Attendees included Alec MacCall, California Fish and Game; Gary Stauffer, Dan Anderson, Svein Fougner, NMFS; and Gale Kobetich, FWS. The group was unable to reach any definite conclusion as to whether or not the level of harvests allowed by the anchovy plan would have any adverse effect on the pelicans. The Fish and Wildlife Service will be responsible for conducting a "Threshold examination" to determine whether the fishery plan constitutes a threat to the continued existence of brown pelicans or would modify or destroy the critical habitat of the brown pelican.

Estimates Made of Distribution of Anchovy Larvae in U.S. Waters

Dr. Gary Stauffer, Fishery Biologist at the La Jolla Laboratory, has written an Administrative Report examining the distribution of anchovy larvae sampled by CalCOFI surveys. The key question was the division of larval occurrence between U.S. and Mexican waters. The percent of estimated larval abundance in U.S. waters varied substantially, with 45 percent being the lowest and 86 percent being the highest. When the estimated anchovy biomass was below 1 million tons in the period 1951-1956, 60 percent of the larvae were found in the U.S. zone. In the period 1957-1961, when the biomass was estimated at between 1 and 2 million tons, the U.S. percent was 72. In the period 1962-1975, the estimated biomass was greater than 2 million tons and 71 percent of the larvae were found in the U.S. zone. For the 19 CalCOFI survey years since 1951, the average percent of the biomass in the U.S. zone is 70 percent.

Aerial Survey Data Base

During February, Joe Caruso, Mathematician at La Jolla, continued to make progress towards the eventual creation of a full data base for aerial survey data. Caruso reported that the searching effort and sighting data bases were declared in February. Update programs for both data bases were written and debugged. Two additional years of data were also keypunched during February.

Economic Studies Concentrate on Squid Management Plan

During the month of February, economics research at the La Jolla Laboratory was confined primarily to the squid fishery and the economic descriptions necessary to the formulation of a Squid Fishery Management Plan for the Pacific Fisheries Management Council. The first draft of the economics section of the Plan was reviewed by the Squid Management Plan Development Team and the Squid Advisory Subpanel in Long Beach, February 22-24. Jane McMillan and Dan Huppert, Economists, revised the economics section after the meetings and the new version will be incorporated in the Draft Plan to be submitted to the Pacific Fishery Management Council in May.

McMillan devoted substantial time to the further development of the fish meal demand analysis in February. Econometric methods employed included examination of the functional form through maximum likelihood estimates of the so-called Box-Cox transformation, and examination of the existence of a distributed lag structure through application of a test suggested by Zvi Griliches, theoretical economist at Harvard. The results of this study will be submitted for publication soon.

Rockfish Research

John MacGregor, Fishery Biologist at the La Jolla Laboratory, reports that in February blue rockfish (Sebastes mystinus) samples from Tanner Bank and the San Diego sportfishery were processed. There appears to be no difference in growth between these two groups, but both are somewhat slower growing than blue rockfish from the Monterey area sampled and aged by Miller and Geibel of the California Department of Fish and Game.

The greatest difference between inshore and offshore populations of the larger species of rockfishes for which samples are available from both areas is size. Blue rockfish from Osborn and Tanner Banks ranged from 210 to 278 mm standard length, while from the heavily-fished inshore area they ranged from 156 to 179 mm. For olive rockfish (S. serrandoides) the Tanner Bank samples ranged from 246 to 442 mm, and the inshore samples from 170 to 244 mm.

Oceanic Fisheries Resources Division

TUNA RESOURCES PROGRAM

Preliminary 1977 Atlantic Tropical Tuna Purse Seine Fishery Statistics Submitted to ICCAT

Mathematician Al Coan and Computer Technician Stan Moore of the La Jolla Laboratory completed a preliminary report on the 1977 Atlantic tropical tuna statistics from the American purse seine fishery. The

report has been submitted to the International Commission for the Conservation of Atlantic Tunas (ICCAT), as part of a requirements of member countries.

Twelve vessels fished in the eastern tropical Atlantic and four vessels fished in the midwestern Atlantic during 1977, compared to only 7 and 3 respectively in 1976. Estimated catches by ocean area are as follows:

Ocean Region	TOTAL CATCH (METRIC TONS) BY SPECIES									
	Yellowfin	Skipjack	Bigeye	Little Tunny	Auxis	Bluefin	Albacore	Other	Total	Number of Vessels
Eastern Atl.	6,700	6,262	331	53				2	13,348	12
Mid-Western Atl.	729	79					2	9	819	4
Total	7,429	6,341	331	53			2	11	14,167	

Catch and effort from logbooks by 1° and 5° area-month strata indicate that approximately 70% of the yellowfin and skipjack tuna were from the Gulf of Guinea area. Months of greatest catches were August and September for both species. Catch per effort was 4.3 and 3.9 tons per fishing day for yellowfin and skipjack tuna during 1977 and 5.2 and 5.1 respectively for 1976.

Length-frequency samples, taken by the Inter-American Tropical Tuna Commission under NMFS contract indicate the average length of yellowfin tuna caught was 69 cm, and 47 cm for skipjack tuna caught.

Sampling Results for Foreign-Caught Atlantic Tunas, 1977

Preliminary results of length-frequency data collected in 1977 from Atlantic-caught tunas transshipped to Mayaguez, Puerto Rico, have been compiled by Mathematician Al Coan and Computer Technician Stan Moore at La Jolla for submission to the International Commission for the Conservation of Atlantic Tunas (ICCAT). Approximately, 120 length-frequency samples were obtained by Eugene Holzapfel, biological technician from the La Jolla Laboratory, in Mayaguez, Puerto Rico during 1977. Samples were taken from the catches of French, Spanish, Ghanaian, Japanese and Korean longliners, baitboats, and purse seiners. Emphasis was on sampling the tropical tuna catch of the surface fishery. Preliminary results of average length by species and gear are as follows:

Species	Purse Seine	Average length (cm)		Unknown
		Baitboat	Longline	
Yellowfin	61	62		56
Skipjack	47	45		45
Bigeye	70	59		50
Albacore			90	
Auxis	51			

1977 Gardiner Tagging Prizes Awarded

An annual award is given by the Gardiner Foundation of Oakland, California in cooperation with the National Marine Fisheries Service to Mexican sportfishing boat captains who tag and release the most billfish (marlin and sailfish) during the calendar year.

Thomas Gardiner was an active sportfisherman and conservationist in the San Francisco/Oakland area and his estate has provided funds for the conduct of the award program and other activities concerning the study and conservation of sportfishery resources.

The awards are based on a tabulation of Mexican captains' names as they appear on the tag cards received at the Southwest Fisheries Center, for the period January 1, 1977 to December 31, 1977. Some tag cards do not have the names of the captain, and cannot therefore count in the award program. The lower portion of the Baja California peninsula is the award area.

According to Fishery Biologist J. Squire at the La Jolla Laboratory who tabulates the tag cards and maintains records, $100 U.S. is given for first place, second place, $80, third place, $60, and fourth through sixth place, $40. The hotel with the winning captain in each area receives an engraved plaque.

The top captain this year tagged 46 billfish; the second place winner tagged 29, third place, 23 and the fourth place winner tagged 22 billfish.

A total of 42 sportfishing boat captains was recorded as tagging fish in the award area in 1977.

Tuna Vessel Participation in FAX Advisory Program

During February, 27 U.S. tuna seiners cooperated in the FAX program of the La Jolla Laboratory. Several vessels have shown an improvement in their reporting rates over that of last year. The summary table of observations below reflects the participation during February for 1976, 1977, and 1978.

February Reporting Rates

Year	Vessels with equipment	Vessels with Observations	Total weather Observations	Total XBT Observations	Total Observations
1976	73	32	327	39	366
1977	63	22	203	22	225
1978	55	27	263	49	312

During February 1978, 49% of the participating vessels radioed observations to the Southwest Fisheries Center, up from 43% in 1976 and 39% in 1977. The tuna seiner, Cheryl Marie, led cooperating vessels with 17 weather observations and 17 XBT observations. The Cheryl Marie's reports comprised 11% of the total number and congratulations are due Captain John Silveira.

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The new radio crystals for the frequency designated by the Federal Communications Commission for station WWD are now available locally and will be ready for installation in the FAX transmitters by midweek of February 27. Mark Sweeney, Communications Specialist, together with Dr. Eric Barham have been in contact with the tuna fleet, providing supplies, performing routine maintenance, and informing the vessels of availability of the crystals.

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Director of the Western Regional Weather Service H. Bedke, and J. Steiner of the San Diego Weather Service office met with G. Sakagawa, Barham, Sweeney of the La Jolla Laboratory, and Forrest Miller of the IATTC at the Center on February 21. The meeting was held to investigate procedures which would improve FAX products transmitted by WWD to the tropical tuna fleet.

MARINE MAMMAL BIOLOGY AND TECHNOLOGY PROGRAM

Research Begun to Improve Age-Determining Techniques in Porpoise

With a new petrographic photomicroscope, Al Myrick, Wildlife Biologist at La Jolla, has begun studies into genesis and accumulation rates of layers in the teeth and bones of porpoise. Techniques include various staining, decalcification, deproteninization preparations, and the use of polarizing and phase-contrast microscopic examination. Preliminary findings indicate that putative annual layers in tooth and periosteal tissues are composed of monthly layers, which signals future refinement and improvement of the age determination methods currently in use.

Plans are also being made by Myrick to monitor hard tissue layering in the bottlenose dolphin by obtaining biannual tooth samples from four live captive animals over a 2 or 3-year period. These will be studied in concert with hormonal analyses of blood samples as a means of defining factors that may be influencing incremental layering.

Preliminary preparations have begun for tagging and tetracycline marking of wild porpoise which may be caught on the fourth cruise of the dedicated tuna vessel. Subsequent recovery of porpoise so marked will provide corroborating data on rates of layering.

Studies Continue of Responses of Porpoise to Chase

Dr. Warren Stuntz, Fishery Biologist at the La Jolla Laboratory, is analyzing blood samples from 10 live porpoise taken in tuna purse seining operations. He has noted unusually high serum potassium levels that appear to indicate maximum adrenal discharge. Plans to expand this aspect of his investigations by sampling wild populations that will be temporarily held in porpoise impoundment pens during the second cruise of the Queen Mary, the vessel dedicated by the U.S. tuna industry to research on the porpoise/tuna problem.

Stuntz recently traveled to the University of California, Irvine to address local members of the American Cetacean Society on the porpoise/tuna interaction. He also reports that the paper on porpoise behavior studies from the Elizabeth C. J. cruise has just been put into final form and is expected to be published soon by National Technical Information Services.

New Porpoise Impoundment System Tested for Dedicated Vessel

Jackie Jennings, Leader of the Porpoise Tagging Program and James Coe, Leader of the Porpoise Mortality Reduction Task at the La Jolla Laboratory, have successfully tested the new porpoise impoundment system that will be used to facilitate biological and tagging experiments during cruises of the dedicated vessel, Queen Mary. Coe, who is responsible for coordinating the testing, modification, and installation of the new system, expects shipment of the gear from Bay St. Louis, Mississippi to San Diego in early March. Prior to its installation on board the Queen Mary, the gear will undergo further preliminary dock-side and at sea tests in San Diego. In addition to overseeing the implementation of the new system, Coe is engineering alternative programs to optimize standard gear systems to be tested during the second cruise of the dedicated vessel.

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Dr. William F. Perrin, Leader of the Porpoise Biological Studies Task at La Jolla, has recently completed two manuscripts which are currently undergoing "in-house" review. One, co-authored with Dr. Joe Powers, deals with contributions of parasitism to the natural mortality of spotted dolphins, and is scheduled to be published in the Journal of Wildlife Management. The other paper reports on movements of Stenella spp. of dolphins in the eastern tropical Pacific as indicated by tag recovery data for the period, 1969-1976.

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Technicians on the staff of the La Jolla Laboratory's Marine Mammal Biology program have announced that the procedures manual for processing porpoise biological specimens is nearing final form. This is an instruction manual that describes the step-by-step operations of specimens processing. Major contributors to the manual are Ruth Miller, Priscilla Sloan, Chuck Evans, and John Henderson. Data from the first observer cruise of 1978 are beginning to arrive. The laboratory is gearing up to meet the anticipated rush of life history forms and porpoise biological samples.

New Porpoise Tagging Device Selected

Since little is known about the short and long-term movements of porpoise in the Pacific Ocean, porpoise researchers have recommended that a tagging program be undertaken by NMFS at the earliest possible time. The development of a reliable and non-injurious method for tagging porpoise has been an essential first step in undertaking a full-scale tagging program.

Fishery Biologist Jackie Jennings of the La Jolla Laboratory has been developing and testing porpoise tagging devices at the Hubbs-Sea World Research Institute in San Diego. This month Jennings reported that a dorsal fin disc tag has been selected for use in the tagging program; the tag is sufficiently loose to permit water to circulate between fin and tag and its thin, circular shape reduces water resistance to a minimum. Jennings will travel soon to Hawaii to test the tag on six captive and 20 wild Hawaiian spinner sporpoise. As an alternative to the disc tags, she is also investigating the possible use of freeze brands for marking Hawaiian spinner porpoise.

Staff Participates in Marine Mammal Salvage Program

John Henderson, Biological Laboratory Technician at La Jolla, is stationed temporarily at Cape Hatteras National Sea Shore, North Carolina, where he is participating in a 2-week long Marine Mammal Salvage Training program sponsored by the Smithsonian Institution. The training Henderson receives will be used to improve the Marine Mammal Salvage effort which he heads in the San Diego area.

Incidental to its regular tasks, the staff in the Marine Mammal Biology program at La Jolla, retrieves dead, beached cetaceans within San Diego County (live animals are generally handled by Sea World). Information gained from stranded animals will aid in determining aspects of the biology of local species, and will contribute especially to knowledge of reproductive rates. Body measurements of the animals are taken and gonads collected. When an unusual species is encountered, the skeleton is also retained to provide taxonomic data.

The recovery program at the La Jolla Laboratory is part of a developing statewide network, centered at the NMFS Southwest Region, and implemented through local California Department of Fish and Game wardens. Beginning in fiscal year 1979, the recovery program will be included in the assigned mission of the Marine Mammal Biology program.

Conference on Age Determination Scheduled at Southwest Fisheries Center

Dr. William Perrin and Albert Myrick, are jointly coordinating the first international conference for determining age in odontocete cetaceans (toothed whales) which is scheduled at the Southwest Fisheries Center, La Jolla, California in early September. Planned events during the conference include a 3-day symposium and a 10-day workshop that will bring together workers of various related disciplines who can contribute to a potentially integrated approach to the problems of age determination, life history and endogenous correlates of hard tissue layering in Odontocetes.

Population Dynamics Subcommittee for Atlantic Menhaden Meets in La Jolla

The Population Dynamics Subcommittee for Atlantic Menhaden held its first meeting on February 1 and 2 at the La Jolla Laboratory. The Subcommittee was formed in August 1977 under the aegis of the Scientific and Statistical Committee, Atlantic Marine Fisheries Commission.

Appointed members of the subcommittee are Gordon Broadhead, Living Marine Resources, San Diego, California; Dr. Churchill Grimes, Rutgers University, New Brunswich, New Jersey; Dr. Joseph Loesch, Virginia Institute of Marine Science, Gloucester Point, Virginia; Dr. Walter Nelson, NMFS-Beaufort Laboratory, Beaufort, North Carolina; Dr. Gary Sakagawa, NMFS-La Jolla Laboratory; and Katy West, North Carolina Department of Natural and Economic Research, Morehead City, North Carolina. The subcommittee is charged with providing information on the following:

1. What is the present status of the menhaden resource?

2. How will it respond to various levels of fishing in the near- and long-term?

3. Can a useful unit of effort be devised, and if not, are there other solutions?

4. Can the yield-per-recruit be improved?

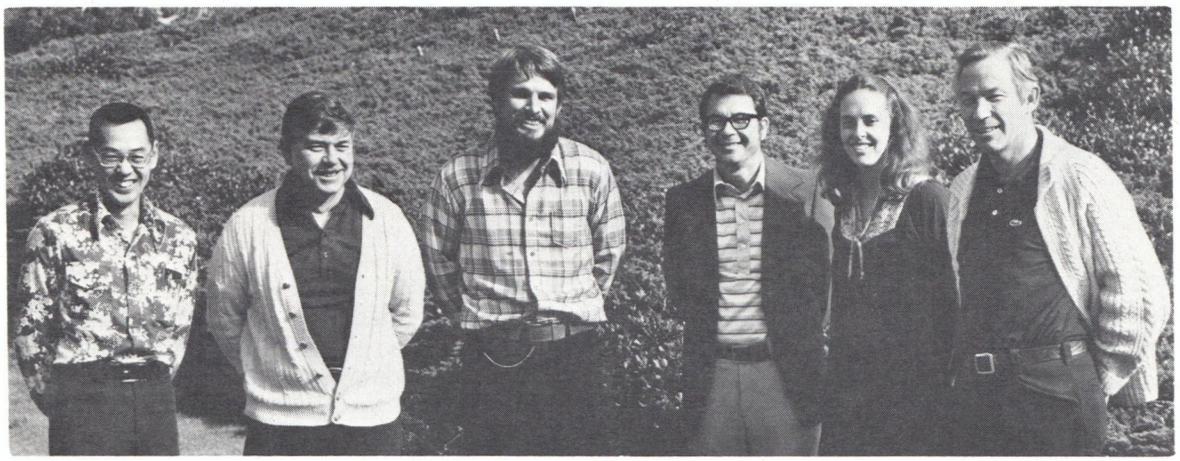
5. Pinpoint gaps in the data and propose solutions within a priority framework.

6. What would be the long-range effects of various levels of fishing by age-groups or geographical areas?

7. To what user group-area advantage or disadvantage would the benefits of these options accrue?

At the meeting, Loesch was elected chairman. The subcommittee reviewed available information on the population dynamics of the stock and drafted its findings and recommendations.

In summary, the subcommittee considered the available information and analysis with respect to the stated items. It was not able to respond adequately to certain items, but was able to consider the others. Additional analyses of various types were recommended and the subcommittee proposed to develop an overview document. It would contain for each item the basic data and results essential to support the opinions of the group when the analyses are completed. The subcommittee developed an outline for the overview document and assigned Nelson the responsibility of completing the required analyses within the next 3 months.



Pictured left to right are the members of the Population Dynamics Subcommittee for Atlantic Menhaden: Dr. Gary Sakagawa, Dr. Joseph Loesch, Dr. Churchill Grimes, Dr. Walter Nelson, Mrs. Katy West, and Mr. Gordon Broadhead.

PACIFIC ENVIRONMENTAL GROUP

OCEAN CLIMATOLOGY AND MONITORING PROGRAM

Oceanographer Discusses Effect of Climate on Fisheries

Dr. Douglas R. McLain, Oceanographer at PEG, traveled to Anchorage, Alaska, February 5-11 to give an invited talk on climate and fisheries to a meeting of the Commercial Fisheries Division of Alaska Department of Fish and Game. The weather in Alaska in the past decade has been variable and has had marked effects on fisheries. Two extremely cold winters occurred back to back in 1970-1971 and 1971-1972 and apparently had serious effects on Bristol Bay sockeye salmon, Gulf of Alaska pink shrimp, and possibly also king crab. Colder than normal weather persisted until the winter of 1976-1977 which was extremely warm.

Biologists at the Alaska Department of Fish and Game were interested in sources of environmental data, methods of use of environmental data in fishery forecast models, and in possibilities of forecasting climatic changes. They particularly were interested in the probability of occurrence of two cold winters back-to-back again in the next decade. Although insufficient historical environmental monitoring records exist, such paired cold winters may occur once every 10 to 15 years.

The probability of cold winters is affected by long term cooling and warming trends. Historical air temperature data from land stations show a general warming trend from about 1890 to 1940 and cooling since that time in the Northern Hemisphere. Measurements of the O^{18}/O^{16} ratio from ice core samples from Greenland correlate well with known past climatic changes and suggest that the present cooling trend may last another 5 to 10 years after which warming may occur. Thus probability of cold winters in Alaska may increase and then decrease in the next 20 years.

TIBURON LABORATORY

FISH COMMUNITIES INVESTIGATION PROGRAM

Analysis of Flatfish Fisheries Provides Recommendations

The stocks of petrale sole and English sole, in the Columbia, Washington area are being fully exploited, but there is room to expand the Dover sole fishery in this same area. This is the conclusion drawn by Dr. William Lenarz, Leader of the Rockfish Analysis Task at the Tiburon Laboratory, following production model and cohort analyses of these fisheries that he did as a member of the Pacific Fishery Council's Groundfish Management Plan Development Team.

Workshop Examines Ecosystem Models that Would Assess Effects of Oil Spills

Models that would assess the effects of oil spills on the marine ecosystem, and the fisheries, in the Bering Sea, were examined this month by a workshop at the Northwest and Alaska Fisheries Center, Seattle. Peter Adams, Fishery Biologist with the Tiburon Laboratory's Rockfish Analysis Task, who participated, reported that one of these models (the Bulk Biomass Model--BBM) is simply two-dimensional, whereas the other (the Dynamic Numerical Marine Ecosystem Model--Dynamics III), is a more complex version that also considers water depth and time of day. Other topics discussed included modeling activities and data-base management at other laboratories, and the need for more informal contact among workers in ecosystem modeling.

Blue Rockfish May Leave Coves with Heavy Fresh-Water Outflow

When coastal streams discharge heavy outflows of fresh water, the blue rockfish may leave affected coves and move to more offshore reefs. This is suggested by observations of Fishery Biologist Tony Chess and

Biological Technician Chet Chaffee at Mendocino this month. A succession of winter storms had prevented work at the Albion study site over the past two months, and so a visit was made to assess the effects of these storms. Although underwater visibility was sharply reduced, making assessments difficult, no blue rockfish were seen on reefs nearshore where they had been numerous during the two previous winters when rainfall--and resulting runoff--had been minimal. The blue rockfish were as numerous as ever this month on the more offshore reefs, however. Chess believes that heavy flow of fresh water from coastal streams into the coves creates conditions nearshore that are unfavorable for this species.

FISHERIES DEVELOPMENT INVESTIGATION

Loss of Trawl Leads to Suspension of Euphausid Fishery

Two trips were made to Moss Landing by S. Kato and J.T. Barnes of the Tiburon Laboratory, in attempts to harvest euphausids from the fishing vessel, Lady Olga. The first trip was cancelled due to rough weather. On February 23 the first attempt this season to catch euphausids got under way but was quickly thwarted when the first tow with the mid-water trawl ended in disaster. The entire trawl except the headrope and footrope was lost, possibly due to overloading. According to the fishermen, the net, which had recently been modified, was not constructed properly to withstand normal strain. Work on this species has thus been suspended, unfortunately, at a time when interest in euphausids is growing.

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Barnes has finished construction of 30 octopus pots for experimental fishing trials at Bodega Bay. Fishermen in the Santa Barbara area are also interested in trying to catch octopus.

Kato traveled to Long Beach on February 21-24 to participate in a meeting of the Pacific Management Council's Squid Management Plan Development Team and its advisors where the first draft of the Plan was presented the public.

RECREATIONAL FISHERIES IMPROVEMENT

Preparation Made for Final Year of Salmon Pen-Rearing Experiments

Further preparations were made for the final year of salmon pen-rearing experiments. A shipment of 100,000 king salmon is expected next month from the California Department of Fish and Game; in June, a shipment

of 60,000 coho salmon is expected from a private grower in Rochester, Washington. This month was occupied by the logistics of feed purchase, tagging, innoculating, imprinting, and transportation of the fish. Ten thousand of the cohos will be taken by University of California Extension Service, Sea Grant, for their Tomales Bay pen-rearing project.

Nets and pens were partially refurbished during the month and modifications made. The pen sections are being fastened together rigidly, rather than articulated, in order to reduce wave damage where sections are joined.

Materials are being assembled to make the morphaline-releasing drip apparatus for imprinting the salmon.

Green consulted with Tyee Club members, furnishing data to them to be used in deliberations on their future role in the project.

Eleven tag returns were received in February--nine from the fall 1976 release of king salmon, one coho from the fall 1976 release and one from the fall of 1975. The latter fish was estimated by the angler to be 32 lbs. The accuracy of the estimate is highly suspect, since this would be a new world record for anadromous coho salmon. The fish was not weighed and was consumed before there was an opportunity to interview the angler.

Anglers' Guide Published by Government Printing Office

The Anglers' Guide to the United States Pacific Coast, coauthored by James Squire of the La Jolla Laboratory and Susan Smith of the Tiburon Laboratory, was finally published in February. The sale price has yet to be determined by the Superintendent of Documents pending receipt of the printing bill. The book describes marine game fish, fishing grounds, and fishing facilities along the U.S. west coast from California to Alaska, including the tropical islands of Hawaii, American Samoa, and Guam.

During the month a review copy was requested by the Travel Editor of Sunset Magazine, a periodical that has a wide distribution along the west coast. The editor plans to mention the Angler's Guide in an upcoming article on Pacific Coast partyboat fishing, which will appear in Sunset's April issue.

PHYSIOLOGY INVESTIGATIONS

Additional Funding Received for Completion of OCSEAP Petroleum Task

Dr. Jeannette Whipple and Tom Yocom of the Tiburon Laboratory presented a verbal report to the Outer Continental Shelf Environmental Assessment Project (OCSEAP) representatives to secure funding to complete sample processing and manuscript preparation. Funding was received and project personnel spent the month analyzing tissues for dicyclic aromatic hydrocarbons.

Work continued on quantifying tissue-bound cyclohexanes, compounds not previously identified as important toxic components of crude oils. These compounds (most notably methycyclohexane) accumulate to higher concentrations and are retained in tissues longer than monocyclic aromatic hydrocarbons; concentrations of the cyclohexanes in exposure tank waters were below detectable levels.

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Whipple completed reviewing the criterion document for toluene to be included in the Environmental Protection Agency "Red Book."

Dr. Fred Weiss of Shell Development Company visited staff members this month to discuss upcoming meetings and research subjects of mutual interest.

Results of Two Years Experiments on Early Life Mortality Presented

Preparations were completed by the staff of the Striped Bass Task at Tiburon for a meeting presenting the results of two years of experiments on early life stage mortality of striped bass. The meeting, scheduled for March 2, will be attended by researchers, culturists and resource managers concerned with the California striped bass population.

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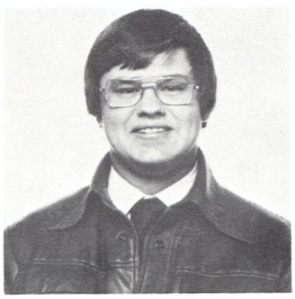
A differential stain which distinguishes cartilage from bone development was successfully used to determine the effects of food ration on ossification in striped bass larvae. It was found that the sequence of cartilage and bone development did not change between starved and the different food rations. Rather, the rates of development were directly correlated, as was growth, to the food ration. The first bones to form cartilage and to ossify were those of the branchiocranium. This coincides with the onset of feeding and is believed closely linked to the ability of the animal to capture food successfully. This analytical technique has potential as a measure of growth and development and will be used in further experiments on factors affecting mortality in striped bass larvae.

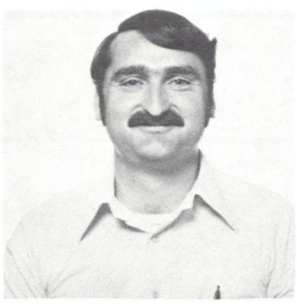
RECENT ADDITIONS TO SWFC STAFF

The staff at the Southwest Fisheries Center has increased during the past year. To help us become better acquainted, we will present photographs of new staff members in the Center Monthly Report as they come to work. Initially, however, we do have a considerable backlog of new employees to present and we will run their photographs as they become available to us. Shown here, in alphabetical order, is our first group of new career or career-conditional employees.



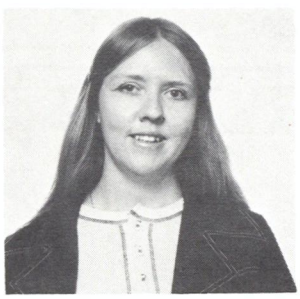
NORMAN W. BARTOO - EOD: 2-13-77

Fishery Biologist (Research) - Assigned to Tuna Resources Program at La Jolla Laboratory.



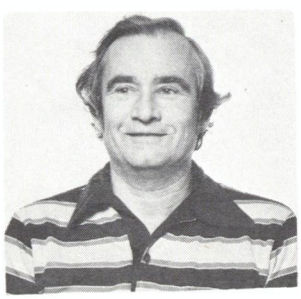
JOSEPH P. CARUSO - EOD: 12-18-77

Mathematics Technician - Works in the Commercial and Recreational Fisheries for Management Program, La Jolla Laboratory.



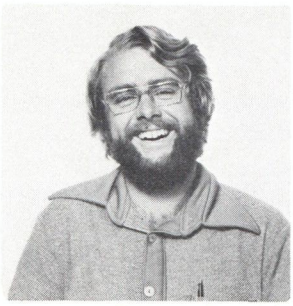
SUSAN H. COVEY - EOD: 2-13-78

Library Technician - SWFC, La Jolla.



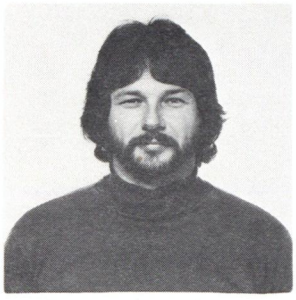
RICHARD J. DYER - EOD: 12-18-77

Computer Technician - Quantitative Analysis and Data Management in Marine Mammal and Assessment Program, La Jolla Laboratory.



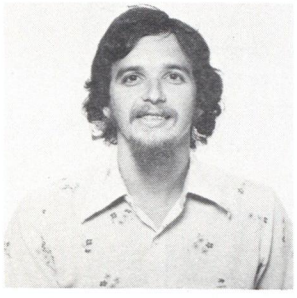
CHARLES J. EVANS - EOD: 10-11-77

Biological Laboratory Technician (Fisheries) - Life History and Systematics in the Marine Mammal Biology & Technology Program, La Jolla Laboratory.



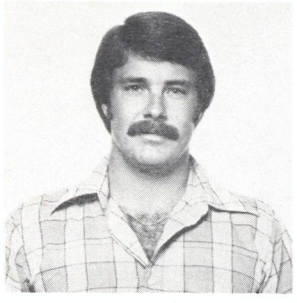
ROBERT K. FOUNTAIN - EOD: 3-13-77

Biological Technician (Fisheries) - Quantitative Analysis and Data Management, Marine Mammal Assessment & Monitoring Program, La Jolla Laboratory.



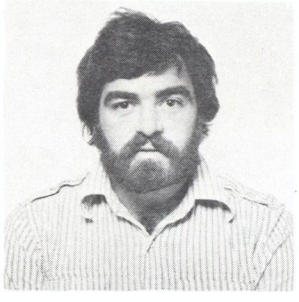
FRANK G. IORIO - EOD: 12-5-76

Computer Programmer - Quantitative Analysis and Data Management Marine Mammal Assessment & Monitoring Program, La Jolla Laboratory.



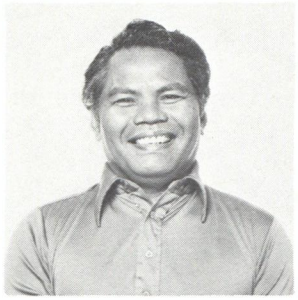
TERRANCE D. JACKSON - EOD: 7-30-76

Lieutenant, NOAA Corps - Assigned to Stock Assessment in the Marine Mammal Assessment and Monitoring Program, La Jolla Laboratory.



DENNIS M. KING - EOD: 4-10-77

Industry Economist, Tuna Resources Program, La Jolla Laboratory.



RUDY R. MARBIBI - EOD: 1-31-78

Computer Programmer - Quantitative Analysis and Data Management, Marine Mammal Assessment and Monitoring Program, La Jolla Laboratory.

Director Participant in Symposium on Domestic and International Aspects of Extended Marine Jurisdiction

Director Barrett was an invited participant in the Symposium on Domestic and International Aspects of Extended Marine Jurisdiction, chaired by Dr. Brian Rothschild, Deputy Director, Office of Policy and Planning, NOAA, presented during the 1978 annual meeting of the AAAS in Washington, D.C., February 14-16. Barrett presented a talk on the information requirements of extended jurisdiction. He pointed out that the information needs of Extended Jurisdiction are being approached vigorously today by those involved in the development of fisheries management within the Fishery Conservation and Management Act (FCMA) of 1976. Actions being taken include the accelerated employment of economists, sociologists and lawyers within NMFS to identify gaps, develop concepts and theories, and specify information content, quality and quantity. The awareness of the need for a better theoretical base than that presently available has resulted in the convening of a number of national and regional workshops to examine problems and offer recommendations and solutions. Contracts are being awarded to university researchers to develop basic theory, and in-house approaches to the problems are being funded in the NMFS fisheries research centers.

Communications are being improved among the many institutional participants in the FCMA--mandated management activities through their membership on the Councils and associated committees, through State/Federal Committees, and through inter-Council plan-development, to name a few.

An awareness of the information needs for FCMA among the data gatherers and holders has also helped to make the information more accessible. Problems of confidentiality are being examined by legal experts and various arrangements devised both to preserve the confidentiality of the data and yet permit their use in a non-identifiable manner in the formulation of the management plans.

The specific management of fisheries and other FCMA-related information and data is being approached in NMFS as a two-tiered structure. Four regional data management subsystems will operate within a national systems management framework. At the regional level, first studies are being made on both the institutional and technical structure and mechanisms needed for collection and management of the information needed for FCMA. Funding and personnel are being provided on a priority basis for these data management activities within overall NMFS budgetary constraints.

Heart-to-Heart Campaign Held at SWFC

Shown in accompanying photograph are Charles Hill, Chief of Support Services and Anita Coit, Administrative Assistant, at the National Marine Fisheries Service's Southwest Fisheries Center in La Jolla, California, with some of the clothing and canned food donated to orphanages in Tijuana, Mexico, during the Heart-to-Heart Campaign which ended on St. Valentine's Day, February 14. Hill was the campaign coordinator for the Southwest Fisheriec Center while Coit served as the campaign chairperson for the federal agencies (including the Federal Executive Association and Federally Employed Women) who endorsed the effort in San Diego County. According to Coit, this year's campaign resulted in the collection of 800 pounds of food and clothing and cash contributions. Collecting boxes were placed in areas for a two-week period in February ending on St. Valentine's day in areas designated by the respective federal agency.

The contributions were formally received by representatives of the Mexican government. Coit noted that the Heart-to-Heart gifts filled a special need this year since the disastrous series of storms which caused widespread damage in southern California and Baja California, Mexico, left an estimated 12,000 people homeless in Tijuana.

SEMINARS

La Jolla Laboratory

The following seminars, arranged by the seminar chairman for 1978, Dr. C. O'Connell of the La Jolla Laboratory, included the following in February.

February 6 - Dr. Eric Barham, SWFC: "Porpoise Aerial Survey, 1977: The Big Enchilada"

14 - Dr. William Fox, Jr., SWFC: "Oceanic Fisheries Resources Division Research at the Southwest Fisheries Center"

15 - Dr. Patrick Lett, Marine Fish Division, Bedford Institute of Oceanography, Dartmouth, Nova Scotia, ENVIRONMENT CANADA: "Biological basis for management of the Northwest Atlantic Harp Seal"

16 - Dr. Lett: "Recruitment and multispecies interaction and their effect on Gulf of St. Lawrence cod"

27 - Dr. Frank White, Department of Pathology, UCSD School of MEDICINE: "Vascular anatomy of albacore tuna"

Tiburon Laboratory

February 7 - Dr. Sylvia Earle: "Behavior and Songs of the Humpback Whale from Alaska and Hawaii"

HONORS AND AWARDS

February 1 - Michael Bowers, Biological Aid, - Sustained Superior Performance - Tiburon Laboratory

VISITORS

La Jolla Laboratory

February 1 - Walter Nelson, NMFS, Beaufort, North Carolina.

- Joseph G. Loesch, Virginia Institute of Marine Science, Gloucester Point, Virginia.

6 - D. F. Markle, Laboratoire Maritime, Huntsman Marine Laboratory, St. Andrews, New Brunswick, Canada.

February 8 - Ray Strysin, Upward Bound, Harvey Mudd College, Claremont, California.

9 - Maurice E. Stansby, NMFS Northwest and Alaska Fisheries Center, Seattle.

10 - William Leet, NMFS, SWF Region, Tiburon.

- Roland Garwood, Naval Postgraduate School, Monterey.

13 - Mark I. Farber, NMFS Southeast Fisheries Center, Miami, Florida.

- Dr. Bruce Mate, Oregon State University, Newport, Oregon.

- Roland Finch, Office of Assistant Director for Fisheries Management, Washington, D.C.

21 - William Clarke, NMFS, Juneau, Alaska.

- George Johnson, Acting Chief, Personnel Division, Northwest Administrative Services Office. Johnson presented an EEO seminar on the new Factor Evaluation System.

22 - Gary Smith, SW Region and Dick Heimann, CF&G, met on the Fishing Information System with D. Mackett, Program and Planning Officer.

27-28 - William Ripley, Director, Fisheries Division, United Nations Development Program, New York.

VISITORS

Honolulu Laboratory

February 6 - Dr. Richard T. Johnson, the Graduate School of Business, Stanford University, Stanford, Ca., met with Mr. Shomura to discuss a contract Dr. Johnson has with the High Commissioner of the Trust Territory of the Pacific Islands and the Department of the Interior to examine economic options available to the Trust Territory Districts in the fisheries area.

8 - Dr. Paul Callaghan, University of Guam, visited Mr. Yuen to seek information on the Hawaiian ika-sibi fishery.

9 - Mr. Gerald V. Howard and Mr. William Craig of the Southwest Region met with Mr. Shomura; Messrs. Howard and Craig were in Honolulu to attend the PTDF meeting.

February 13 - Dr. Frederick F. Monroe, Chief, Marine Boundaries and Resource Division, Office of the Geographer, U.S. Department of State, Washington, D.C., visited Acting Director Otsu. Mr. Monroe was seeking information on the distribution of various resources in the western Pacific.

Pacific Environmental Group

February 28 - Captain Dewey Rushford, NOAA Corps, Rockville, Maryland.

- Cdr. Donald Northrup, NOAA Corps, Monterey, Ca.

Tiburon Laboratory

February 7 - Jean Jacobs, California Academy of Sciences, San Francisco.

- Richard G. Miller, Forest, Inst. for Ocean and Mountain Studies, Carson City, Nevada.

10 - John Klein, Marin Foods, San Rafael, Ca.

21 - Nelson Ross, EDS, La Jolla, Ca.

23 - R. Jablonski, Potomac Research Institute, La Jolla, Ca.

- George Johnson, NOAA, NASO, Seattle, Wa.

24 - Wm. Ellis Ripley, United Nations, New York City.

MEETINGS AND TRAVEL

February 1-2 - The Southwest Fisheries Center Management Meeting was held at Honolulu Laboratory. In attendance from La Jolla were I. Barrett, R. Lasker, W. Fox, B. Remington and D. Mackett; from the Tiburon Laboratory, N. Abramson; from the Pacific Environmental Group, Monterey, G. Seckel; and representating the Southwest Region, D. Gates and R. Iversen. Also present was John F. Carr, Deputy Center Director-Designate. Shomura and the Honolulu Laboratory Program Leaders made short presentations on the first day.

2 - Director Barrett talked about the Washington NMFS reorganization at a brief general staff meeting.

3 - Shomura, Barrett and Fox met to discuss SWFC's research program on tunas and billfishes. General areas of responsibility were reviewed.

February 5-8 - Dr. Sakagawa in Honolulu to attend a meeting of the billfish subpanel of the Western Pacific Fishery Management Council.

5-11 - Douglas McLain traveled to Anchorage and Juneau, Alaska to attend meeting of the Division of Commercial Fisheries and visit NMFS Laboatory.

6 - As a member of the San Diego Underwater Parks Committee, Director Barrett attended their monthly meeting.

6-8 - Richard Parrish, PEG, traveled to Seattle, Washington, to attend NMFS Workshop on Ecosystem Models of NWAFC.

6-10 - Systems Analyst F. Kellenberger, La Jolla, in Miami to attend the National Data Management System meeting and Fishery Information System meeting in San Francisco.

- Drs. J. Powers, D. Au and M. Laurs all of the La Jolla Laboratory, in Seattle to attend the NMFS Workshop on Ecosystem Models.

7-9 - Peter Adams, Tiburon Laboratory, traveled to Seattle to attend the NMFS Ecosystem Modeling Workshop.

7 - The Billfish Planning Team and the Advisory Subpanel on Billfishes, WPRFMC, held a joint meeting in the Honolulu Laboratory conference room. Robert Bell, California Fish and Game, Gary Sakagawa, SWFC, and Lorry Nakatsu, Executive Director, Pacific Regional Fishery Management Council also were present at the Meeting.

8-9 - Dr. D. Huppert, La Jolla Laboratory, was in Santa Cruz, California, to present a lecture on the Anchovy Plan to a class on natural resources economics at the University of California, Santa Cruz.

9 - Dr. Huppert to UC Santa Cruz to deliver lecture on the economics of fisheries management and the Draft Anchovy Management Plan.

- Drs. W. Fox and G. Sakagawa, La Jolla Laboratory, traveled to Miami for a 1978 planning session for the International Commission for the Conservation of Atlantic Tunas.

- Director Barrett traveled to Sacramento to attend the State/Federal Steering Committee meeting.

February 9 - Shomura, Honolulu Laboratory, attended the first day's meeting of the Pacific Tuna Development Foundation (PTDF) at the Royal Hawaiian Hotel.

- Director Barrett traveled to Sacramento to attend the State/Federal Steering Committee meeting.

9-10 - David Mackett, Center Program and Planning Officer, was in Sacramento to attend a State/Federal Technical Committee meeting and a State/Federal Steering Committee meeting. Subsequently, Mackett met with Dick Heimann of the CF&G and Gary Smith of the NMFS Southwest Region in Menlo Park, California.

12-14 - Ed Ueber, Tiburon Laboratory, traveled to Grover City, Avila Beach, and Moss Landing to set up fish recovery experiments on Sebastes goodeye.

14 - Norman Abramson, Tiburon Laboratory, traveled to Miami, Florida to attend the meeting on the Ocean Pollution Research and Monitoring Program Act.

14-17 - Dr. W. Perrin, La Jolla Laboratory, in La Paz, Mexico to attend a U.S./Mexico marine mammal meeting.

15 - Ed Ueber, Tiburon Laboratory, attended the Dungeness Crab Management Plan Development Team meeting at Portland, Oregon.

16 - Mickey Eldridge, Tiburon Laboratory, visited with Drs. J. Cech and S.I. Doroshev of the University of California, Davis, on the possibility of joint research efforts during the upcoming striped bass experimental season.

- Shomura, Honolulu Laboratory, attended a hearing at the State Capitol on House Bill 2193, relating to the Hawaii fishing industry master plan.

16-17 - Dr. Huppert and Alec MacCall in Portland, Oregon to report to Pacific Fishery Management Council on Anchovy Plan progress and to hear Fish and Wildlife Service report on endangered species, i.e., pelican issue.

- Dr. D. Huppert, La Jolla Laboratory, attended the Pacific Fishery Management Council meeting in Portland, Oregon.

17 - Hazel Nishimura, Honolulu Laboratory, attended a workshop on GPO materials sponsored by the Federal Libraries section of the Hawaii Library Association. The workshop was conducted by Helen Holt, Library Inspector, Government Printing Office, and was held at the Pearl Harbor Naval Training Center.

February 17 - R. Lasker, K. Bliss, R. Counts, J. Brown and J. Thrailkill of the La Jolla Laboratory, at sea for one day aboard the NOAA research vessel, David Starr Jordan, for a CalCOFI training cruise.

17-18 - Paul Sund traveled to Monterey to confer with Chief and staff and PEG.

20 - Sus Kato, Tiburon Laboratory, to Long Beach, Ca. to attend the Squid Management Plan Development Team meeting.

20-23 - Director Barrett was in Miami to attend a Bluefin Tuna Workshop and then on to Terminal Island where he attended a meeting on the Anchovy Fishery Management Plan.

21 - Fishery Biologist W. Stuntz, La Jolla Laboratory, in Irvine to present a talk to the Orange County chapter of the American Cetacean Society on the Porpoise/Tuna problem.

21-23 - Gunter Seckel, PEG, traveled to Mt. Hood, Oregon to attend a NORPAX meeting.

22 - Ed Ueber, Tiburon Laboratory, traveled to Fort Bragg to meet with fish processors regarding the possibility of doing fillet recovery work on Sebastes paucispinis.

22-23 - Dr. R. Lasker, La Jolla Laboratory, participated in a post-IDOE (International Decade of Ocean Exploration) Planning Steering Committee meeting at Scripps Institution of Oceanography, La Jolla.

22-24 - Dr. Huppert and Jane McMillan traveled to Long Beach and Terminal Island for 1) meeting of Squid Advisory Subpanel and Squid Management Plan Development Team, 2) NMFS policy meeting on Anchovy Plan, and 3) Squid Team working sessions.

- B. Remington, SWFC, attended the FIMA (Financial Information) Workshop in San Diego. Following the meetings, a number of the participants visited the Center for a tour of the facilities.

23 - Dr. W. Fox, La Jolla Laboratory, in Houston, Texas to attend a review meeting of the Scientific Advisory Committee of the Marine Mammal Commission.

February 22-24 - Economists D. Huppert and J. McMillan, La Jolla Laboratory, in Long Beach to participate in the Squid Advisory Panel, Squid Team Workshop and Center/Region meeting on anchovy management.

24 - Shomura and WPRFMC members met with David H. Wallace, Office of Assistant Administrator for Fisheries, Washington, D.C., at the State Capitol.

27 - Barrett attended a meeting of the Underwater Parks Committee in San Diego.

- Shomura departed Honolulu to attend meetings in Manila (IPFC Sessions, 1-17 March) and in Taipei, Republic of China (USA/ROC Economic Council Meeting, 28-30 March); he is scheduled to return to Honolulu on April 2.

27-28 - Norman Abramson, Tiburon Laboratory, participated in a meeting of the PFMC's Pink Shrimp Management Plan Development Team at California Fish and Game's Menlo Park Laboratory.

28 - Dr. Stauffer and Alec MacCall went to Santa Barbara to join Svein Fougner, SWR, in an exploratory meeting with FWS representatives and prominent ornithologists on the subject of ecological interactions between pelicans and other seabirds with the anchovy fishery.

February 27 - March 1 - Douglas McLain, PEG, traveled to Washington, D.C. to participate as a panel member to review the National Oceanographic Data Center.

PERSONNEL

February 6 - Marta Dik, Biological Aid (Temp.) - Entered on Duty - La Jolla Laboratory

February 12 - Oden Burris, Computer Programmer - Promotion - La Jolla Laboratory

- James Coe, Fishery Biologist - Promotion - La Jolla Laboratory

- James Squire, Fishery Biologist - Reassignment to Oceanic Fisheries Resources Division, Tuna Resources Program, La Jolla Laboratory.

February 13 - Meryl H. Cohen, Biological Technician - 700 hr. appt. - Tiburon Laboratory.

- Alice Rhodes, Clerk-Steno - Resignation - Tiburon Laboratory

21 - Kathy Senini, Data Transcriber - Temporary Appt. - La Jolla Laboratory.

TRAINING

February 13-17 - Jeannette A. Whipple, Civil Service Commission sponsored course, "Supervision and Performance."

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