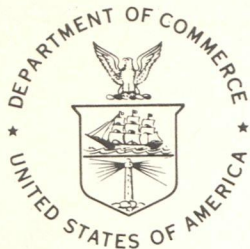


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HONOLULU
LA JOLLA
MONTEREY
TIBURON



SOUTHWEST FISHERIES CENTER

MONTHLY REPORT - JUNE 1983

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SOUTHWEST FISHERIES CENTER
LA JOLLA, CALIFORNIA

HONOLULU LABORATORY
LA JOLLA LABORATORY
TIBURON LABORATORY
PACIFIC ENVIRONMENTAL GROUP

MONTHLY REPORT - JUNE 1983

STATUS OF PUBLICATIONS

Published

Burgess, Lourdes Alvina. 1982. Four new species of squid (Oegopsida: Enoploteuthis) from the central Pacific and a description of adult Enoploteuthis reticulata. Fish. Bull., U.S. 80(4):703-734.

Four new species of Enoploteuthis (E. obliqua, E. octolineata, E. higginsii) are described, illustrated, and compared. Adults of E. reticulata Rancurel 1970 are described for the first time. A key for all the species is provided.

Hewitt, Roger. 1983. Roll, heave and vertical ichthyoplankton tows. Ocean Science and Engineering, 8(1):41-51.

A simple model of ship's motion is described and used in the design of vertical ichthyoplankton tows. The velocity of the net, as it is affected by roll, heave and retrieval rate, is plotted for the duration of the tow. After simulating various conditions the retrieval rate may be specified that minimizes extrusion of soft bodied organisms and is still sufficient to prevent stalling and back flushing of the net; the model may also be used to specify the sea state at which field operations should be suspended.

Lasker, Reuben and Alec MacCall. 1983. New ideas on the fluctuations of the clupeoid stocks off California. Proceedings of the Joint Oceanographic Assembly 1982, General Symposia, Dalhousie Univ., Halifax, Nova Scotia, Canada, 110-120 pp.

THIS REPORT DOES NOT CONSTITUTE PUBLICATION AND IS FOR INFORMATION ONLY.

Martin, Gerald G., and Jeffrey J. Polovina. 1982. A comparative study of fish yields from various tropical ecosystems. In D. Pauly and G.I. Murphy (editors), Theory and management of tropical fisheries, p. 255-289. ICLARM Conference Proceedings, 9, 360 p. International Center for Living Aquatic Resources Management, Manila, Philippines and Division of Fisheries Research, Commonwealth Scientific and Industrial Research Organization, Cronulla, Australia.

There is an immense variation in actual and potential fish yields, both within and between different kinds of aquatic tropical ecosystems. The finfish catches from lakes, reservoirs, rivers, continental shelves and coral reefs all fall in approximately the same range of 0.1 to 30 tonnes/km²/year, with most catches falling in the range of 1 to 10 tonnes/km²/year and modal values falling in a range of 3 to 6 tonnes/km²/year. The yields from estuaries and ponds can be considerably higher (up to 120 tonnes/km²/year without supplementary feeding), and the yields from open ocean are considerably lower (.002 to .05 tonnes/km²/year). Within the tropics, the best physical indicator of a fishery's potential yield is water depth, and the best biological indicator is primary productivity. Some ecosystems such as rivers, estuaries and ponds have relatively high fish yields for their primary productivity, presumably because of organic matter inputs. Other ecosystems such as coral reefs and open oceans have relatively low fish yields, presumably because of long food chains. However, no single indicator, including primary productivity, can predict fish yields very precisely. More refined yield assessments will have to be empirical in nature, recognizing the importance of fishing practices in assessing potential yields and giving particular attention to how the composition of fish communities in different habitats is altered by fishing and other human activities.

Administrative Reports

Shomura, Richard S., and Henry Sakuda. 1983. A summary of the 1983 tuna baitfish workshop. SWFC Admin. Rep. H-83-9.

SMS Research. 1983. Survey of the broker and retail sectors of the fish markets in Hawaii: Final report. SWFC Admin. Rep. H-83-10C.

Approved by Center Director

Breisch, Eric A., Francis White, H. Martin Jone and R. Michael Laurs. Ultrastructural morphometry of the myocardium of Thunnus alalunga. For consideration for publication in Cell and Tissue Research.

Cech, Joseph J., Jr., R. Michael Laurs and Jeffrey B. Graham. Temperature-induced changes in blood gas equilibria in the albacore, Thunnus alalunga, a warm-bodied tuna. For consideration for publication in the Journal of Experimental Biology.

Gerrodette, Tim, Daniel Goodman, and Jay Barlow. Conference limits for population projections when vital rates vary randomly. For consideration for publication in the Canadian Journal of Fisheries and Aquatic Sciences.

Hunter, John R. Commentary on determinants of stock abundance. For publication in a Symposium on Recruitment Variability to be published by the University of Washington Press.

Polacheck, Tom. Functional responses and optimal foraging in patchy environments. For consideration for publication in the Journal of Wildlife Management.

Smith, S.E. Timing of vertebral band disposition and local movements of tetracycline-injected leopard shark (Triakis semifasciata) tagged in San Francisco Bay. To be submitted to Transactions of the American Fisheries Society for consideration.

Sumida, B., B. Washington and W. LaRoche. Notes on illustrating fish eggs and larvae. For consideration for publication in the Ahlstrom Symposium volume.

The following manuscripts are scheduled for publication in the Proceedings of the Special Symposium on Resource Investigations in the Northwestern Hawaiian Islands, May 25-27, 1983, University of Hawaii, Honolulu.

Humphreys, Robert L., Jr., Darryl T. Tagami, and Michael P. Seki. Seamount fishery resources within the southern Emperor-northern Hawaiian Ridge.

Ito, Bernard M., Richard N. Uchida, Lance K. Shirai, Mary A. Abad, Lucille H. Kimura, and Yoshitsugi Hokama. Radioimmunoassay results of ciguatera analysis of fishes in the Northwestern Hawaiian Islands, 1980-81.

Kikkawa, Bert S. Maturation, spawning, and fecundity of opakapaka, Pristipomoides filamentosus, in the Northwestern Hawaiian Islands.

Kikkawa, Bert S., and Alan R. Everson. Gonadal maturation, fecundity, and spawning of the greater amberjack, Seriola dumerili (Risso), in Hawaiian waters with references to ciguatoxin incidences.

Uchida, Richard N., and Darryl T. Tagami. Biology, distribution, population structure, and pre-exploitation abundance of spiny

lobster, Panulirus marginatus (Quoy and Gaimard 1825), in the Northwestern Hawaiian Islands.

Uchiyama, James H., Sally H. Kuba, and Darryl T. Tagami. Length-weight and standard length-fork length relationships of deep-sea handline fishes of the Northwestern Hawaiian Islands.

HONOLULU LABORATORY

INSULAR RESOURCES INVESTIGATION

Plans Made for Field Work in the Marianas in FY 1984

Dr. Jeffrey J. Polovina, Leader, Resource Assessment Investigation of the Mariana Archipelago (RAIOMA) Program, reports RAIOMA field work in FY 1984 will consist of four cruises on the NOAA research vessel, Townsend Cromwell, in the Mariana Archipelago, November 1983 through May 1984. The objectives of the field work are to determine the distribution and relative abundance of bottom fishes, shrimp, and bigeye scad, and to conduct intensive fishing to estimate the density of shrimp and bottom fishes at several small seamounts in the archipelago. Also scheduled is work to extend the site specific time series of length-frequency data on shrimp, bottom fishes, and bigeye scad that was begun earlier and to conduct a photographic survey of resources and bottom topography down to approximately 900 m (500 fathoms) using an underwater 35 mm camera.

Researchers from the University of Guam Marine Laboratory will participate in most of the cruises to conduct surveys for precious corals, and sample zooplankton and midwater fishes. Also, Dr. Ted Hobson, Fishery Biologist at the Tiburon Laboratory, will be Chief Scientist on a 20-day cruise. The cruise will include a survey of nearshore fishes around seven islands in the archipelago and a survey of the terrestrial fauna on the seven islands by terrestrial biologists from the Commonwealth of the Northern Mariana Islands.

* * * * *

Dr. Stephen Ralston, Fishery Biologist, began computer simulations to study the problem of estimating the L parameter on the von Bertalanffy equation from length-frequency data.

Seamount Cruise to Survey for Armorhead and Alfonsin

Richard N. Uchida, Leader, Insular Ecosystem Program, reports that the NOAA Ship, Townsend Cromwell, departed June 2 with Research Assistant Robert L. Humphreys, Jr. as Chief Scientist to survey the central north Pacific seamounts for armorhead, Pentaceros richardsoni, and alfonsin, Beryx splendens. Before proceeding to the seamounts, the Cromwell transported supplies and equipment to the field parties studying the Hawaiian monk seal, Monachus schauinslandi, and green turtle, Chelonia mydas, on Lisianski Island and Pearl and Hermes Reef. At this writing the Cromwell has surveyed Wentworth Seamount, Seamount Nos. 10 and 11, Southwest Hancock and Northwest

Hancock Seamounts, Colahan Seamount, and Yuryaku Seamount. Armorhead catches of about 400 and 550 kg were made with the Northeastern trawl at Southeast Hancock Seamount. Also noteworthy were the large alfoncins caught on handline gear at depths of approximately 290-545 m (160 to 300 fathoms). This find is significant since large alfoncins are uncommon on or near the summit of the seamounts. Others in the scientific field party are research assistants Darryl T. Tagami, Scot H. Hamaguchi, Daniel A. Mahar, and statistician Gary L. Kamer.

* * * * *

Richard N. Uchida reviewed the final draft of the manuscript, "Historical background, description of the islands, and review of the climate, oceanography, and submarine topography around Guam and the Northern Mariana Islands" by Dr. Lou Eldredge of the University of Guam Marine Laboratory; revised the first draft of "A summary of the 1983 tuna baitfish workshop" by Richard S. Shomura and Henry Sakuda; completed revision of his manuscript, "Summary of pertinent biological characteristics of potential ocean thermal energy conversion (OTEC) sites in the Pacific Ocean;" and began revision of another manuscript, "Groundfish fisheries and research in the vicinity of seamounts in the North Pacific Ocean."

PELAGIC RESOURCES INVESTIGATION

Behavioral Experiments Continue

Dr. Richard W. Brill, Leader, Experimental Ecology of Tunas Program reports that experiments are continuing on the development of attractive odors for tunas, and on determining standard metabolic rate and the magnetic compass sense of tunas at the Kewalo Research Facility.

Kawakawa, Euthynnus affinis, and skipjack tuna, Katsuwonus pelamis, do not appear as responsive as yellowfin tuna, Thunnus albacares to behavioral testing procedures to detect changes in the Earth's magnetic field. Research assistant Martina K.K. Queen, therefore, has begun testing a classical conditioning paradigm where kawakawa are trained to expect food (and to move to the area of the tank where the food is presented) when a light above the tank is turned on. Using this technique, several fish at a time may be kept and tested in the same tank. This set of conditions seems to improve the behavior and "testability" of kawakawa and skipjack tuna. Eventually, these species will be tested to determine if they can be trained to associate changes in the Earth's magnetic field with food presented at a specific area in the tank. If they can detect changes in the Earth's magnetic field, they should swim to the area where the food is presented.

Researchers Recognized by Local Newspapers for Research at Kewalo Facility

Two cooperating researchers were recognized by local newspapers for their research work at the Kewalo Research Facility. Michael M. Walker, University of Hawaii graduate student, was featured in an article in the Honolulu Star-Bulletin which describes his work on the magnetic compass sense of yellowfin tuna. A similar story was also telecast on the evening news program of a local television station.

Dr. Kim Holland, University of Hawaii, who is conducting research to determine effective natural and artificial prey odors that could enhance local tuna fishing methods was featured in a front page story in the Malamalama, a quarterly newspaper published by the University of Hawaii.

FISHERY MANAGEMENT RESEARCH PROGRAM

Hawaii Landings of Skipjack Tuna Below Long-term Average

The June 1983 Hawaii landings of skipjack tuna were estimated at 124 metric tons (MT), which is 298 MT below the June 1982 landings and 527 MT below the 1964-80 long-term average for June. The cumulative landings from January through June were estimated at 307 MT, which is 476 MT below the 1982 landings for the same period and 1,408 MT below the 1964-80 long-term average for the same period (Figure 1).

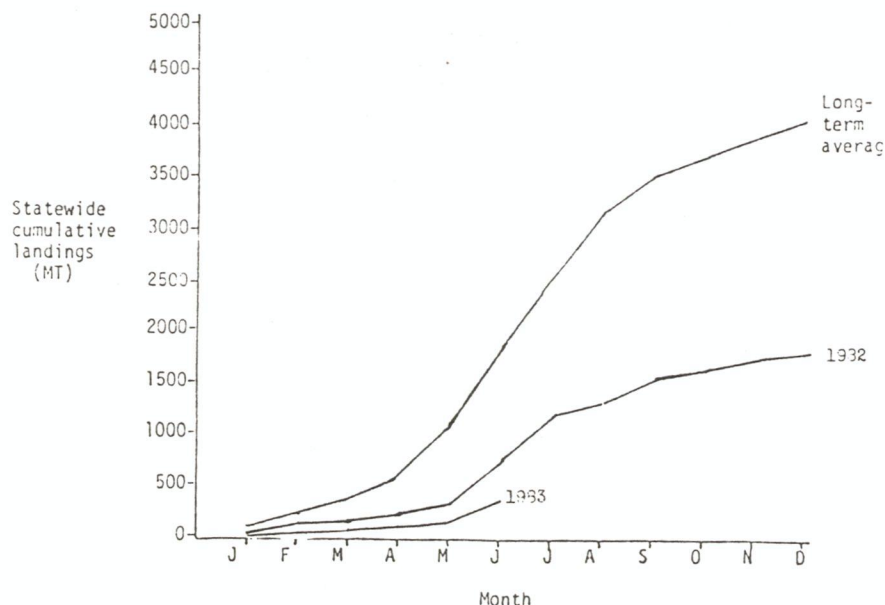


Figure 1.--Cumulative landings in the Hawaiian skipjack tuna fishery.

LA JOLLA LABORATORY

Coastal Fisheries Resources Division

COMMERCIAL AND RECREATIONAL FISHERY RESEARCH MANAGEMENT

Anchovy Fishery Management Plan Revised

Alec MacCall and Richard Methot spent most of June on activities concerned with the Anchovy Fishery Management Plan (FMP). As a result of earlier technical reviews, interpretation of the spawning biomass time series was modified and a new model of anchovy productivity was developed. Dr. Dan Huppert revised the economic model that describes the expected response of fishing effort to changes in abundance and fishing costs. Appropriate changes were incorporated in the third draft of the revised FMP which was sent to the PFMC for printing and distribution prior to the Council meeting in July.

Two SWFC Administrative Reports are being prepared to document the technical material underlying the draft Anchovy FMP. The first report contains technical reviews of the FMP by Drs. J. Beddington and N. Wilimovsky and by Living Marine Resources, Inc.; the Anchovy Plan Development Team's response to these reviews; and a technical description of changes in the population model as a result of these reviews. The second report is a complete documentation of the development of the population model and supersedes three earlier Administrative Reports by MacCall and Methot that documented the model presented in the first draft of the FMP. In addition, Methot is working on a relatively non-technical description of the rationale for and development of the population model. This document is targeted for non-scientific readers of the FMP.

Anchovy Spawning Biomass Estimate Completed

The 1983 estimate of the anchovy spawning biomass was completed and communicated to the Acting Director, Southwest Region on June 15 for their public announcement. The spawning biomass was estimated from an "egg production method" survey and involved the expertise of a large number of Coastal Division scientists in various capacities. Anchovy eggs were sampled at a large number of stations, and daily production rate was determined from information on abundance-at-age. Concurrent sampling of adult spawning fish by a midwater trawl survey provided information on daily spawning rate, fecundity, sex ratio, etc., which allowed calculation of daily production of eggs per unit biomass.

Statistician, Susan Picquelle, completed the editing of the trawl survey data with the assistance of Lalitha Avula, Computer Specialist. The data were

then tabulated by trawl and each of the parameters used to calculate the daily production of eggs per unit biomass were estimated, using FORTRAN and MINITAB. The parameters, female weight and spawning fraction, varied greatly with geographic region, violating one of the egg production model's assumptions that all parameters are constant over the range and duration of the survey. To correct for this, Picquelle divided the survey area into three regions, within which the parameters are relatively constant. The biomass was estimated separately for each region and then summed over regions to produce a total spawning biomass estimate of 652,000 metric tons. The individual parameter estimates and coefficients of variation for each region are shown in Table 1.

Table 1. Estimates of egg production and spawning biomass by region for 1983. Coefficient of variation indicated by ().

Parameters		North	Bight	South	Total
Egg production (eggs/0.05m ² -day)	P ₀	1.62 (0.671)	7.28 (0.0751)	5.06 (0.332)	
Area of survey (*1012 0.05m ²)	A	0.420	1.33	1.36	
Average female weight (grams)	W	12.9 (0.121)	11.2 (0.0705)	9.63 (0.0385)	
Batch fecundity (eggs per batch per mature female)	F	6285 (0.140)	5295 (0.0882)	4423 (0.0570)	
Spawning fraction (spawning females/ total females)	S	0.0346 (0.563)	0.103 (0.174)	0.126 (0.237)	
Sex ratio females/total)	R	0.523 (0.0949)	0.559 (0.0736)	0.549 (0.128)	
Spawning biomass (m tons)	B	77,500 (0.987)	338,000 (0.214)	216,000 (0.419)	652,000 (0.211)

NOAA Corps Officer Roger Hewitt converted this egg production method estimate to a "larva census equivalent" estimate of spawning biomass for purposes of establishing the 1983-84 anchovy Optimum Yield by the formula specified by the 1978 Anchovy Plan. The biomass estimate is documented in a report written by Picquelle and Hewitt, entitled "Estimates of the spawning

biomass of the northern anchovy for the 1983-84 California fishing season." They also presented the biomass estimates to SWFC and CDF&G staff in a seminar held on June 29. (Note: the Anchovy Plan is presently being revised to incorporate the egg production method of anchovy biomass estimation.)

Relationship Between Anchovy Egg Mortality and Transport Examined

Alec MacCall and Dr. James Power, (NOAA Postdoctoral Fellow) examined the relationship between apparent anchovy egg mortality rates and transport using an advection-diffusion model of the CalCOFI region developed by Power. The 1982 anchovy egg survey showed two dense concentrations of anchovy eggs, one in the Southern California Bight, and the other off northern Baja California. The apparent daily egg mortality rate for these two areas of concentration was much higher than for the surrounding area of lower egg density. This discrepancy is of concern from two standpoints: 1) the egg production method of estimating anchovy spawning biomass has assumed a geographically homogeneous mortality rate (violation of this assumption could require modification of statistical methods), and 2) anchovy spawner activity seems to be higher in the apparently poorer habitat, which is contrary to ecological theory. It may, however, be hypothesized that the difference in apparent mortality rates is influenced by the transport of eggs from areas of high density to surrounding areas of lower density, augmenting the abundance of older eggs in the latter area. Simulation of egg transport from the distribution of 1-day-old eggs supports the latter hypothesis. After correcting apparent mortality rates for the effects of transport, estimated mortality rates in the areas of high and low egg density are rather similar, allaying the above concerns.

MRF Economic Value Contract Reviewed

Economic evaluation of marine recreational fishing on the Pacific Coast was included in the economic research plans for FY 1983. A contract Request for Proposal (RFP) asking for evaluation based upon NMFS's 1979-1981 Marine Recreational Fishing Statistical Survey and 1980 MRF Socio-economic Survey was advertised for 30-days during May and June. The Source Evaluation Board convened at La Jolla on June 22, for a technical review of five proposals. The Board consisted of Dr. Daniel Huppert and Cynthia Thomson, Industry Economists at La Jolla, Chuck Korson, Economist from Terminal Island, and Dr. Richard Marasco, Industry Economist from the Northwest and Alaska Fisheries Center. After completion of the reviews, the Board decided to request additional information and clarification from the bidders. Final review and award of the contract will be completed after receipt of the best and final offers in late July.

Preparations Continue for Documenting
the Egg Production Method

The staff of the Coastal Division at the La Jolla Laboratory has thus far conducted five surveys for egg production to estimate the stock of the central subpopulation of the northern anchovy to arrive at a quota, based on spawning biomass. To do this, they have placed, taken, sorted, identified and aged 3,478 samples, of which 1600, or 46% contained anchovy eggs. In preparation for documenting the egg production method, Dr. Paul E. Smith and Celeste Santos, with help from the CalCOFI group, particularly Jim Thrailkill and Rich Charter, have summarized the egg stages and the aged eggs from all samples.

One early conclusion from the analysis is that the log-normal model of sample size distribution is not appropriate for the anchovy egg samples. When one simulates the egg sample size distribution from the log-normal using the parameters determined empirically, the greatest effect is that the size of the maximum sample is consistently overestimated. In the first 1600 samples with the vertical egg tow (CalVET), the maximum number of total anchovy eggs is 605 per tow. In 11 simulations with 1600 tows, the maximum ranged from 637 to 2103 eggs per tow. (Since the sampler is 1/20 square meter these values are sample maxima of 12,100 per square meter and 11 simulation maxima of 12,740 to 42,060 per square meter.) In addition, all means and variances in the simulations were overestimates of their arithmetic counterparts in the actual samples.

The fraction of positive stations and eggs per positive station varies systematically during the day from a low in late afternoon of 40% and 25 eggs per tow to a high at midnight of 50% and 35 eggs per tow. This is the effect of spawning in that interval while other intervals experience only mortality. On the basis of eggs surviving per egg spawning, all four of the winter tow series are indistinguishable. The single tow series in April 1981 exhibited no significant egg mortality.

COASTAL EASTERN PACIFIC POPULATION BIOLOGY OF FISHES

Larval Mortality Compared in Different Environments,
Open Ocean Versus Near Islands and Banks

Gail Theilacker, Fishery Biologist, of the La Jolla Laboratory previously described the histology of larval jack mackerel, Trachurus symmetricus, and developed criteria to assess the nutritional condition of laboratory-reared fish by comparing the histology of larvae of the same age that were fed, starved, and in which feeding was delayed. Recently, she has been using these criteria to identify condition of sea caught larvae. This technique should be useful for detecting the incidence of starvation and predicting larval fish survival in the field.

This month, Theilacker completed the histological examination of fish collected during a special field study in 1980 designed to give information on total mortality and starvation-induced mortality (Table 1). These fish were collected about 200 miles off the coast of San Diego.

HISTOLOGICAL CONDITION OF FIELD-COLLECTED JACK MACKEREL

	DYING	STARVING	RECOVERING	HEALTHY	TOTAL	DAILY PERCENT STARVING	
						max ¹	min ²
YOLK-SAC	-	-	-	15	15	0	0
< 3.5mm							
NUMBER	43	74	45	38	200		
DURATION, DAYS	1	3	2	6			
NUMBER/DAY	43	24.7	22.5	6.3	96.5	70	57
3.5- < 4.0mm							
NUMBER	2	16	38	54	112		
DURATION, DAYS	1	3	2	3.3			
NUMBER/DAY	2	5.3	19	16.4	42.7	17	11
≥ 4.0mm							
NUMBER	0	2	12	45	59		
DURATION, DAYS	-	3	2	3.3			
NUMBER/DAY	-	0.7	6	13.6	20.3	3	1.6

¹
NUMBER DYING + STARVING
TOTAL

²
NUMBER DYING + 1/2 NUMBER STARVING
TOTAL

In addition to jack mackerel collections made in the open ocean a few special tows for histological analyses were made, as time permitted, during routine cruises in 1979 and 1980. A total of 47 young fish were obtained, 41 of which were collected in the vicinity of the Channel Islands (Anacapa, Santa Barbara and San Clemente, and Tanner Bank). Theilacker has examined these

fish, and the results allow a preliminary comparison of the condition of fish living in different environments, open ocean versus near islands and banks (Table 2).

HISTOLOGICAL CONDITION OF FIELD-COLLECTED JACK MACKEREL

	DYING	STARVING	RECOVERING	HEALTHY	TOTAL	DAILY PERCENT STARVING max ¹ min ²	
YOLK-SAC							
< 3.5mm							
NUMBER	0	2	6	12	20		
DURATION, DAYS	1	3	2	6			
NUMBER/DAY	-	0.7	3	2	5.7	12	6
3.5- < 4.0mm							
NUMBER	0	1	1	12	14		
DURATION, DAYS	1	3	2	3.3			
NUMBER/DAY	-	0.3	0.5	3.6	4.4	7	3
≥ 4.0mm							
NUMBER	0	0	0	7	7		
DURATION, DAYS	1	3	2	3.3			
NUMBER/DAY	-	-	-	2	2	0	0

¹
NUMBER DYING STARVING
 TOTAL

²
NUMBER DYING 1/2 NUMBER STARVING
 TOTAL

Between environments, there is a large difference in the calculated, daily larval mortality due to starvation. Between 57 and 70% of the first-feeding fish are dying due to starvation in the open ocean as compared to between 6 and 12% dying in the near island areas. Furthermore, healthy fish collected near island were more "fit" than healthy, open-ocean fish. In particular, island fish stored abundant quantities of glycogen in their livers, whereas healthy, ocean fish rarely stored reserves, suggesting that food must be plentiful for the island fish but that open-ocean fish are barely meeting their daily metabolic requirements. Indeed, spawning tactics may influence larval survival, and the use of the histological analysis may allow further exploration of this potential source of larval mortality.

Acquired Resistance to UV by Fish Larvae Documented

In the final research effort of the "UV project," once headed by Dr. John R. Hunter, Sandor E. Kaupp, Marine Life Resources Group, SIO, UCSD, has

investigated pattern in the level of resistance to UV-B radiation developed by larval marine fishes. The sensitivity of larval marine fish to UV irradiation and impact impending ozone depletion have been studied at the Southwest Fisheries Center for the past 6 years. During the last few years, work has been conducted to compile a list documenting resistance to UV irradiation of larval species during the embryonic phase of their life history. This was done to gain insight into the inherent level of resistance to UV among species of larval fish from potentially different UV environments (i.e., differences in spawning season, latitude, and optical character of the water). Data on thirteen larval species in eight families has been obtained. The major finding is that larval fish species within a family have the same developed level of resistance to UV radiation, but the sensitivity to UV is different between families. The table below gives mortality estimates for five species of larval fish. In addition to data on anchovies and scombrids, an LD₅₀ estimate for grunion larvae, an example of an exclusively neustonic larvae is included. Its exposure to solar UV would be extensive, and its innate level of resistance was the highest among all the species studied; conversely, the anchovy was the fish most sensitive to UV.

A comparison of the UV habitats occupied by the anchovies and scombrids suggests that these larval species have selected UV habitats to compensate for sensitivity to UV. The larval northern anchovy spawned predominantly in the winter and spring, and the larval bay anchovies (deepbody anchoa compress and slough, a delieatissima) spawn exclusively in the summer, during the most intense UV season (32.5 N lat.). The summer solstice, clear day, incident biologically effective UV (i.e., the UV spectrum weighted by an action spectrum for larval fish mortality) is more than twice the spring equinox (273 vs 132 Jm⁻² bio.eff. d⁻¹). The bay environment attenuates UV-B more severely (2.3 times) than the offshore, Southern California Bight water of the larval northern anchovy. The environment for the larval bay anchovy is only 1 to 3 m in depth, versus the 50 to 60 m depth of the vertical distribution of the larval northern anchovy. The shallow habitat places the bay anchovies at more risk to increasing UV-B, as will occur with the depletion of atmospheric ozone.

Like the larval bay anchovies, the larval skipjack inhabit a more intense UV-B environment (ca. 5 times) relative to that of larval Pacific mackerel, owing to its occupation of tropical/subtropical sea with more intense incident UV (1.2 times) and less attenuating water (ca. 4.2 times). The larval skipjack has compensated for its sensitivity to UV by occupying deeper strata of the ocean relative to the larval Pacific mackerel. The center of the larval skipjack distribution is greater than 20 m, and is merely 6 m for the larval Pacific mackerel.

The intrafamilial similarity of sensitivity to UV-B has evolved conservatively. An analysis of the habitat occupied suggests that there has been selection of the UV habitat in conformity with respective sensitivity to UV-B. The rate of evolution of behavioral habitat selection is unknown, but the intrusive nature of UV-B into the habitat of the bay anchovies relative to the other species investigated, suggests that selection of a habitat by larval fish populations may have evolved slowly, also. The innate resistance to UV of larval fish cannot be expected to adapt to the changing UV environment in

the time frame of expected ozone depletion (ca. 100 years). Whether larval fish populations can select new environments to mitigate an increase in injurious UV, or not, they will be further limited from the epipelagic realm with increasing ozone depletion. The extent of this limitation will vary from species to species depending on the optical character of the habitat, the inherent level of resistance to UV, and the vertical distribution of the larval population.

Table 1. The level of resistance to UV-B irradiation exhibited by embryonic marine fish larvae. All dosages are weighted by an action spectrum for larval northern anchovy mortality. The LD₅₀ represents a 4 day cumulative dosage of UV radiation.

Species	LD ₅₀	95% confidence interval
Family Engraulidae		
<u>Engraulis mordax</u> (northern anchovy)	1120 JM ⁻² bio.eff.	964-1360 Jm ⁻² bio.eff.
<u>Anchoa delicatissima</u> (slough anchovy)	938	560-1570
<u>A. compressa</u> (deepbody anchovy)	1200	758-1890
Family Scombridae		
<u>Scomber japonicus</u> (Pacific mackerel)	2290	1810-2710
<u>Katsuwonus pelamis</u> (skipjack)	1820	938-3510
Family Atherinidae		
<u>Leuresthes tenuis</u> (grunion)	144,000	2190-5.88x10 ⁶

* * * * *

Drs. Reuben Lasker and Paul Smith were invited speakers on June 20-22 at the Symposium, "The biological characteristics of herring and their implication for management," which marked the 75th anniversary of the Canadian Pacific Biological Station in Nanaimo, B.C. Dr. Lasker spoke on, "What limits clupeoid production?" and Dr. Smith discussed "Year class strength and survival of 0-group clupeoids."

Oceanic Fisheries Resources Division

TUNA AND BILLFISH RESOURCES PROGRAM

DNA Samples Prepared from Tissues of Offshore Northern and Southern Spotted Dolphin Population

Northern and southern offshore forms of the spotted dolphin, (*Stenella attenuata*), are distinguished on the basis of certain external and skull measurements, but spotted dolphins west of 120° W show affinities with those south of the equator; east-west and north-south variation seems clinal rather than discrete. The goal of investigators in this program is to use mtDNA nucleotide sequence comparisons to examine relatedness among these northern and southern stocks. The more similar is the nucleotide sequence, the more closely related are the samples. Furthermore, since the mutation rate of mtDNA can be estimated, a time scale of divergence, if indeed this can be shown in the groups can be formulated.

Towards this goal, Drs. Steve Ferris, a summer visitor from the University of California at Berkeley, Andrew Dizon and John Graves of the SWFC isolated and purified DNA from 7 southern and 12 northern animals in preparation for the analyses. Tissues were obtained from specimens collected over several past years and stored frozen. Fetal material was used exclusively. Ferris, Dizon and Graves rationalized that if the stocks are isolated, it must occur during breeding. Mixing of the stocks could occur during other periods.

To provide an idea of the rate of evolution of marine mammals in general, DNA from other species has also been isolated and purified for the upcoming analysis. Together with the 19 offshore spotted dolphin specimens, they will make sequence comparisons with Pseudorca crassidens, Tursiops truncatus, Delphinus delphis, Steno bredanensis, and Stenella longirostris.

1982 Gardiner Awards Presented to Fishing Boat Captains

On June 14, 1983, the annual Gardiner Foundation Awards were presented by Fishery Biologist James Squire of the Southwest Fisheries Center, La Jolla, to fishing boat captains who tagged and released the most billfish in 1982. The awards to the six leading captains were made at an evening ceremony at Rancho Buena Vista, B.C.S., Mexico. The award program, supported by the Gardiner Foundation, Oakland, California, assists the NMFS billfish tagging program by providing engraved plaques and cash awards as an encouragement to tag and release billfish. Squire maintains the records for the award program and each year travels to Mexico to award the prizes.

The winner in 1982 was Captain Jesus Araiza who tagged and released more than 90 billfish. Capt. Araiza has won the Gardiner Award 9 out of the last 10 years. Rancho Buena Vista again won the fishing resort award for the most billfish tagged and released by their boats.

Pacific Billfish Angler Survey Distributed

Survey forms for the 1982 Pacific International Billfish Angler Survey were distributed to taggers and participants in the annual billfish catch and effort survey. Through the cooperation of the International Game Fish Association (IGFA), forms were distributed to its members in the recent issue of "Marine Angler." Responses are currently being received.

SWFC Scientists Attend International Skipjack Conference

Drs. David Au, Andrew Dizon, John Graves, Pierre Kleiber, and Gary Sakagawa of the Southwest Fisheries Center traveled to Tenerife in the Canary Islands to present papers and participate in a "wrap-up" conference, June 20-30, for the International Skipjack Year Program (ISYP) sponsored by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

The conference was held at a new oceanographic institute on the island of Tenerife in the city of Santa Cruz. The Instituto Español de Oceanografía hosted delegates from Benin, Brazil, Canada, Cape Verde, Cuba, France, Gabon, Ivory Coast, Japan, Korea, Portugal, Senegal, South Africa, Spain, and the U.S. as well as observers from ICCAT (the sponsoring group), the Fisheries Committee for the Eastern Central Atlantic, and the South Pacific Commission (SPC). Dr. P.E.K. Symons (ICCAT) chaired the meeting and Dr. Brian Rothschild, University of Maryland, and Dr. Robert Kearney, SPC made the keynote addresses.

Papers presented by the U.S. delegates assisted in directing the thinking towards the idea that skipjack are a single, widespread stock of high productivity. Rapid growth, early maturity, and a short life-span characterize these opportunistic tunas.

Much discussion centered on the results obtained by the French delegation's analysis of tagging data. These data showed extensive movements of fish along the African coast with area-specific growth and attrition rates. On the basis of these data and from analysis of catch statistics, the French scientists proposed the term "black hole" (sink) to explain the sizeable segment of large fish (greater than 53 cm) of the exploited stock that moves offshore, thus becoming unavailable to the fishery, but which may function as the "cryptic nursery" (source) for recruits, as they describe it. In the discussion that ensued, the conference participants felt that it was impossible to distinguish between high mortality rates, changes in behavior which render them unavailable to the gear, or emigration (The French hypothesis).

The meeting was concluded with consideration of research goals posed by the ISYP organizers. The delegates approved wording to the effect that skipjack catches could be increased, with due caution for the juvenile yellowfin and bigeye bycatch in the coastal fisheries, and that more intensive sampling and studies be conducted in certain poorly known areas, particularly those of the western Atlantic.

Status of Atlantic Tuna Fishery Sampling Program

Foreign-caught Atlantic tunas transshipped to Puerto Rico are sampled routinely for biological information by Biological Technician Eugene Holzapfel. Data on fork length, weight, and species composition of catches are collected. Results of Holzapfel's sampling during the period January 1, 1983 to June 30, 1983 are as follows:

Species and gear	# of samples	# of fish sampled	Tonnage sampled (MT)
Yellowfin			
Purse seine	3	213	142.8
Baitboat	2	190	8.3
Unknown	3	157	31.8
Skipjack			
Purse seine	3	152	1073.2
Baitboat	2	100	119.2
Bigeye			
Purse seine	3	87	81.5
Unknown	1	22	6.3
Blackfin			
Baitboat	1	50	12.6

TIBURON LABORATORY

UNDERUTILIZED FISHERIES RESOURCES

Fish Aggregating Devices (FADs) to be Deployed by NOAA Ship David Starr Jordan

Preparations are complete for Leg 3 of the cruise of the David Starr Jordan which will depart from Sausalito on June 25. FAD Project Leader, William Leet, will be accompanied on Leg 3 by fishery biologists Sus Kato and Sennen Salapare. The cruise will deploy two fish aggregating devices (FADs) that have been under construction at the Tiburon Laboratory. After loading the anchor, mooring buoys and other equipment, the Jordan will travel to San Pedro to pick up representatives of the Regional Office and various commercial and sportfishing organizations. The FADs will be deployed on June 27 in the vicinities of Thirty-mile Bank and Sixty-mile Bank, where it is believed that they will aggregate bluefin tuna and other pelagic fish. Commercial and sport fishermen will use the FADs as fishing sites. Scientists of the Fishery Development Task will monitor fishing activity around the FADs through log-book and on-site observations.

Ocean Sunfish Offers Potential as a High-Value Market Species

The bizarre tail-less form of the ocean sunfish, Mola mola, is a common sight in temperate waters throughout the world. One-hundred-pound individuals are often seen floating on the surface and some fish even exceed a thousand pounds. The flesh of ocean sunfish is unlike that of most fish, in that it is jelly-like, similar to lobster. Indeed, when cooked, the consistency is very much like lobster meat, and its flavor is more like shellfish than finfish. In Japan the flesh is often eaten raw, dipped in a sauce made from shoyu and sunfish liver. Some Italians apparently like the intestines of sunfish as well as, or even better than, the flesh. In fact, the cleaned intestines are quite similar to that of beef. Still, ocean sunfish is rarely seen in the market because they are not caught consistently in large enough quantities. Many fishermen prefer to eat the fish themselves rather than to sell it. Another reason for the absence of sunfish in fish markets, aside from the unusual jelly-like flesh, is because they are thought to be riddled with parasites. James Hardwick, Port Biologist of California Department of Fish and Game relates, however, that he has seen landing tickets for ocean sunfish meat, sold at high prices, at Monterey docks.

Until recently rarely taken by California fishermen, sunfish is now a significant by-catch in the new shark gill net fishery, but the fish are discarded at sea. This month, at the request of project leader Sus Kato, shark fisherman Matt May of San Pedro delivered eleven small sunfish to the Tiburon Laboratory. The fish, ranging from 6 to 22 pounds, were filleted and

the meat frozen. Samples were sent to two fish processors in Santa Barbara for evaluation. Similar samples will be provided to the West Coast area and elsewhere in California. If reaction to the fish is anything like that of staff members at the Tiburon Laboratory, ocean sunfish should be a highly popular fish. Nearly every one who tasted it approved of its taste and texture, and those who did not know the identity of the fish thought they were eating some sort of shellfish.

The yield of meat averaged 20% (range 18-22%) for the small fish, and should be higher for larger individuals. The cleaned intestines added another quarter-pound to the yield for each fish. Only a few parasites, no more than usual for other species, was found in the flesh of the ocean sunfish.

Canada-United States Groundfish Technical Subcommittee Meets to Coordinate Groundfish Research

The Technical Subcommittee (TSC) of the Canada-United States Groundfish committee met in Menlo Park, California, 14 through 17 June to review the status of the groundfish fishery and coordinate groundfish research. The TSC is composed of six members, three observers and invited participants. The members are from Alaska, British Columbia, Washington, Oregon, California, and NMFS; the observers are from the North Pacific Management Council, International Halibut Commission and the Pacific Fishery Management Council; participants are invited on a need basis. The U.S. section operates under the auspices of the Pacific Marine Fishery Commission (PFMC), whose director is Dr. John Harville. Dr. Harville will be replaced in July by Mr. Lawrence Six as Director of the PFMC and assume the position of U.S. representative to the parent committee.

Norman Abramson, Director, Tiburon Laboratory discussed the upcoming Sablefish Workshop 7 and 8 of July. A review was presented of the past, present and future sablefish research. The TSC strongly endorsed the Tiburon workshop and proposed that some formal report of the workshop be made on needed research, funding and possible agency involvement.

Ueber discussed current shifts in traditional Canada-U.S. market channels for groundfish. He also proposed possible reasons for recent U.S. and Canadian groundfish expansion and further marketing of groundfish between Alaska and the lower 48 and between Canada and the U.S. Dr. Al Tyler of Pacific Biological Station, Nanaimo, B.C., substantiated some of the market changes which Ueber believed were occurring in British Columbia; a method for monitoring these changes was discussed. Alaska also affirmed the increased movement of groundfish to the West Coast and other U.S. markets. Some of these markets were previously served by California, Oregon, and Washington processors.

The TSC made recommendations to the parent committee on having an economist knowledgeable about groundfish from both the U.S. and Canada, assigned as observers to the TSC. Another recommendation was that another rockfish ageing workshop be convened to maintain the momentum and communication which was established in the first workshop. Other topics

covered in the committee included joint venture fisheries, foreign fisheries, status of the fish stocks and present research.

FISH COMMUNITIES INVESTIGATION

Seasonal and Temporal Occurrences of Prey Species Under Study

The larger predatory coastal fishes off central and northern California are strongly affected by seasonal patterns of occurrence in their prey. Earlier studies by scientists in the Predator-Prey Task of the Tiburon Laboratory showed that the king salmon switches seasonally between anchovies, juvenile rockfishes, and euphausiids--depending on their relative availabilities. The basis for the relative availabilities of these prey is a current area of study for the Predator-Prey Task.

This month the first of a series of cruises on the NOAA research vessel, David Starr Jordan, was led by fishery biologist Peter Adams to study this problem. With fishery biologists Tony Chess, Susan Smith and Dan Howard participating, and with the help of Paul Fisher, of San Francisco State University, five stations were sampled with midwater trawl and Tucker net near the Farallon Islands, a major fishing ground. The midwater trawl sampling was very successful, with anchovies consistently taken in shallow water stations (< 20 fm), and consistently absent at deepwater stations (> 30 fm). Juvenile rockfish were absent from all deepwater collections. Adult euphausiids (species Thysanoessa sponifera) were relatively scarce in the catch except at one deepwater station.

PHYSIOLOGICAL ECOLOGY INVESTIGATION

Sablefish Sampled for Selected Pollutants

Dr. Jeannette Whipple, Pete Benville, Brian Jarvis and Rahel Fischer recently collected and performed histopathological autopsies and subsampling for selected pollutants on a small sample of sablefish which was captured off Cordell Bank near Point Reyes in June. The purpose of this sampling was to determine whether sablefish tissues contain petrochemicals, as have been found in their roundworm parasites.

Anasakid roundworms obtained from sablefish and used in infection-exposure experiments with striped bass has been found to contain high levels of petrochemicals not originating from petrochemical exposure. For example, striped bass were infected with roundworms and then exposed to benzene and zinc. Although the striped bass tissues contained only benzene, as expected, the roundworms contained not only benzene, but toluene, xylenes and other petrochemicals not yet identified. Since there is no evidence of contamination in the experiment, the monocyclic aromatics in the roundworms probably came from their earlier life as parasites in sablefish.

These observations indicate that roundworm larvae have limited capacity to depurate petrochemicals and that the source of the petrochemicals may be from the offshore environment where the host sablefish were captured. These studies are needed to complete interpretation of results with striped bass experiments and will also be used in preparation for future studies with bottomfish, including the sablefish.

When data obtained from the sample of sablefish are completely analyzed, the results will be reported. Methods developed for the study of pollutant effects on striped bass were found highly applicable in the examination and study of the condition of sablefish, as well.

CF&G Completes Monitoring Study of Prespawning Striped Bass

The monitoring study of prespawning striped bass from the San Joaquin River for 1983 was completed by California Department of Fish and Game personnel this month. Twenty mature males and 16 mature females were captured during gill-netting coincidental to adult tagging (ms in preparation; Whipple, Fischer and Jung) and data were collected according to a rewritten and preserved for pollutant analyses. Data will be analyzed cooperatively by staff of NMFS and CDF&G. In future years, this research effort will be conducted by CDF&G.

Preliminary results of the examination of prespawning striped bass from the San Joaquin River indicate that the fish still show some of the problems of previous years, but not as severely. Petrochemicals were still present, but at lower levels. This is a high-flow year, and spawning appears to be considerably delayed, with a late spawning run in the Sacramento River. Analysis of data from the spawning run in the San Joaquin River will be reported upon on completion of data analyses.

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Dr. Jeannette Whipple completed a review for MBC Applied Environmental Sciences and Science Applications, Inc., of Volume II of their contract report to the Bureau of Land Management, entitled "California Commercial/Sport Fish and Shellfish Oil Toxicity Study."

FISHERIES INFORMATION SYSTEMS AND AUTOMATIC DATA PROCESSING

CALFIN Credit Card System for Salmon Now Operational

The CALFIN credit card system for the salmon fishery is now operational, although the salmon fishery strike has thus far kept the use of the credit card system to a minimum. The implementation of the credit card system for the trawl fishery has been delayed until July 1, 1983, because the supplier has failed to deliver the card im printers.

A PACFIN meeting was held in Seattle, Washington, on July 27 and 29, 1983, with David Mackett, SWFC Planning Officer, attending. The groundfish, salmon and research system and the PACFIN FY 84 budget were discussed at the meeting. John Davies, SWFC employee stationed at the Southwest Region (SWR), reports that habitat protection data has been entered for the past quarter and the habitat protection quarterly report program is now operational. The report will summarize permit information either by individuals, Corps of Engineers, district, or for the region as a whole.

Procurement Packages for ADP Equipment Submitted for Approval

Dorothy Roll, Computer Systems Analyst, reports that nine procurement packages were sent to Washington, D.C. for approval processing this month. The requests are for the procurement of the following: 1) 5 modems, 13 CONCEPT AVT amber screened terminals, and 5 TAB 132/15 terminals for word processing, financial reporting, and data entry tasks, 2) the Molecular Supermicro for the David Starr Jordan, 3) the components for three La Jolla Standard microsystems, dot-matrix printers, letter quality printers, high speed letter quality printer, modems, and error controllers to check transmission errors in support of word processing and the financial tasks to be implemented on the Molecular 64X, 4) a DEC RAINBOW 100 and associated peripherals for the Tiburon Laboratory, 5) the components for three 8/16-bit scientific microcomputers for the La Jolla Laboratory, 6) a portable microcomputer with a built-in printer for the Coastal Fisheries Resource Division, portable terminals and portable printer, and modems for the La Jolla Laboratory's backup units, 7) spare units/modules for the La Jolla Standard microsystems, 8) the Molecular 32X for the Tiburon Laboratory, and an XBT Data Acquisition System for the David Starr Jordan, and 9) upgrade modules and peripherals for the Mohawk data entry system in the Honolulu Laboratory.

Approvals have been received from Washington, D.C. for the procurement of the components for a La Jolla Standard microsystem for the Coastal Marine Mammal project and the CRT terminals for the FIN project and administrative tasks in the Southwest Region. The first two request packages submitted in early June have also been approved: the CRT terminals and the Molecular Supeermicro 15-8 for the David Starr Jordan. The approved CD-45 equipment orders are in Seattle's WASC procurement section for processing. The orders with cost estimates of \$10,000+ will be placed on competitive bids.

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Jack Brown, Electronics Engineer, was officially transferred from the Coastal Fisheries Resource Division to the Data Systems Management Group on June 1. As the technical advisor on computer hardware equipment and data communication requirements, he is developing the technical hardware specifications and standards for the Southwest Fisheries Center. Currently, he is reviewing and selecting the components for the 8/16-bit scientific microcomputer.

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Robert Nydam, Computer Programmer Analyst, installed SUPERCALC and DBASE II on the TAB 132/15 terminal, which has a video port. SUPERCALC is a CP/M spreadsheet software. DBASE II is a CP/M data base management software. The installations on the TAB terminals allow the software packages to be used with the ADP group's projector system for meetings and training sessions.

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Robert Nydam and Robert Bistodeau are reviewing the data elements and data base structures required for the FY 84 Financial Reporting System (FRS). Nydam is designing the data entry programs for the FY 84 FRS to be implemented on the approved Molecular Supermicro 64X. Bistodeau will assist in the coding of this data entry software.

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Susan Iacometti is designing and writing the program codes to process the 1981 PACFIN data. The integrity of the data submitted by the states of California, Oregon, and Washington will be verified by her program.

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During the albacore constituency meeting the first week of June, Iacometti operated the Interpretive Structural Modeling (ISM). The meeting, held in the Center's auditorium, was facilitated by Dr. A. Christakis and Dave Mackett, Planning Officer.

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Two computer technical users meetings were held during June in the Center's auditorium. The June 9 meeting was an audio/video training session on DBASE II, a CP/M based data management system. Robert Bistodeau has been highly commended by the attendees on his presentation. The second session, attended by the scientific, technical, and secretarial staff, was conducted by Jack Brown on June 22. He discussed the proper way to use, store and maintain floppy disks. Following his presentation, Joe Shoeningh of ACCO International, Inc. showed the different types of containers manufactured for the safe storage of floppy disks.

MISCELLANEOUS

HONORS AND AWARDS

One of the most significant testimonials to the worth of a scientific paper is the number of times it is cited in publications. Current Contents of June 27, 1983, in "This Week's Citation Classic" noted a paper by Dr. Reuben Lasker, "Feeding growth, respiration, and carbon utilization of a euphausiid crustacean," published by the Journal of the Fisheries Research Board of Canada 23:1291-317, 1966. Science Citation Index which maintains a record of these citations indicated that this paper has been cited in more than 125 publications since 1966, making it one of the most-cited papers ever published in this journal.

Dr. Lasker showed in this paper that Euphausia pacifica juveniles and adults maintained in the laboratory molted at intervals of 3 to 8 days depending on temperature. Crustacean nauplii were found to be a preferred food and over 80% of ingested carbon was assimilated. While the oceanic population incorporated about 9% of the carbon eaten, rapidly growing animals incorporated as much as 30%. Molts and dead bodies amounted to over 7 times the biomass as detritus in a year.

This paper also won a Superior Performance Award for Dr. Lasker in 1968 from the U.S. Department of Interior's Bureau of Commercial Fisheries.

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At the La Jolla Laboratory, federal length of service emblems were presented to:

John S. MacGregor, 35 years
Fred J. Kellenberger, 15 years

At the Pacific Environmental Group, length of service emblems were given to:

David Husby, 15 years
Andrew Bakun, 15 years

PUBLIC AFFAIRS

Honolulu Laboratory

Dr. Stephen Ralston presented a lecture to participants in the Hawaii Institute of Marine Biology's summer Coral Population Biology Program. His

lecture, "Approaches to model building in fisheries biology," was designed to expose participating researchers to the rationale and analytic structure behind several fisheries models currently in use.

La Jolla Laboratory

El Niño continues to be a subject of great public interest. This month, Jim Squire, Fishery Biologist at the La Jolla Laboratory, discussed the warm ocean water and fish off the U.S. West Coast, in an interview with Mark Armstrong of Station KYYX, CBS News, Portland, Oregon, June 13. Later the same day, Squire was interviewed by Dan Morris of National Public Radio, Washington, DC, for his show, "All Things Considered."

Dr. Michael Laurs talked about El Niño and oceanography for TV Channel 10 which aired on the evening news, June 21.

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A CBS News team filmed a sequence on El Niño for the Dan Rather program at the Center on June 17. Jim Squire and Forrest Miller were interviewed and showed charts and satellite pictures of the phenomenon. When the sequence was finally shown on national television, it had been reduced to a minute or so and only Miller's discussion was presented.

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Dr. Al Myrick of the La Jolla Laboratory spoke to a class at Grossmont High School on May 11 on the subject, "Biology of whales." On June 4, Dr. Myrick delivered a lecture to a zoology class at Pt. Loma High School on "Marine Mammals of the Pacific." Both lectures were given in connection with the participation of Southwest Fisheries Center scientists in the San Diego County School's lecture program, "Meet the Scientist."

SEMINARS

La Jolla Laboratory

- June 7 - Forrest Miller, Inter-American Tropical Tuna Commission discussed, "The El Niño of 1982-1983."
- 16 - Dr. Daniel Goodman, Montana State University, spoke on "Effects of impoundment on daily thermal regimes of salmonid habitat."

- 30 - Dr. Roger Hewitt, NOAA Corps, presented a lecture on "The reaction of dolphins to survey vessels."

Tiburon Laboratory

- June 21 - A seminar presented cooperatively by the Tiburon Center for Environmental Studies, San Francisco State University and the Tiburon Laboratory featured guest speaker Dr. James Acheson, University of Maine who spoke on "Technological Innovations by New England Fishermen."

VISITORS

Honolulu Laboratory

- June 1 - Dr. James Maragos of the U.S. Corps of Engineers visited Richard S. Shomura to discuss a marine turtle project on Johnston Island.
- 2 - Takashi Takahashi, Chief, General Affairs Division, Japan Marine Fishery Resources Research Center (JAMARC), Tokyo, Japan, and Richard Miyashiro, Ship's Agent, Hawaii-Pacific Maritime, Inc., visited Richard S. Shomura.
- 7 - Jeanne Moore, Director, Office of Congressional Affairs, NOAA, Washington, DC.
- 9 - Doc Holliday, a Hawaiian commercial fisherman, visited Richard N. Uchida.
- 22 - Cmdr. Larry Keister, new Commanding Officer, of the Townsend Cromwell, visited Richard S. Shomura.
- 27 - Dr. Ian Johnston of the University of St. Andrews, Scotland, arrived in Honolulu. Dr. Johnston will be conducting experiments on the physiology, energetics, and ultrastructure of tuna muscle at the Kewalo Research Facility.

La Jolla Laboratory

- June 1 - Ed Gohlick, Hope and Associates, here to take pictures for 20th anniversary of the building of the Southwest Fisheries Center.

- 16 - Shintaro Suzuki, Deputy Director for Import Planning, Distribution Division, Fisheries Policy Department, Japan Fisheries Agency. Mr. Suzuki was interested in discussing the new Governing International Fishery Agreement between the U.S. and Japan.
- 29 - Uffe Thorndahl, Member of the Danish Parliament and Director, Ingeniorgruppen Copenhagen Consulting Engineers.

Tiburon Laboratory

- June 7 - Bill Flerx, SWFC, La Jolla, California.
- 20 - Jim Earley, Oregon State University, Corvallis, Oregon.
- 21 - Jim Acheson, University of Maine, Orono, Maine.
- Chris Dewees, University of California Sea Grant, Davis, California.
- Michael S. Mohr, Humboldt State University, Arcata, California.
- 23 - K. Takayama, Wescon International, San Francisco, California.
- David Rand, NMFS, Washington, DC.
- Jim Meehan, NMFS, Washington, DC.

MEETINGS AND TRAVEL

Honolulu Laboratory

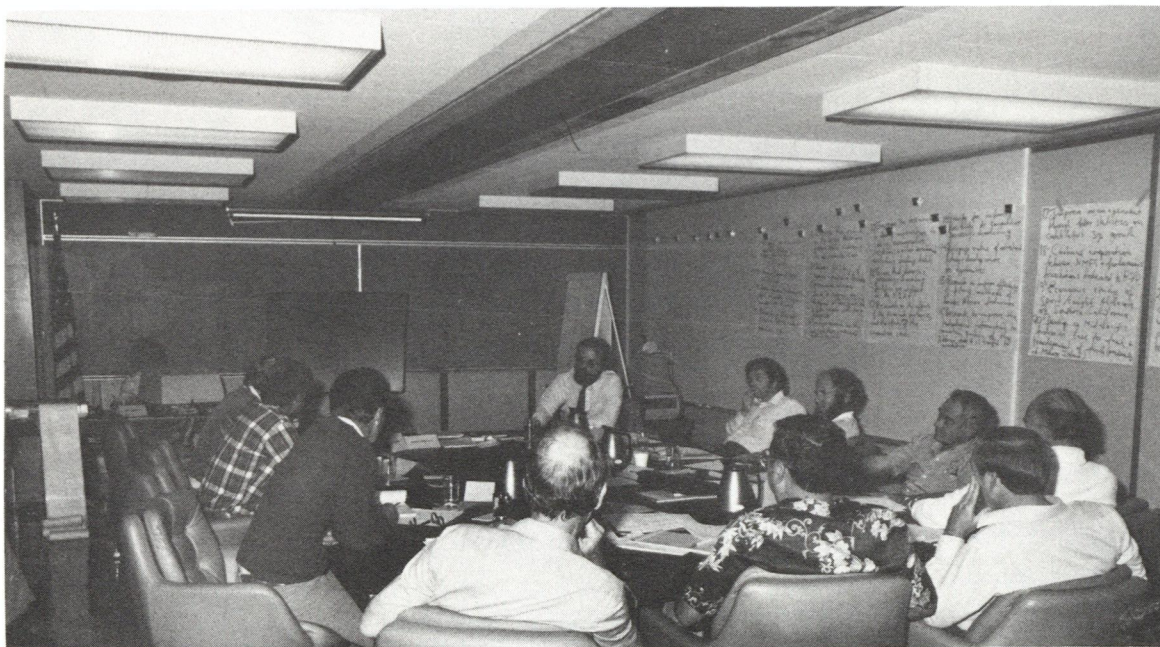
- June 1 - The pre-cruise meeting for Townsend Cromwell cruise 83-02 was held in the Honolulu Laboratory conference room.
- 15 - Richard S. Shomura, Richard N. Uchida, Dr. Jeffrey J. Polovina, and James H. Uchiyama attended a meeting of the Coordinating Council for Research--Northwestern Hawaiian Islands.
- Richard S. Shomura attended a briefing arranged by the Western Pacific Program Office, Southwest Region, regarding the Pacific Tuna Development Foundation charter of the purse seiner Joanne.

- 20-21 - Dr. Izadore Barrett, John F. Carr, and David J. Mackett conducted the Honolulu Laboratory program reviews. David Rand and James Meehan from the Washington, DC staff attended the reviews.
- 27 - Richard S. Shomura departed Honolulu to attend the joint Western Association of Fish and Wildlife Agencies and Western Division, American Fisheries Society meetings in Wyoming.

La Jolla Laboratory

SWFC and Region Host Albacore Workshop

A Workshop on the future of the North Pacific albacore fishery was held at the Southwest Fisheries Center in La Jolla, June 1 and 2, sponsored by the Center and the Southwest Regional Office. Participants in the workshop represented a variety of perspectives but shared a common interest in the albacore resource and fishery.



According to David Mackett, Co-Facilitator for the Workshop, "The purposes of the workshop were to benefit both NMFS and the participants. NMFS hoped to gain valuable information about what interested people hoped to see happen in the North Pacific albacore fishery over the next decade. NMFS could then use this information in making program plans consistent with and supportive of the participant's goals for the fishery. It was also intended that the participants, through their involvement in the Workshop, would gain a sense of having contributed in a meaningful and useful way toward the improvement of their government and toward creating the future they desire for an important and valuable fishery."

The participants in the Workshop included: Mr. Ed Deringer, Commercial Fisherman, Lomita, California; Mr. Nick Cates, San Diego Sport Fishing Association, San Diego, California; Mr. Ben Felt, Financier, Pala, California; Mr. John Gough, Boat Owner and Fisherman, San Diego, California; Mr. Bud Kerns, Executive Director, U.S. Tuna Foundation, San Diego, California; Mr. Edwin Martin, Esq., Recreational Fisherman, National Coalition for Marine Conservation, Santa Ana, California; Mr. Mike McGowan, General Manager of Tuna Procurement, Bumble Bee Seafoods, San Diego, California; Honorable Richard Matsuura, Hawaii State Legislature, Hilo, Hawaii; Mr. William Perkins, General Manager, Western Fishboat Owners Association, San Diego, California; Dr. William Percy, Department of Oceanography, Oregon State University, Corvallis, Oregon.

Convenors.--Dr. Izadore Barrett, Director, Southwest Fisheries Center, NMFS, La Jolla, California; and Mr. Floyd S. Anders, Jr., Acting Regional Director, Southwest Region, Terminal Island, California.

Facilitators.--Dr. Alexander Christakis, Options Assessments, Charlottesville, Virginia; Mr. David Mackett, Planning Officer, Southwest Fisheries Center, NMFS, La Jolla, California; and Ms. Susan Iacometti, Computer Programmer, Southwest Fisheries Center, NMFS, La Jolla, California.

Observers.--Richard Parrish, Chairperson, Pacific Environmental Group, Monterey, California; R. Michael Laurs, Fisheries Environment Investigation, La Jolla, California; Norman Bartoo, Oceanic Fisheries Resources Division, La Jolla, California; Jerry Wetherall, Honolulu Laboratory, Honolulu, Hawaii; and Rod McInnis, Southwest Regional Office, Terminal Island, California.

The Workshop generated and organized 23 desirable goals and objectives for the North Pacific albacore fishery to 1993. From the results of organizing or structuring the objectives four major clusters of objectives were identified: Fishery Development, Alternative Products, Research and Fishery/Government Partnership. On the basis of their own experience and insights, the participants identified future desirable trends and events that if realized would help achieve the objectives in each of the four clusters. About 120 such trends and events were identified. The joint SWFC/SWR Task Force for Planning the albacore program, chaired by Richard Parrish will meet to organize this information for facilitating the Strategic Planning phase. NMFS managers will hold a strategic planning meeting in the fall.

- May 31- June 2 - Dr. Gary Sakagawa traveled to Washington, DC, to attend planning meetings on porpoise-tuna management.
- May 31- June 16 - Fred Kellenberger was detailed to Washington, DC, as the Acting Director of the Office of Data and Information Management.
- June 3-8 - Dr. Doug DeMaster was in Washington, DC, to meet with the Proposed Technical Evaluation Committee (PTEC) panel for Mineral Management Service to review proposals concerning oil risks to marine mammals.
- June 6 - Izadore Barrett, Director, Deputy Director John Carr and Reuben Lasker attended a CalCOFI meeting at the Center.
- June 6-7 - Izadore Barrett, Director, traveled to Portland, Oregon, to attend the Pacific Council's SSC meeting and then to Monterey, California, for a review of PEG programs. He was joined in Monterey by Deputy Director John Carr.
- 6-8 - Dr. Dan Huppert traveled to Portland, Oregon, to attend the Pacific Fishery Management Council and Scientific and Statistical Committee (SSC) meetings.
- 6-10 - David Mackett traveled to Washington, DC, to attend the NMFS Planners' meeting and to present a seminar on management systems.
- 7-8 - Dr. Rick Methot traveled to Portland, Oregon, to discuss reviews of the Anchovy Management Plan with the SSC.
- 7-26 - Fishery biologist Bill Flerx traveled to San Francisco, California, to board the NOAA research vessel, David Starr Jordan, to participate in Cruise 83-06.
- 8-10 - Dr. Reuben Lasker traveled to Washington, DC, to attend a meeting on oceanography in Rockville, Maryland, and later visited the Osborne Laboratory in New York.
- June 10- July 1 - Dr. John Hunter traveled to Arendal, Norway, to present an invited talk at the Cod Symposium at Flodevigen Laboratory.
- June 13-16 - Izadore Barrett, Director, traveled to Washington, DC, to attend a Board of Directors' meeting.
- 14 - Drs. Gary Sakagawa, and Sam Herrick traveled to the Southwest Regional Office, Terminal Island, California, for discussions on economic analysis on DEIS for new 1985 Tuna/Porpoise Regulations.

- June 17- July 1 - Drs. Gary Sakagawa, David Au, Andy Dizon, John Graves, and Pierre Kleiber traveled to Tenerife, Canary Islands, to attend and present material at the Conference for the International Skipjack Year Program, sponsored by International Commission for the Conservation of Atlantic Tunas.
- June 19-21 - Izadore Barrett, Director, Deputy Director John Carr and Planning Officer David Mackett traveled to Honolulu, Hawaii, to conduct task reviews and discuss FY 1984 plans and budgets. On June 23 they participated in an ADP/FIN review at the Center.
- 20-22 - Drs. Reuben Lasker and Paul Smith were in Nanaimo, British Columbia, to participate in a herring symposium at the Pacific Biological Station. Later the two presented seminars at the Northwest and Alaska Fisheries Center.
- 20-21 - Dr. Steve Reilly was in Monterey, California, to consult with PEG staff on analyses of oceanographic and distribution data.
- 20-26 - Dr. Doug DeMaster traveled to Charlottesville, Virginia to attend a training session in consensus techniques and then to Santa Barbara, California, for a survey of historical sea lion rookeries.
- June 22- July 1 - Mark Lowry traveled to San Nicolas Island to conduct studies of the food habits of sea lions.
- June 23-27 - Chuck Oliver and Lisa Ferm traveled to San Clemente Island, to continue studies on pinnipeds.
- June 23- July 10 - Dr. William Perrin in Cambridge, England, to chair meetings of the IWC Small Cetacean Subcommittee and then to London to work with study collections at the British Museum.
- June 28-29 - David Mackett traveled to Seattle, Washington, to attend a meeting of the Pacific Coast Fisheries Data Committee.

Tiburon Laboratory

- June 1 - Bill Leet and Sus Kato traveled to Santa Cruz to witness the demonstration of a squid-cleaning machine.
- 9-10 - Bill Leet traveled to Costa Mesa to pick up mooring buoy beacons and receive instructions in installation and maintenance.

- 13 - Ed Ueber met with Tom Dark, NWAFC; Tom Jow, CDF&G; and Robert Demory, ODFW; to discuss sablefish research and management and current U.S. groundfish management.
- 20 - Ed Ueber met with Mr. James Early of Oregon State University to discuss groundfish markets, market channels and shipping methods.

PERSONNEL ACTIONS

Honolulu Laboratory

- June 1 - George H. Balazs, Wildlife Biologist - Full-Time Temporary Appointment.
- 3 - Linda L. Hudgins, Industry Economist - Full-Time Temporary Excepted Appointment (Faculty Fellowship Program).
- 14 - Graydon A. Keala, Biological Aid - Temporary Intermittent Appointment.
- 15 - Theresa L. M. Villaneuva, Biological Science Student Trainee - Appointment under NOAA Junior Fellow Program.

La Jolla Laboratory

- June 10 - Barry Finzel, Computer Assistant - Resignation.
- 12 - Robert Bistodeau, Computer Clerk - Pay Adjustment to Full-Time.
- Susan Picquelle, Statistician - Promotion.
- David Ambrose, Fishery Biologist - Full-Time Appointment.
- 17 - Michael Lichter, Computer Clerk - Resignation.
- 20 - Melinda Stell, Clerk Typist - Part-Time Temporary Appointment.
- Celeste Santos, Biologist Aid - Pay Adjustment to Full-Time.
- Marlene Johnson, Biological Science Student Trainee - Excepted Appointment.

- John Michno, III, Biological Science Student Trainee - Excepted Appointment.

Johnson and Michno are the newly-appointed NOAA Junior Fellows at the La Jolla Laboratory. Also returning to continue their work at the Center this summer are NOAA Junior Fellows Roberta Folk and Lisa Lau.

- 26 - Gary Hunt, Biological Aid - Pay Adjustment to Full-Time.
- 27 - Kathryn McKune, Clerk Typist - Part-Time Temporary Appointment.

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- June 12 - Frank J. Jacques, Biological Science Student Trainee - Return to Duty.
- Susan C. Logan, Biological Aid - Return to Duty.

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