

THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
MARINE RESOURCES OPERATIONS

REPORT FOR THE MONTH OF JULY 1968

A new steel-hull stern ramp trawler has been added to the California trawl fleet with the completion of the Janet Ann, which is currently undergoing gear and equipment trials in the Monterey area. The Janet Ann will be based at Moss Landing and will engage primarily in the rockfish fishery. This is the first stern ramp trawler to be built in California and the first new trawler since 1963.

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The new Simrad sonar was field tested with satisfactory results. Anchovy schools were detected at a maximum range of 1200 yards. Using range and bearing information obtained by sonar, the ALASKA was easily maneuvered directly over anchovy schools.

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The 1968 season was launched on July 1, when 2 albacore were caught by anglers on one of the long-range partyboats operating from San Diego. The fish were caught southwest of Cortes Bank. By the 4th of July, significant sportcatches were made around Sixtymile Bank. Since then sportfishing success has fluctuated markedly. However, the catch exceeds comparable figures for 1967.

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We received two bluefin tuna tags from Japan this month. Both were recaptured off Japan, in two-boat purse seines, nearly 4 years after being released: The first fish was recovered July 4, 1968, about 4,740 miles from the release area. It had been tagged August 13, 1964, west of San Martin Island, Baja California; and it was recaptured east of Osaki Zaki, Honshu. Bluefin No. 2 was recaptured July 14, 1968, approximately 4,550 miles from the release location. It had been tagged August 20, 1964, near San Diego, California; and it was caught for the final time off Todo Saki, Honshu.

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A Pacific amberjack, *Seriola colburni*, hooked from a partyboat at the Barn Kelp north of Oceanside on July 25 represented the third record of this species from California. Both previous occurrences have been in the Oceanside area also.

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Ninth Annual Meeting of the Technical Sub-Committee
of the International Trawl Fishery Committee
San Francisco, California

June 25-27, 1968

Technical Sub-Committee members from the Fisheries Research Board of Canada and fisheries departments of Canada, Washington, Oregon and California and committee members M. P. Houghton, Chief Protection Officer, Canada and Leon Verhoeven, Executive Director, Pacific Marine Fisheries Commission, United States attended the ninth annual meeting in San Francisco.

The group considered an agenda of 15 topics. Lengthy discussions occurred on fishery status reports, data exchange procedures, groundfish research programs, projects of mutual interest, cooperative projects, and international problems.

Trawl landings by U.S. and Canadian fishermen in 1967 totaled 170 million pounds, a decline of 8 percent from 1966 but 20 percent greater than the annual average for 1957-1966. The 1967 landings included 27 million pounds of hake which comprised 16 percent of the 170 million pound total. A decline in market demand for food species and foreign trawling for certain species affected the 1967 landings.

The catch trends by Canadian and United States fishermen has been upward in recent years but the vast potential for expansion remains untapped except by Soviet and Japanese distant sea trawlers. No information on the catch by Japanese trawlers off the west coast or the Soviet catch off Canada was available to the Sub-Committee. However, Soviet trawlers caught 432,000,000 pounds of hake and rockfish off the United States in 1967. Of this total 110 million pounds of hake and 50 million pounds of rockfish were taken off California.

Development of new formats and changes in present ones for groundfish data and the use of the P.M.F.C. data series provide excellent media for data exchange among agencies.

Plans for cooperative research on stocks of mutual interest, petrale sole and Pacific ocean perch, were formulated. International fisheries on petrale sole are being monitored closely by Canadian and U.S. agencies since the removal of winter restrictions in 1967 by Washington and Oregon.

Foreign fishing has been of concern to the Sub-Committee since 1961. Recommendations to obtain statistics of this catch and to increase research on groundfish were reaffirmed.

Fishery agreements with other nations were discussed. Details of the 1967 winter Soviet-U.S. winter meeting were given to the Sub-Committee. The fishery agreement of 1967 with the Soviets was renewed with no changes for 1968. This agreement provided for certain fishing and loading areas for the Soviets within the U.S. 12 mile, exclusive fishing zone and also specify certain areas outside of 12 miles where the Soviets will refrain from fishing or concentrating vessels. Another negotiating meeting between the U.S. and Soviets is scheduled for winter 1968 to consider fishing off

Washington, Oregon, Kodiak, and the Bering Sea. A scientific meeting in Moscow is also scheduled for Fall 1968.

Canada does not presently have agreements with foreign nations.

The Sub-Committee views with satisfaction the progress made in data exchange, cooperative programs, and expanded research since its first meeting in 1960.

Mr. C. R. Forrester, Fisheries Research Board of Canada, replaces Tom Jow as chairman for 1969. The next meeting is scheduled for Portland, Oregon.--Tom Jow.

1. BOTTOMFISH

A. Fishery

Flatfish: Catches of Dover and English sole dominated landings in the area from Eureka to San Francisco. Landings of petrale sole were moderate. English and petrale sole were the predominant species in the area from Monterey to Santa Barbara. Small amounts of Dover sole were also reported from this area.

Most of the San Francisco based trawlers have shifted their operations to Fort Bragg and Eureka leaving only 4 trawlers in the San Francisco area.

Roundfish: Moderate catches of rockfish were reported from Eureka to Santa Barbara.

B. Research

Flatfish: Market sampling was accomplished at all ports from Eureka to Santa Barbara. June trawler logs and market receipts were processed and sent to Terminal Island.

Nineteen English, 5 petrale and 5 Dover sole tags were recovered during the month. The English sole were tagged during 1967-1968 in the Monterey and San Francisco areas. Three of the English sole were recovered from the Eureka area and two from the Fort Bragg area. A single Peterson disc tag was returned from an English sole released off Washington.

Distribution of new logbooks continued in all areas.

Summaries of 1967 market sampling in the Eureka area were completed.

Catch and effort figures were readjusted for the data exchange with the U.S.S.R.

Roundfish: Position vacant, no research conducted.

2. SHELLFISH

A. Fishery

Abalone: Fishing effort remained low in the Morro Bay region and high in the Channel Islands area as several Morro Bay boats continue to operate from Santa Barbara.

Good landings of large, pink abalone were made at San Nicholas Island. These abalone brought fishermen \$12 per dozen.

Morro Bay processors continued to buy and truck large quantities of both red and pink abalone from Santa Barbara.

From one to five abalone boats, daily, were operating on the Pt. Estero

to Cambria beds. Daily catches were reported to be ranging between three and six dozen red abalone.

Crab: Season closed in the San Francisco area. The northern California season closed July 15 with no reported landings for the month.

Shrimp: Area A (Crescent City-Eureka) shrimp season closed on July 14 with total landings of 2,080,000 pounds in California. An additional 121,000 pounds were reported landed at Brookings from California waters. Catches were good throughout the bed. The vessels averaged 1,128 pounds per hour in July.

Area B-2 (Bodega Bay) landings totaled 74,650 pounds on July 28. These are the highest landings since 1965 when 253,502 pounds were landed. Rough weather has hampered fishing operations. Fishing is taking place off Pt. Reyes in 40-42 fathoms of water.

No landings have been reported from Areas B-1 and C.

Oysters: At Eureka, Coast Oyster Company has closed harvesting operations and will not begin harvesting again until fall. Presently they are engaged in equipment repair and transplanting.

Eureka Oyster Farms is now producing 400 gallons of meats per week, some of which are going into "Oystamins".

A total of 2,350 strings (470 standard cases) of Pacific oyster seed were planted in Drakes Estero. This seed was trucked down from Dabob Bay, Washington and arrived on July 11. Inspection of the seed revealed no pests.

B. Research

Abalone: Survey dives on the Pt. Estero to Cambria beds disclosed large numbers of red abalone in the 5 to 7 inch size range. Several trial dives by project members yielded average catches of 1 dozen, commercially legal, red abalone per hour. These catches closely approximate those reported by commercial fishermen and are considered to be marginal, profit-wise.

Kelp development appears optimal this season. Bull kelp development in the Point Estero to Cambria region is nearly 1½ times that of last season. Pea kelp, *Macrocystis*, is showing extensive canopy development along the entire central California coastline. Additionally this kelp has been slowly encroaching upon the once "pure" stands of bull kelp nearer to Pt. Estero. This encroachment of pea kelp into areas that once were exclusively bull kelp is a long-term change that is being monitored because of the influence these kelps have upon the community structure and abalone populations.

Crab: A trawl cruise in the San Francisco area to assess the relative abundance of incoming year class strengths was completed July 21. Fifty-one tows produced 777 crabs consisting of 395 males and 382 females. The 1968 year class was taken in 10 of the tows and comprised 3.2 percent of the catch. This is a very poor representation for an incoming year class. However, it's possible the crabs were too small

to be retained in the net. Future cruises will give a better indication of the relative strength of the 1968 year class.

On previous cruises, the 1967 year class has appeared relatively weak. This was again the case as this year class comprised 23.6 percent of the total catch.

Four trawls were made in Humboldt Bay July 17. The material collected is being sorted by a Marine Biology class at Eureka High School.

The 1966-67 market sampling data from Eureka and Crescent City were transferred to INFOL forms and sent to Shellfish Data Analysis, Menlo Park.

Shrimp: At Eureka most of the month has been spent processing logs and conducting preliminary analysis of shrimp data.

Samples of shrimp were obtained from vessels fishing Area B-2. Shrimp from these samples will be sexed, measured and weighed.

Oysters and Clams: The clam census at Clam Bar near Lawson's Landing on Tomales Bay was completed during July. A total of 132 randomly selected plots were laid out and all clam siphon holes counted. A preliminary estimate revealed about 560,000 horseneck clams. Further population surveys on Clam Bar are planned for the Fall of 1968 and the Spring of 1969.

Clam diggers on Clam Bar were also interviewed twice during the month. Measurements of the catch were taken. Very little effort by skiff fishermen is taking place since Lawson discontinued his barge service on July 1. He plans to start again in November.

3. SHELLFISH AND BOTTOMFISH DATA ANALYSIS PROJECT (M68D)

Information Storage and Retrieval System: Data Bank

The box-sampling data have been established in an INFOL system and several test reports were run from the file. Production of reports showing the distribution of flatfish will proceed after consultations with the Bottomfish Investigation biologists.

Shrimp market samples from Bodega Bay were added to the INFOL system.

The data from Crab cruise 68-N-3 were added to the master tape. Several standard reports, summarizing the information, were produced for Mel Willis.

Crab catch data from the Humboldt Bay Trawling Study were established and added to the master tape.

The results of our postcard survey of crab fishermen were established in an INFOL system. A listing of the physical description and number of traps fished was produced. These data will be collated with the catch data for computation of population sizes and exploitation rates.

The gear codes contained in the Shrimp and Crab INFOL systems were revised.

Operations Research

A Fortran Program to summarize the crab data from research cruises is being written. Width frequencies by sex, month, gear, and depth will be printed. INFOL was used to prepare a magnetic tape to be used as input to the program.

A generalized plan for a fisheries investigation was written.

4. PESTICIDE MONITORING (B.C.F. Contract)

Chromatograph malfunctions during June have resulted in a backlog of over 30 samples. Replacement of the oven temperature controller unit and the oven fan motor have remedied the problem. A new supply of Gas Chrom Q, a column packing material resolves all isomers of DDT, DDD and DDE. An earlier supply from a manufacturing corporation in Walnut Creek did not accomplish this separation. Analysis of June samples will be completed in July.

Laboratory space provided by "Marine World" to investigate pesticide pollution on local marine fauna will be available in August.

The second quarterly report covering the period April through June 1968 has been completed.

Project is on schedule.

5. SHELLFISH LABORATORY OPERATIONS (Bartlett Project M64R3)

Marine Culture Laboratory funds were approved by the Legislature for 1968-69. A total of \$163,800 was allocated for the project, including two additional assistant marine biologists. Negotiations are in progress with Stanford University for laboratory space adjacent to Hopkins Marine Station at Pacific Grove. An architect from the Facilities Planning Division of General Services is in the process of completing floor plans to present to Stanford for lease estimates. After completion of lease arrangements, Stanford will build a building to our specifications. It is anticipated construction can begin in November or December.

Research

Clam samples were collected from Drakes Bay and Humboldt Bay for gonad analysis. Four months of samples have been taken and processed.

Assistance was given the crab project at Bodega Bay for one day. An attempt was made to run transects on the bottom in outer Bodega Bay, but murky water prevented the survey. A large abalone population was noted in 18-20 feet of water south of Bird Rock. These animals appear slow growing with heavily bored shells (*Clinona* sp.).

6. OYSTER DISEASE AND MORTALITY STUDY (B.C.F. Contract)

Routine sampling was carried out in Humboldt Bay, Tomales Bay, and Drakes Estero during July. In addition to the live oysters and gapers

collected from the experimental stations, numerous gapers were collected from commercial populations in Humboldt and Tomales Bays. Losses in the experimental populations remained negligible at Drakes Estero. The losses in Tomales and Humboldt Bays continue with Humboldt Bay oysters showing a decrease in mortality rates during July.

The second count was made on the Pacific oyster seed planted in May. The average count of spat per mother shell was noted to decrease from 20 to 70 percent depending on area or origin. This loss was attributed to shipping and handling although it is believed that crab predation accounted for a sizable proportion of the loss.

The processing of tissue and plankton samples continues.

The program is on schedule.

7. PORT SAMPLING (Bartlett Project 66-D)

Shrimp fishing at Crescent City resumed July 7, with a quota raise from 1.5 million pounds to a 2.0 million pounds. It took the vessels only eight days to fill the additional poundage up to the two million mark. The grade of shrimp was good with an average count per pound of 102 for 27 samples.

The 1968 year-class shrimp started showing up in market samples taken July 8, and the fishermen report good showing of the new year class in some areas of the shrimp bed.

Seven vessels of the California shrimp fleet have moved to Brookings and Port Orford to continue shrimping.

Marked samples from Brookings and Port Orford show counts per pound of 94 and 104 respectively.

The summary of incidental fish sampling from shrimp landings shows nine species of fish with yellowtail rockfish and canary rockfish making up 71.3 percent of the landings.

Hake stomach sampling continued with 122 stomachs examined. There was an average of 2.2 shrimp per stomach. The 1968 year-class shrimp made up 26.6 percent of the shrimp by numbers.

8. SEA OTTER PROJECT

Project Leader, Mel Odemar, spent eight days on Amchitka Island, Alaska, in the Aleutians, observing the capture and handling of sea otter by the Alaska Department of Fish and Game. Approximately 350 sea otter are to be transplanted from Amchitka to S.E. Alaska.

Two days were spent diving off Point Estero to examine the marine habitat in the area.

The initial studies of this new project are being outlined for

presentation to the Marine Resources Manager for review and submission for approval by the Department.

San Francisco-Drainage Oceanography (S.W.Q.C.B. Contract)

The final report entitled A Survey of the Marine Environment from Fort Ross, Sonoma County, to Point Lobos, Monterey County was submitted to the San Francisco Bay-Delta Water Quality Control Program. The report is being duplicated and will be distributed as Marine Resources Operations, Reference No. 68-12.

9. PELAGIC FISH

A. Fishery

Landings in tons <u>Species</u>	<u>July</u>		<u>January 1 - July 31</u>		<u>10 yr. mean 1957-1966</u>
	<u>1968*</u>	<u>1967</u>	<u>1968*</u>	<u>1967</u>	
Anchovy	4	142	1,986	28,011	4,904
Mackerel, jack	1,600	1,063	14,315	14,496	16,429
Mackerel, Pacific	35	25	423	179	6,326
Sardines	2	2	56	64	1,583
Squid	540	1,049	9,712	8,168	4,658
Total	2,181	2,281	26,492	50,918	33,900

*Estimated. Accumulated landings are revised monthly.

B. Anchovy

Fishery

Commercial: The Fish and Game Commission approved new regulations governing the take of anchovies for reduction and expressed the intent to continue the fishery at least through the 1970-71 season. Quotas and zones remained unchanged from 1967-68.

Season: Northern Permit Area, Aug. 1-May 15; Southern Permit Area, Sept. 15-May 15. If the quota for either permit area should be approached the Commission will consider increasing the quota for that area.

Live Bait: During the month the southern California live bait fishery centered around the Los Angeles Harbor. Decreasing availability of bait caused boats from San Diego, Oceanside, and Newport to fish in the harbor at an ever increasing rate as the month went by. At month's end live bait was difficult to obtain everywhere along the southern California coast with the exception of the Port Hueneme-Oxnard area. Bait fishermen blamed high temperatures (70° F+) for the bait shortage in the Los Angeles Harbor area.

During the month the sampler observed fishing operations of 10 vessels (3 off San Diego, 2 off Newport, 2 in the L.A.-L.B. Harbor, 2 at Port Hueneme, and 1 at San Francisco) and in accord with the sampling plan, obtained a total of 16 samples from 5 of them.

Research: Reading of otoliths and scales for the scale-otolith age

study was completed, analysis is underway.

C. Mackerel-Sardine

Resource: Jack Mackerel landings fell to 1,600 tons during the month. Most of the catch was taken at Cortes Bank, with smaller amounts coming from Santa Cruz Island. Large schools of jack mackerel were found in the shallows of Cortes Bank throughout the month. Catches were made in 10-12 fathoms of water.

No jack mackerel landings were reported in the Monterey area.

Pacific Mackerel landings rose to 35 tons. A pure 20 ton school was taken near La Jolla during the night of the 16th. The scoop fleet landed measurable amounts of Pacific mackerel in southern California after several months of inactivity. Trace amounts of mackerel are still appearing in some catches from Cortes Bank.

Sardine landings continued to be low, with most of the catch being taken incidentally by lampara boats fishing the inshore waters near San Pedro.

Squid landings fell to 540 tons this month. Monterey area canners stopped ordering fish after the first two weeks of the month.

Fleet: Bluefin tuna appeared within range of the mackerel-sardine purse seine fleet by the middle of the month. This caused many of the seiners to scout for bluefin instead of jack mackerel. Near the end of the month, several of the seiners were able to purse seine albacore. Only 5-6 boats fished mackerel regularly during the month.

Research: Ten jack mackerel and 2 Pacific mackerel samples were taken this month.

Work continued on Pacific mackerel material for a meeting with State, Federal and Mexican officials. Parrish completed a review of Pacific mackerel age assignments and a comparison between old and new age composition estimates is underway.

Work continued on a jack mackerel article for the next CalCOFI report. Considerable time was spent preparing a planning report for Herb Frey.

General: A meeting between officials of the Mexican Government, the U.S. Bureau of Commercial Fisheries and the California Dept. of Fish and Game to discuss the status of wetfish resources was held at La Jolla, California on July 31st. Presentations describing the fishery, the current state of our biological knowledge, and the present condition of the mackerel stocks off California and Baja California were made by Department biologists. A joint resolution expressing concern for the depressed fisheries of both countries off California and Baja California and need for specific research was adopted.

Personnel: Ken Aasen promoted to Associate Fishery Biologist and transferred to Water Projects, L.A.

D. Fisheries Resources Sea Survey (M53R)

Surveys

A sea survey cruise of southern California aboard the R/V ALASKA was completed July 3. The adult anchovy population was still scattered over a large offshore area in the vicinity of San Nicolas Basin, but some inshore movement was detected east of San Clemente Island. School estimates decreased by 50 percent since the last survey in May. No commercial size schools or concentrations were found.

Juveniles were found in abundance close to shore from Point Dume to Ventura. Large schools at depths ranging from the surface to 100 fathoms were located along the steep bottom contours of this area and over the Ventura Flats.

The new Simrad sonar was field tested with satisfactory results. Anchovy schools were detected at a maximum range of 1200 yards. Using range and bearing information obtained by sonar, the ALASKA was easily maneuvered directly over anchovy schools.

Scuba diving observations were made on our 30 foot midwater trawl. A change in float positioning on the headrope resulted in excellent mouth opening and trawl configuration.

The new net reel for trawling arrived early in the month and is presently being installed aboard the ALASKA. Specifications were written for construction of a new trawl winch for the ALASKA. This winch will enable us to use the depth telemetry system developed by the U.S. Bureau of Commercial Fisheries for the Pacific Northwest trawl fishery.

The 1966 sea survey data report is ready for a final computer run. The output of this run will be used to produce the published report.

Data Analysis

The card to tape transfer program was completed and all Sea Survey data from 1950 through 1965 is now stored on two reels of magnetic tape.

A program to extract temperature and catch data relating to nine commonly encountered species is being written and output from the program should be available within a month.

O'Brien attended a five-day course in PL/1 programming language offered by IBM Corp., Los Angeles.

10. TUNA

A. Albacore

Research

Life History: Age and growth--The 1968 length and age frequency sampling began July 15. These data were supplemented by sampling albacore that was trucked from Oregon. In this way, sufficient information was obtained to make a good estimate of the age composition

of the July catch.

Population Dynamics: Logs representing 20 albacore fishing trips were obtained. This is an unusually small number compared to other Julys. Our newly revised albacore logbooks arrived from the printer July 26. Since most of the fleet sailed for Oregon, only a few books were distributed. Final computer output of processed logbook data, for 1967, was received and checked against fleet landing figures.

Ecology and Oceanography: The 10-meter water samples and the bathythermograph slides obtained during albacore cruise 68-S-1 were taken to Scripps Institution of Oceanography for processing. Correction values also were obtained for reversing thermometer data obtained on this cruise.

Education and Public Relations: Considerable time (at least one man month) was spent answering questions about the current albacore migration. Questions came from both sport and commercial fishermen.

Fishery

Sport: The 1968 season was launched on July 1, when 2 albacore were caught by anglers on one of the long-range partyboats operating from San Diego. The fish were caught southwest of Cortes Bank. By the 4th of July, significant sportcatches were made around Sixtymile Bank. Since then sportfishing success has fluctuated markedly. However, the catch exceeds comparable figures for 1967.

Commercial: Most of the fleet remained in port until July 10, while the Western Fishboat Owners Association negotiated a price with the processors. A few vessel owners did not agree with the Association's request to remain in port; these scouted the local fishing grounds with little success. Meanwhile, Oregon Fish Commission personnel, aboard a chartered survey vessel, reported capturing 263 albacore off the north coast between July 2 and 7. Experience gained by the fishermen during the past three years caused the northern albacore fleet to remain in Oregon and the southern fleet to sail in that direction when the price was established. The price was set at \$425 per ton on July 10.

The small number of vessels remaining off California set record low July landings here, while the large northern fleet reportedly set record high landings in Oregon.

B. Bluefin Tuna

Research

Life History: Age and growth--Scale samples indicate that most fish in this year's bluefin run are two-year-olds.

Migration--We received two bluefin tuna tags from Japan this month. Both were recaptured off Japan, in two-boat purse seines, nearly 4 years after being released: The first fish was recovered July 4, 1968, about 4,740 miles from the release area. It had been tagged August 13, 1964, west of San Martin Island, Baja California; and it was recaptured east of Osaki Zaki, Honshu. Bluefin No. 2 was

recaptured July 14, 1968, approximately 4,550 miles from the release location. It had been tagged August 20, 1964, near San Diego, California; and it was caught for the final time off Todo Saki, Honshu.

On July 30, John Seapin completed a short tagging trip aboard the purse seiner Sea Scout. Fishing was slow, but 35 bluefin were tagged and released. They ranged from 20-30 pounds.

Physiology--Studies of the bluefin tuna pineal apparatus are progressing well. Several bluefin heads have been dissected to study the anatomy of the pineal, before turning to live specimens.

Resource Management: The first half of the 1967 summary of the bluefin fishery has been completed; it contains information on catch, effort, and economics.

Fishery

Sport: The partyboats, especially those going for albacore, are reporting an occasional bluefin tuna in their catches.

Commercial: Landings so far this year are below average. The total to date is about 2,000 tons. Fishing is slow, and the boats are scattered from Cedros Island to the Coronados Islands.

According to ATSA auction rules bluefin prices are automatically set at \$20 per ton lower than the yellowfin bid. Hence, the fishermen are now receiving \$295 per ton for bluefin tuna.

C. Pacific Bonito

Research

Life History: Age and Growth--Two weight-length samples were taken this month.

Migration--Due to other work priority, only 12 fish were tagged this month. About 15 tags were returned from previous tagging. The data suggest that most of the bonito tagged in King Harbor have moved out. They have been recaptured both north and south of Redondo.

Fishery

Sport: Partyboat catches of bonito are high, indicating that sportsmen may have a much better catch than last year.

Commercial: Activity was slow this month. Noteworthy was a catch of about 20 tons of 6 to 8 pound bonito from the Santa Cruz Island area. Most bonito caught during the last couple of months have been small, averaging 3 pounds or less.

D. Miscellaneous

Administration

Personnel: John Geibel is on Air Force Reserve Training and will be lost to us for 2 weeks.

Staff Assignment: Plan and advise--One week was spent in planning.

11. SPORTFISH

A. Partyboat

Research: More than 400 sand bass were tagged in June and 38 tagged bass were recovered. One tagged 12-inch fish grew 3 1/3 inches while at liberty 3 years and a smaller bass grew almost 4 inches in 439 days. Most of the recovered fish were at liberty less than a month.

Fishery: Late catch logs brought the April-May salmon total of the Santa Barbara-Port Hueneme area to 3,100 fish. The June catch was more than 300 fish.

No albacore were reported caught in June, but 2 partyboats reported fishing effort at the month's end.

The 1968 partyboat catch of key species, accumulated through June, compares with 1967 as follows: (nearest 100)

<u>Through June</u>	<u>1968</u>	<u>1967</u>
Rockfish	1,003,100	826,700
Kelp & Sand bass	519,600	271,700
Bonito	456,400	46,900
Barracuda	191,100	179,400
Salmon	39,400	49,000
Calif. halibut	28,400	33,700
Yellowtail	16,200	14,800
Striped bass	2,500	1,600
Sturgeon	800	--

Through June of 1968, 833,000 more fish were taken than in the same period of 1967.

B. Environmental and Behavioral Studies of Coastal Sport Fishes (DJ F22R)

July was vacation time for project personnel. Despite a shortened work period a variety of tasks were undertaken: several meetings to discuss and evaluate marine ecological survey methods and results were attended; diving surveys were conducted in the Los Angeles Harbor and off Zuma Beach; our CONES transect was surveyed and new markers placed along the 100m intensive study area; job completion reports were prepared for submission to D-J Coordination, Sacramento; and numerous new specimens were identified and accessioned into our reference collection.

Project field work is being curtailed due to leaky boat problems. This will be eliminated shortly with purchase of a replacement for the Dolphin. Boat specifications are being drafted preparatory to seeking a builder.

Upper Newport Bay-Sunset Bay Contract Studies

July's work load consisted of sorting and identifying specimens collected from Upper Newport Bay.

Keith Taniguchi was appointed Seasonal Aid.

Redondo Harbor Biological Monitoring (Southern California Edison Company Contract)

Most of the month was spent on the creel census and on identification of polychaete annelids taken during the March benthic index survey. All material should be identified before the next survey, scheduled for August.

Preliminary examination of creel census data shows a drop in angling pressure during July, from May and June.

C. Central California Marine Sportfish Survey (DJ #25R1)

Routine partyboat and skiff sampling was continued at Monterey, Santa Cruz, and Pacific Grove.

One week was spent on the kelp bed ecology survey. Twenty fish were caught and tagged in the study area. Two of these were previously tagged fish.

Anchovies were observed in the Santa Cruz Yacht Harbor in large numbers on July 20. A few were dying off but no mass die-off occurred. Oxygen determinations, temperatures, and plankton samples were taken on the 21st and 23rd. Very low oxygens were found at the surface. Surface temperatures were 16.8°C but bottom (5 meters) temperatures were 14.5°C.

Apparently this layer of colder water on the bottom contained enough oxygen to prevent a large die-off as occurred in 1964. On July 24 all anchovies had left the harbor.

The project's research vessel, Ophiodon, was taken out of the water on July 7 for bottom cleaning and repainting.

Jim Gates started work as Seasonal Aid on July 5.

12. FOOD HABITS STUDY (Bartlett M67R)

Stomachs from 457 fish (bluefin tuna, 279; albacore, 110; bonito, 40; California halibut, 5; sand bass, 17; and barracuda, 6) were collected during the month with the help of two seasonal aids and one volunteer. The samples came from various fishing operations including commercial fishing, Orange County's Marine Science Floating Laboratory, and from the Environmental and Behavioral Studies' diving team at Terminal Island. Various other species of fish were also collected to add to our otolith reference collection: they included ocean whitefish, pompano, Dover sole, yellowtail rockfish, and a fantail sole.

The stomach contents of 108 fish were examined, and identified, and our findings recorded for future analysis: bluefin tuna, 40; albacore, 30; bonito, 20; California halibut, 17; and kelp bass, 1.

13. SPECIAL PROJECTS

A. Southern California

Considerable time was spent this month on Bay and Estuary Planning.

Some time was given to the planning of marine preserves.

Routine duties took up the remainder of the month.

A manuscript on the invertebrates collected during the Santa Monica Bay Trawl Study was submitted to The Veliger.

B. Northern California

All stations of the Gulf of the Farallones study were sampled from the Nautilus. A platform was built for the Eureka thermograph. Assistance was given the Shellfish project in locating the boundaries of the clam study area in Tomales Bay by use of a sextant.

14. BIOSTATISTICS

A. Data Processing

Regular Reports: The June 1968 cannery and processor reports were completed, and the monthly letter summarizing the tuna case pack was mailed.

The reports of the May 1968 landings and shipments were tabulated, decoded, and distributed to the field offices.

The June 1968 partyboat catch reports were tabulated and letters summarizing the catch were mailed.

Pacific Mackerel Port of Landing reports, November 1967 through April 1968, were tabulated for the Pelagic Fish Investigation.

The first list of unregistered boats landing fish during the current license season was prepared for Wildlife Protection Branch.

Changes to the dealer master list were made and forwarded to Sacramento. The corrected lists were then mailed to the field offices.

The 1968-69 registered boat list was tabulated for the Source Documents Unit.

Annual Reports: The 1967 annual species reports for bonito, bluefin, yellowfin and skipjack were tabulated, decoded, and distributed.

The 1967 annual live bait reports were tabulated for the Pelagic Fish Investigation.

Special Reports: A table presenting preliminary figures on landings of taxable fish for the 1967-68 fiscal year was compiled for the Marine Research Committee.

Albacore landings for 1966 and 1967 were compiled for the ports from San Francisco to the northern California border for the Bumble Bee Seafoods Company.

Information on the top ranking 17 species landed in California in 1966 was compiled for the FAO.

A table detailing the 1967 anchovy season landings was compiled for the Pelagic Fish Investigation.

Tables denoting market fish landings by selected origin blocks, 1957 through 1963, have been compiled for the Marine Resources Plan.

Data concerning the 1967 crab landings were given to Frank Alverson, Ralston Purina Co.

An estimate of the number of saltwater anglers that fished in each county along the California coast in 1963 and those predicted to do so in 1980, was compiled for the Security Pacific National Bank, Los Angeles.

Anchovy catch-effort reports by origin block for the 1965-66 and 1966-67 seasons were tabulated for the Pelagic Fish Investigation.

A bluefin boat class report was tabulated for the Tuna Investigation.

IBM card decks and listings were prepared from shrimp market samples 268001-268006 and from petrale sole tagging data for the Shellfish and Bottomfish Data Analysis Project.

Boat catch information for 1962 and 1966 was tabulated for the Marine Resources Plan.

An IBM card deck and listing was prepared from Keith Anderson's Salton Sea data.

Work in Progress: Editing has started on the June market and July cannery fish receipts. The License Unit is still busy with boat registrations, fishermen's licenses, and wholesale dealer licenses for the 1968-69 season.

Work continues on the 1967 catch bulletin.

Field: Biostatistics' field man is on two weeks military leave.

B. Technical Assistance and Mathematical Analysis

Statistical and Mathematical Analysis: The logistic model was fitted to an extended range of shrimp catch data covering the years 1954-1967. The model predicts an optimum sustainable yield which is quite similar to a prediction made using a more limited range of years.

Assistance was given the Inland Fisheries Branch in planning a tagging experiment to estimate the population size of Salton Sea corvina.

An estimator for relative fishing power based on Robson's estimator for log relative fishing power was obtained. A computational outline for this problem was prepared.

Work was carried out on a paper which describes methods of sampling bulk fish landings such as occur in the mackerel, sardine and anchovy fisheries.

Computers: The revised card-to-tape program was de-bugged and a different version is being prepared so that we may make a benchmark run on the 6600 computer. The tape checking program is still undergoing testing.

Modifications to the sablefish boat catch analysis program to allow operation directly from the commercial tape were completed.

The design of a program to produce summary tapes from the commercial catch tape was begun.

15. VESSELS

ALASKA

From 1st through the 3rd the ALASKA engaged in Pelagic Fish Studies off central California coast.

Balance of the month vessel secured, and crew on vacation.

Days scheduled 3; days operated 3.

N. B. SCOFIELD

Vessel secured for vacations the entire month.

Days scheduled 0; days operated 0.

NAUTILUS

Vessel conducted a fourteen day (14) Crab Study cruise off San Francisco and Bodega, and a four day (4) oceanographic cruise off Farallones Islands.

Days scheduled 21; days operated 18.

Three days out of operating time was needed to install and test the oceanographic equipment.

MOLLUSK

Vessel did 5 days of abalone work off Morro Bay.

16. BIOLOGICAL NOTES

A scalloped ribbonfish, *Zu cristatus*, netted with bluefin tuna north of Cedros Island on July 12, was the second largest known of this world-ranging species, and only the third individual taken in the eastern North Pacific. This fish at 38½ inches and 5½ pounds had neither the shape nor color of smaller individuals and even lacked (had grown out of) the scalloped belly of the juvenile from which its

name is derived. The stomach of this ribbonfish contained a 4-inch long black dragonfish, *Idiacanthus antrostomus*.

A Pacific amberjack, *Seriola colburni*, hooked from a partyboat at the Barn Kelp north of Oceanside on July 25 represented the third record of this species from California. Both previous occurrences have been in the Oceanside area also.

Stomachs of 19 jumbo squids (*Dosidicus gigas*) were examined recently and yielded 1,771 otoliths from 11 species of fish. These squid, ranging in mantle length from 8 to 10½ inches, had been dipnetted at the surface by a tuna fisherman operating south of the Revillagigedos. The bulk of the otoliths (1,621) were from the gonostomatid *Vinciguerrria lucetia*. *Dosidicus* and *Vinciguerrria* are both known to inhabit waters off southern California.

What appears to be a record meal for a cetacean in the eastern Pacific was noted in the finding of 7,011 otoliths in the stomach of a spinner dolphin, *Stenella longirostris*, captured off southern Mexico recently. Although 6,147 of these otoliths were from a single species of lanternfish, six other fish species were involved. This eastern Pacific "record" falls far short of the 15,191 otoliths found in the stomach of a common dolphin (*Delphinus delphis*) harpooned in the Mediterranean in 1910.

17. MISCELLANEOUS

A. Meetings, Talks and Visitors

- July 1 - Dick Heimann met with Dahlstrom and Jow at Menlo Park to discuss oyster prices and animal food landings.
- July 2 - Marine Research Committee meeting met at the CMI Terminal, Berth 93, at San Pedro. Baxter, Leighton, Richardson and Messersmith attended.
- July 2 - Turner met with John H. Prescott, Marineland of the Pacific, to discuss underwater parks and preserves; Marineland.
- July 2 - Carlisle met with local officials to discuss the Orange County marine preserves, Newport Beach.
- July 3 - Herb Frey met with Tom Jow at Menlo Park to discuss planning.
- July 3 - Carlisle and Haugen met with Ron Heim, Region 5, and Eleanor Young, Orange County Planning Dept. regarding planning for Upper Newport and Anaheim-Sunset-Bola Bays; at Santa Ana.
- July 3 - Turner met with John Day, Region 5 Water Quality Biologist, to discuss and design an offshore ecological survey and monitoring program to be conducted in the vicinity of the Orange County Sanitation Districts' proposed ocean outfall; Terminal Island.

- July 9 - Turner met with John Day (Region 5 Water Quality Biologist), Richard Harris (Regional Water Quality Control Board #4), Ralph Moore, Charles Hudgins and Harold Hilliard (Continental Oil Company) and Dr. William Anikouchine (Oceanographic Services Inc., Santa Barbara) to discuss and evaluate the pre-discharge survey and post-discharge monitoring program OSI is conducting for CONCO offshore from their Ventura facilities; Los Angeles.
- July 9 - Turner met with John Day (Region 5), Richard Harris (Regional Water Quality Control Board #4), Phil West, Ed Carey and Hal Potter (Southern California Edison Co.) to discuss Edison's proposed Ormond Beach steam-generating station.
- July 10 - Ebert met with H. Bissell at Menlo Park to discuss and critique P.G.&E.'s report of the marine environment off Diablo Canyon.
- July 10 - Herb Frey was in San Diego meeting with members of the fishing industry to gather information for the Marine Resources Plan.
- July 11 - Aplin spoke to the staff of the Regional Water Quality Board in Oakland on the current information available on the Gulf of the Farallones biology and the study now getting underway.
- July 12 - Emil Smith, Herb Frey, Jeanne Cowger and Ellen Gramm met and discussed the new agar harvesting.
- July 12-13 - Underwater Parks Advisory Board meeting; Monterey; Turner.
- July 17 - Carlisle, Baxter & Dahlstrom attended a Bay and Estuary Planning meeting, Sacramento.
- July 17 - Orcutt and Aplin attended the pre-opening visitation of Marine World, Redwood City.
- July 18 - Baxter attended a meeting with the Commercial Fishing Industry in San Francisco.
- July 19 - Knaggs presented a talk and showed a film at the Long Beach Burnette Elementary School. Seventy pupils were in attendance.
- July 19 - Orcutt and Dahlstrom participated in shellfish discussions of the Department with representatives of the oyster industry at Morro Bay.
- July 20 - James Forbes visited with Clemens to discuss economics research. His company is the Forbes, Stevenson Co. at 606 So. Olive St., Los Angeles. He was working on processing fish before they reach the canneries. Now he is more interested in how biologists manage to survive on their present salary.

- July 22 - Smith met with Dr. Murison, Humboldt State College, to discuss plans for a fisheries symposium in March 1969.
- July 22 - Blunt conferred with G. Rolfson on the mackerel fishery.
- July 22 - Haugen addressed E.S.E.A. pupils at Jane Addames School, Long Beach.
- July 23 - Carlisle met with Beaches and Parks and local officials to discuss a marine preserve for Dana Point, Doheny State Park.
- July 23-24 - Jow, Frey & Baxter attended planning meetings in Sacramento.
- July 26 - Baxter and Messersmith attended the California Fish and Game Commission meeting held at San Diego. The anchovy reduction season was established for the present season.
- July 26 - Jim Phelan showed a movie and gave a talk to 55 4th-6th graders taking part in the Long Beach School District summer program for culturally disadvantaged children.
- July 29-30 - Heimann was in Sacramento for budget hearings.
- July 30 - Carlisle gave two talks to Oceanography classes at North High, Torrance.
- July 30 - Leighton, Petrich, Baxter, Clemens, Pinkas, Orcutt and Heimann attended the MRO budget hearing, Sacramento.
- July 30 - Catherine Berude and Norman Abramson attended a Control Data Corporation seminar on uses of the 6600 computer.
- July 31 - Baxter, Blunt and Tomlinson participated in a meeting at La Jolla in which representatives of the Mexican Government, U.S. Bureau of Commercial Fisheries and the Department of Fish and Game discussed the state of the Pacific mackerel stocks common to both countries. A joint statement concerning the state of the fisheries was prepared.
- July 31 - Robert Wilson visited the lab. He was on his way to Mexico to discuss tuna and other problems of common interest to the U.S. and Mexico.

B. Personnel

- July 2 - Alice D. Montoya, Stenographer II, Biostatistics, T.I., resigned.
- July 15 - Kenneth D. Aasen, Assistant Marine Biologist, Pelagic Fish, Terminal Island, promoted to Associate Fisheries Biologist, Water Projects, Los Angeles.

July 19

- Charles C. Landrum, TAU Motor Vessel Engineman,
Research Vessels, Terminal Island, resigned.


John L. Baxter
Acting Manager