OF SPORT FISHING AND FISHERMEN

Laura Burchard

Fishermen, as everyone knows, come in all sizes--little fry with 10-cent hooks to tired executives with expensive gear complete with boat. But what conservation agencies want to know is who they are, where they fish, how much they fish, and how much they spend on the sport.

To find answers, the U.S. Government supplied Federal aid funds for an extensive updating of previous surveys.

The 1970 National Survey of Fishing and Hunting, conducted by the Bureau of the Census and released recently, shows an increase in avid fishermen despite pollution, mercury, dredging, urbanization, and changing occupations and interests of young people. During the year, about 49 million Americans fished at some time or another--averaging one in every 3 men, and one in every 9 women.

The fishermen come from a wide range of social, economic, and demographic backgrounds. By education, the group with the highest number of fishermen was the high-school graduates. In occupation, the largest single group was the blue-collar craftsmen; farm laborers and household workers were the smallest. Among white-collar workers, professionals and technicians made up the largest group. But the very lowest number recorded was in the group one might think had the most time for "bathing a worm", the 'Never Work Fulltime' category.

The largest group by age was the 45 to 64 bracket; the lowest, teen age. But a new group is coming on--the 9-to 11-year olds; $3\frac{1}{2}$ million boys went fishing, and almost 2 million girls followed their lead.

The Biggest Fish Story

Based on family income, the largest group was the 10-to 15-thousand-dollar class. In fact, this income bracket led in number of fishermen and in all statistics. They spent the most money--over a billion dollars--and took the most fishing trips, traveled the most miles, and enjoyed the most recreation days.

There are some fishermen among those cowboys out west. The highest percent (per population) of fishermen is in the western mountain states, with the northern part of the midwest next. Towns and rural areas, of course, led the way, but a surprising 12.3% of urban dwellers escape the city with rod and reel.

Where they fished naturally followed geographic location. Anglers tended to ply the 'fishing hole' in their own area. The survey indicates more either fished less than a mile from home, or traveled 100 to 250 miles. There were, however, over 40,000 fishermen who covered 4 or more states in their pursuit of the "big ones". Totals show that modern-day Isaac Waltons added up more than 29 billion passenger-miles in search of fish.

Who Is Minding The Store?

In 1970, American fishermen spent 706,187,000 recreation days at the sport. Over 29 million of them tried their luck during 592 million days of fresh-water fishing, and about a third that many fishermen used more than 113 million days on the briny deep. They spent close to 5 billion dollars--over 30 million dollars of this amount just launching their boats.

Simpler Arithmetic

Here are some figures easier to fathom: Fishermen, seeming to prefer their sport alone and unorganized, averaged only $.24 on special club dues. They spent, on an average, less than a quarter on guide fees, and a mere nickle for special government fees. You can draw your own conclusions on their luck when you note they spent more feeding the fish than themselves--averaging $17.11 on bait and $14.41 on meals.

Twenty-million-plus fishermen were licensed in 1970. These fees, sales excise taxes on equipment, and contributions to conservation organizations mean that, for the most part, fishermen pay their own way. General taxes have not been a major source of funds for maintaining fish and wildlife resources.

These figures are more than comparative statistics. They represent facts that may determine where and how we all will fish in

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Expenditures of Fishermen in 1970

Expenditure item	Number of spenders	Percent of all fishermen	Total spent	Average spent per fisherman
	Thousands		*Thousands*	
United States, total	31,407	94.7	$4,958,883	$149.55
Food and lodging:				
Food	15,352	46.3	477,720	14.41
Lodging	3,795	11.4	166,928	5.03
Transportation:				
Automobile	25,462	76.8	613,742	18.51
Bus, rail, air, and water	304	.9	25,000	.75
Auxiliary equipment:				
Special fishing clothing	1,000	3.0	14,441	.44
Tents	411	1.2	19,400	.58
Boats	890	2.7	472,147	14.24
Motors	792	2.4	224,226	6.76
Other equipment	6,299	19.0	753,171	22.71
Fishing equipment:				
Fresh-water rods	6,211	18.7	87,461	2.64
Fresh-water reels	5,109	15.4	80,617	2.43
Salt-water rods	1,194	3.6	24,747	.75
Salt-water reels	969	2.9	27,474	.83
Lures	10,666	32.2	84,488	2.55
Lines	9,497	28.6	37,907	1.14
Other fishing equipment	15,018	45.3	126,455	3.81
Licenses, tags, and permits:				
Licenses	19,874	59.9	108,839	3.28
Privilege fees and other:				
Annual lease and privilege fees	361	1.1	24,637	.74
Daily entrance and privilege fees for fishing	2,435	7.3	61,042	1.84
Special government fees	186	.6	1,740	.05
Bait, guide fees, and other trip expenses:				
Bait	19,176	57.8	567,235	17.11
Guide fees	160	.5	7,942	.24
Head and charter fees	2,156	6.5	130,738	3.94
Alcoholic beverages	6,127	18.5	223,857	6.75
Rental equipment	4,401	13.3	119,217	3.59
Other trip expenses	9,614	29.1	340,700	10.27
Magazines	5,291	16.0	36,356	1.10
General club dues	930	2.8	33,251	1.00
Special club dues	317	1.0	7,855	.24
Boat launching fees	1,762	5.3	30,276	.91
Other	2,296	6.9	29,276	.88

The National Survey of Fishing & Hunting was done in 2 parts: part 1, by mail, including anyone who fished in 1970; part 2, by personal interviews with active fishermen. Findings in part 2 were used for this table.

the future. They are imperative to good management of our natural resources. Their very size and volume support the necessity for such a survey.

Our burgeoning population will surely call for proliferation of leisure-activity services. Business communities will continue to develop in areas where personnel have access to recreation. How can we grow and not outgrow our fishing and recreation resources?

This question is really the "big one". Our government and private conservation agencies do not plan to let it get away. They will use the information gleaned in this survey to improve planning in restoration, management, and research.

Keeping Figures in Shape

The conservation agencies need, and the changing nature of our fisheries makes it imperative, to recheck the facts periodically. This survey is the fourth in a series requested by The International Association of Game, Fish, and Conservation Commissioners, which represents the states and Canadian Provinces. Surveys are done in 5-year intervals. So too will be the National Marine Fisheries Service collection of statistics on Marine Sport Fisheries (See Marine Fisheries Review, Sept.-Oct. 1972).

Anyone interested in the complete survey in paperback form may order it for $1.25 from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

U.S. & JAPAN RENEGOTIATE 2 NORTH PACIFIC FISHING AGREEMENTS

The U.S. & Japan have renegotiated two fishery agreements dealing primarily with the northeastern Pacific Ocean and the Bering Sea.

One fishing agreement, first signed in 1967, provides that Japan will continue to refrain from fishing within the nine-mile contiguous U.S. fishery zone. The exceptions will be selected areas mainly off the Aleutian Islands.

In return for fishing privileges within the U. S. contiguous zone, the Japanese have agreed not to fish in certain high-seas areas off Alaska during certain seasons. This will avoid conflicts with U.S. fishermen that arise from the use of different type gear.

Major changes in the renegotiation of this fishing agreement involve the seasons when Japan will be allowed to fish both inside and outside the 12-mile limit adjacent to the U.S. coast. Japan was given new privileges to use the fishery zone contiguous with the Aleutian Islands for loading and unloading fish and supplies.

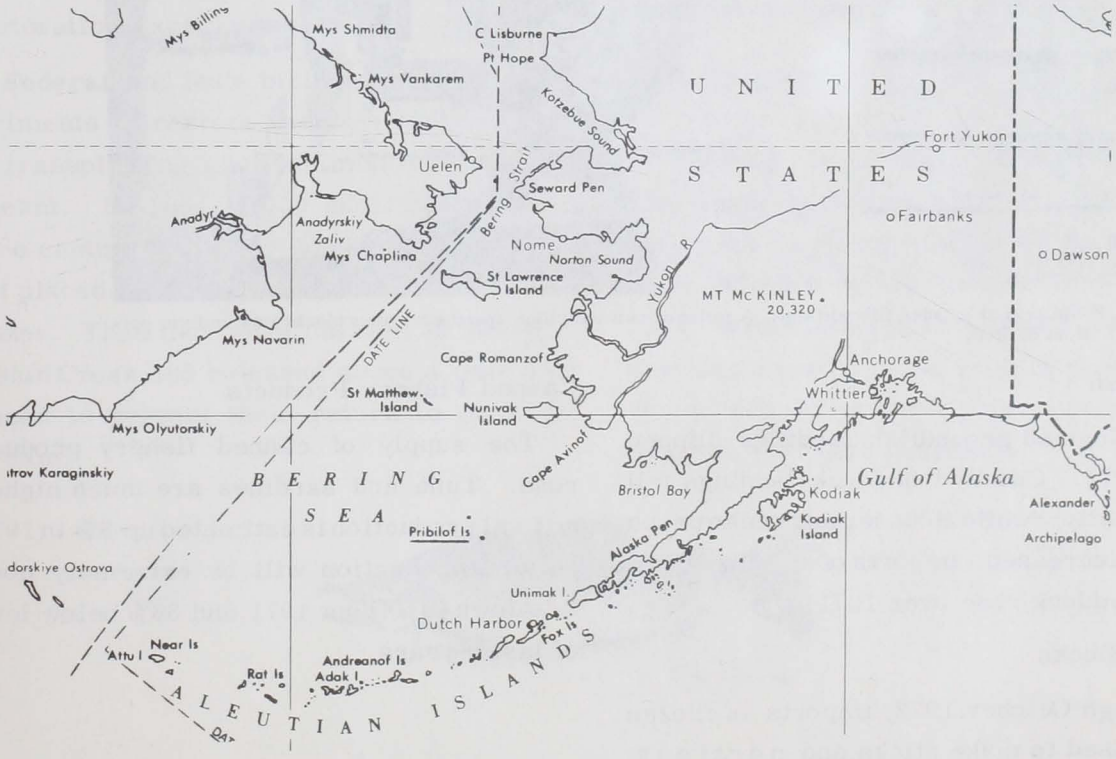
King and Tanner Crab

The second agreement concerns king and tanner crab in the Bering Sea. This fishery is important to both the U.S. and Japan. In recent years, the U.S. fishery has expanded appreciably. Japanese fishing for these species will be reduced about 70% in the southeastern Bering Sea. However, Japan will continue to develop a crab fishery north and west of the Pribilof Islands, an area not used by the U.S. This will give U.S. fishermen greater control of king and tanner crab resources in the southeastern Bering Sea. The U.S. claims these resources because they are "creatures of the shelf" under the 1958 Continental Shelf Convention.

Increased Enforcement

Both nations will have increased opportunities to observe the conduct of enforcement of agreement provisions. The U.S. will have better observation of fishing operations. Both acknowledge, too, the need to avoid polluting these waters and the dumping of undesirable products from fishing vessels.

These newly established agreements will protect the northeastern Pacific environment and allow for better conservation and use of the resources.

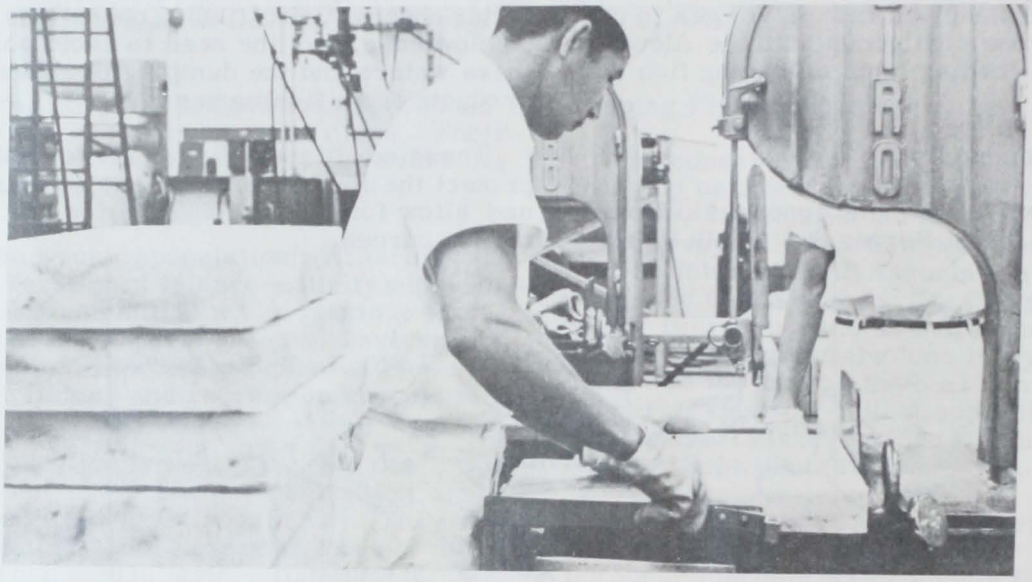


THE 1972 FISHERY PRODUCT SITUATION

The supply of fishery products improved in 1972. This was due largely to much greater imports. Per-capita consumption is estimated up 0.2 pound; fresh and frozen and canned products share the increase.

Consumption of some species--haddock and sea scallops, for example--was reduced. This is attributed mainly to diminished world supplies and growing foreign demand. Shellfish supplies were up slightly--mainly because of a substantial increase in shrimp. In January-August, shrimp landings rose 8% and imports 26% above a year earlier.

were 33% ahead of the year-earlier period. There is a wide price spread between lower-priced blocks--ocean perch and pollock, for example--and higher-priced flounder. Cod, the largest proportion of block imports, is also relatively high priced. Imports of the lower-priced species have been increasing as a percentage of the total; they offer a less-expensive product in a period of rising prices. The output of products, restricted by the shortage of blocks in 1971, increased 15% through first-half 1972 over a year earlier. Inventories of blocks were up 35%.



Production of breaded fish portions. A series of cuts with high-speed saws turns blocks into uniform portions desired.

Groundfish

New England groundfish landings slipped below 1971. Cod and haddock landings fell substantially--while flounder and ocean perch landings increased. Imports of all groundfish except haddock rose over 1971.

Frozen Blocks

Through October 1972, imports of frozen blocks, used to make sticks and portions,

Canned Fishery Products

The supply of canned fishery products rose. Tuna and sardines are much higher, so total production is estimated up 6% in 1972. Salmon production will be extremely poor. It is down 43% from 1971 and 36% below level of last 5 years.

PINK-SALMON STOCKS RESTORED TO ALASKAN STREAM

Ten years ago, biologists counted 8 pink salmon in Sashin Creek on remote Baranof Island in southeast Alaska. In August-September 1972, 14,000 adult pink salmon--1,750% more--were observed returning to spawn. The restoration crowned 8 years of experimentation by biologists of NMFS Biological Laboratory in Auke Bay to reestablish once-productive runs by transplanting adult fish.

In the 1950s, biologists assessed many Alaskan spawning streams. They reported that heavy exploitation and high natural mortality had hurt the once-abundant and valuable pink-salmon stocks. As early as 1948, Sashin Creek was added to the growing number of depleted runs. Only 597 adult pink salmon were counted in the creek; in 1942, there had been 92,000 fish.

Restoration Experiments Begun

Federal and State biologists initiated experiments to restore Sashin's depleted runs by transplanting adult salmon from another stream. In 1964, 2,000 adult pink salmon were captured alive by a commercial seiner and placed in holding tanks aboard a cannery tender. Then they were carried 50 miles to Sashin Creek and released above a weir emplaced to prevent their return to the home stream.

The transplanted salmon adjusted readily. In the first year, the survival rate was a better-than-average 13% of spawned eggs. The salmon fry migrated to sea during spring 1965--and 6,000 returned as adults in summer 1966 to produce new generations.

12,000 in 1968

By 1968, the run had increased to 12,000 adults. The run cheered the experimenters because earlier attempts to stock barren Canadian and Soviet streams with pink salmon eggs and fry from hatcheries had failed after initial successes. In 1970, there was a slight drop to 10,000 fish in the Sashin Creek run, but this did not interrupt the regeneration process. Researchers are confident that the run is reestablished. They envision increases to 30,000 spawners, the most Sashun now can accommodate.

State Programs

Alaska's Department of Fish and Game has transplanted pink salmon to rehabilitate fish runs to Prince William Sound. These were hit hard by the severe earthquake of 1964. State biologists have identified streams that once boasted goods runs of pink salmon. These will be stocked with spawners from streams that have surpluses.

Pink Salmon

CATCH BY U.S. SALTWATER ANGLERS INCREASES

The catch by U.S. saltwater anglers during 1970 was 817 million fish weighing 1.58 billion pounds, according to preliminary data from the 1970 Saltwater Angling Survey. The survey was conducted for the National Marine Fisheries Service by the Bureau of the Census as a supplement to the 1970 National Survey of Fishing and Hunting.

The 1970 catch was up 11% in number of fish and 7% in weight landed since 1965. A similar survey then showed 737 million fish caught weighing 1.47 billion pounds. From 1965 to 1970, the number of saltwater anglers increased from 8.2 million to 9.4 million.

Which Fish & Where Caught

Atlantic Coast anglers (5.0 million) caught 469 million fish, or 918 million pounds, during 1970. The 2.3 million anglers on the Gulf Coast hooked 287 million fish, or 486 million pounds. On the Pacific Coast, 2.1 million anglers caught 61 million fish, or 173 million pounds.

Sea trouts led in numbers (107 million fish) and weight (153 million pounds). Croakers were second in number (66 million), followed by flat fishes (57 million), catfishes (56 million), and Atlantic mackerel (52 million).

Bluefish ranked second in weight (121 million pounds), followed by flat fishes (93 million pounds), striped bass (84 million pounds), and croakers (75 million pounds).

Detailed Results in 1973

Detailed results of the 1970 Saltwater Angling Survey will be published in early 1973. Data on the number and weight of each species caught by fishing method and area of fishing will be presented for seven geographical areas of the United States.

SPORTFISHING '73 FORUM & EXPO

A discussion and exposition of saltwater sport fishing will be held at the Ocean City (Md.) Convention Hall, April 7 and 8, 1973. It is sponsored by the National Marine Fisheries Service, the Delmarva Advisory Council, and natural resource conservation agencies of Delaware, Maryland, Virginia (these 3 are Delmarva), and New Jersey.

Sport fishermen and others interested in ocean resources are invited to panel discussions on the how, when and where of fishing for fun, and the more serious discussions of problems facing sport fisheries. Scientists, economists, managers, environmentalists, and local fishing experts will be evaluating the potential of the 4-state-area sport-fishing resources. They hope these exchanges will provide some direction for future management plans as to fishing limits and conservation of stocks.

Of added interest will be the many exhibits and demonstrations of the latest fishing tackle, boats, and other outdoor equipment.

NEWEST NMFS PUBLICATIONS: FISHERY FACTS

The newest publications of the National Marine Fisheries Service are the first 4 booklets in the series titled "Fishery Facts". The series is valuable to fishermen, processors, and biologists. It documents research developments in the fishery sciences, including biology, technology, and engineering. Information for Fishery Facts is drawn from the NMFS staff.

Fishery Facts I is Redfish--habitat, catch and market demand. No. 2 looks at Alaska's Pacific Herring. Dungeness Crab Pots, their design and use, are examined in No. 3. Fishery Facts 4 deals with Inshore Lobster Fishing, the various pots, methods, equipment, bait, costs, and regulations. All these 6-by 9-inch booklets have pictures and illustrations.

The booklets are available for 25 cents each from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

NMFS SURVEYS READERS OF ITS MARKET NEWS REPORTS

A study to determine how well the Fishery Market News Reports fill the needs of their users has been completed by the Statistics and Market News Division of the National Marine Fisheries Service. The Market News Reports are issued three days a week by the seven Market News offices in important fishing and distribution centers.

During April 1972, a questionnaire was sent to the more than 10,000 readers in the United States and in 70 foreign countries. Questions covered the kinds of market information readers want, how often they want the information, how the information is used, the occupations of readers, and whether they would be willing to pay for the reports.

What Readers Want

The returned questionnaires reveal that most subscribers are interested primarily in wholesale prices of fresh fishery products, landings, wholesale prices of frozen fishery products, imports, miscellaneous news items, and items about U.S. Congressional actions, in that order. More fishermen, wholesalers, and buyers ranked wholesale prices of fresh fishery products as important to them; while processors, importers, and brokers rated wholesale prices of frozen products of prime importance.

Regional Differences

A number of regional differences were noted. For example, readers of reports from the Market News offices in fish-landings centers, such as Boston, Seattle, Terminal Island (California), New Orleans, and New York City, ranked landings and wholesale prices of fresh or frozen products as most important, but not necessarily in the same order of importance. Terminal Island subscribers ranked information about imports most important, and Chicago readers rated cold-storage holdings third in importance after wholesale prices for fresh and frozen products. Only Hampton, Virginia, readers included Congressional actions in the top three.

Readers were asked to list by priority the kinds of information they wanted in a Market News Report. Landings information ranked first and prices second in both the first and second priority category. Data on imports and cold-storage holdings were given top ranking in the third and fourth categories, respectively.

Readers were asked to record how often they desired to receive the information in the various sections of the Reports. The results indicate that some subscribers appear to need market information daily--but the majority would prefer most sections issued once a week. The three-times-a-week group were second in number, then five-times-a-week and, lastly, people who would like to receive sections of the report twice a week.

88% Would Pay Postage Equivalent

Although most readers (88% of respondents to this question) stated they were willing to pay a fee equivalent to the cost of postage to continue getting the reports, two of three preferred less frequent mailing. Greater numbers of fishermen, wholesalers, retailers, and buyers preferred to pay for the reports rather than have the number of mailings per week reduced.

Almost four of five readers shared the Market News Reports with others; the number of additional readers ranged from two to several hundred. The most frequent use made of the data in the reports is for management decision making.

The survey results indicate that readers of Market News Reports are generally satisfied with the information provided and find most sections useful. Nevertheless, based on analysis of questionnaire results, recommendations for some changes will be made and carried out in Market News Offices. This is part of the Statistics and Market News Division's continuing efforts to provide most efficiently the data users want, and to improve the Division's overall operations.

THE ATLANTIC SALMON: Questions & Answers

A. W. May

1. What is the basic Canadian attitude toward fishing of Atlantic salmon?

   As with any other species, we believe that salmon should be fished in accordance with their productive capacity--that is, they should be fished to the maximum extent possible leaving an adequate spawning stock.

2. Where are the salmon being fished now?

   All along the Canadian Atlantic coast from Labrador to the Bay of Fundy, and also at Greenland.

3. How do we know that salmon at Greenland come from Canada?

   Primarily through tagging of young salmon when they first migrate to sea. Over the past 10 years many hundreds of tagged fish have turned up in Greenland.

4. Do all the fish in Greenland originate in Canada?

   No, but on the basis of tagging, plus analysis of blood samples, we estimate that roughly half the salmon present originate in Canadian rivers. A small proportion comes from the United States, and the remainder from western Europe, mainly the U.K. and Ireland.

5. Are there no salmon rivers at Greenland?

   There is only one known river that contains salmon, a small stream with a run of no more than a few hundred fish.

6. Do all Canadian salmon go to Greenland?

   No, only those fish which spend 2 years in the sea before returning to spawn. Fish that return after 1 year (grilse) are not fished at Greenland.

7. Are the 2-sea-year fish evenly distributed among Canadian rivers?

   Again no. Rivers that flow into the Gulf of St. Lawrence, and these are mainly Quebec and New Brunswick rivers, have larger proportions of 2-sea-year fish in the runs than do rivers in Labrador and Newfoundland, for example.

8. Does this mean that fisheries at Greenland have different effects on salmon stocks from different rivers?

   Very definitely so. All Canadian rivers probably contribute some salmon to Greenland; the contribution of some is small in relation to the rivers stocks, but the contribution of others is very large. Apart from that, all fish that go to Greenland are destined to be large 2- or 3-year fish. These are the most valuable commercially, to the angler and for reproduction; 75% of the salmon caught at Greenland are females.

9. Do we have any figures on the numbers of salmon at Greenland which come from different rivers?

   We cannot be that precise, but we do have information on a relative basis. In a number of cases, this shows that the contribution to Greenland must be high. The most notable example is a Quebec tagging experiment where tagged fish were released in 4 different rivers. Of all the tags returned, 42% came from Greenland. This, incidentally, would be a minimum figure because some fishermen at Greenland do not report tags they find.

10. How do we know that fish come back from Greenland to Canadian rivers?

    Salmon have a very strong homing instinct. Almost invariably, they return to the stream in which they were born when they are ready to spawn. It is inconceivable that, each year, hundreds of thousands of salmon would find their way to Greenland, grow larger, and then would not be able to find the way back.

Dr. May, a Canadian scientist, has much experience with Atlantic salmon--particularly in relation to the Greenland and highseas fishery. He prepared these questions and answers for the International Atlantic Salmon Foundation.

In fact, a few hundred fish have been tagged at Greenland in each of the past 5 or 6 years. A total of 27 tags has been recovered outside of Greenland; 12 in Canada, and 15 in Europe. Other tagging experiments have been carried out in the middle of the Labrador Sea after the fish have left Greenland. All returns from these experiments have been to Canadian waters within a few months after tagging. The returns from Greenland are small, probably because of a high mortality of fish tagged from drift nets in the ocean.

Another piece of evidence points to the strong homing instinct of salmon, even from as far away as Greenland: No salmon tagged in North America has ever been recaptured in Europe, or vice versa. Hundreds of thousands of juvenile fish have been tagged on each side of the Atlantic, and salmon from each side occur together at Greenland. If their homeward migration were not directed, we would expect some fish to become lost and to occur on the other side of the Atlantic. We have no evidence that this has ever occurred.

11. Wouldn't some salmon be eaten by larger fish or other animals on the way back?

Some would, but there are not many animals capable of catching an 8-pound salmon. In fact, a very great mortality of salmon in the sea does occur; however, scientists agree that most of this must take place soon after the young salmon leave the rivers for the first time, when they are only 6 inches long. We have no figures for losses during the migration from Greenland to home waters. But, considering the size of the salmon and the time interval involved, losses must be small in relation to those that occur in early life.

Therefore, we believe that these large salmon would return to Canada in large numbers if not taken at Greenland.

12. How severe are the effects of Greenland fishing?

Quite severe on our fisheries. Every fish caught at Greenland is, potentially, one less available to Canadian fishermen. However, the effect on spawning stocks is selective: it is greater in some rivers than others. In a few of our major rivers, the combination of fishing at Greenland, plus fishing in and near the rivers, has contributed to a serious decline in spawning stocks. This is so serious that we are concerned about the continued existence of salmon in those rivers.

13. Is this the reason for closures of fishing in some areas?

Yes, with the exception of the St. John River, where declines have been due to local factors.

14. How big a part has pollution played in causing declines in our rivers?

Declines in some of our large rivers about 15-20 years ago undoubtedly were associated with such factors as increasing pollution, plus poor forest-spraying practices. A great deal of progress has been made in alleviating these conditions, yet salmon runs continue to decline. In 1971, in spite of continuing Canadian fisheries at a high level, catches in some areas were the lowest in 100 years of recorded statistics.

15. Are there natural fluctuations in salmon abundance?

Natural, cyclic fluctuations occur. Salmon abundance was increasing in the early 1960s. It reached a peak in 1967, but this peak was far below previous peaks associated with natural fluctuations. The decline in the Maritimes and Quebec since 1967 has been more rapid than anything we have ever seen before.

16. If half the Greenland catch is Canadian salmon, what does this amount to in relation to the Canadian catch?

In 1971, the Canadian contribution to Greenland fisheries was about 1300 tons, or about 400,000 fish. These were the large 2-sea-year salmon so important to our own fisheries and spawning stocks. We believe that most of these fish originated in Quebec and New Brunswick streams. The fisheries in these areas took less than 400 tons last year, or less than 100,000 fish of the 2-sea-year group. It is obvious that the areas producing these fish are not reaping the benefits of this production.

17. Most of the Canadian catch is taken in Newfoundland and Labrador. What is the situation there?

The catch in these areas has remained at a relatively high level in recent years. A large proportion of the catch consists of grilse (one-sea-year fish). Newfoundland rivers contain mainly grilse in the spawning runs. Interception of salmon bound for mainland rivers does occur, but the extent is unknown. We do not know what proportion of the salmon taken in Newfoundland is bound for mainland rivers.

EXPERIMENTAL ATLANTIC SALMON HATCHERY PLANNED

A $2.4 million experimental selective breeding hatchery, designed to produce high-quality hybrid strains of Atlantic salmon, will be built by several cooperating Canadian and U.S. agencies. "The objective is to enhance, rehabilitate, and establish salmon runs in Canadian and New England rivers."

The hatchery is expected to be under construction early in 1973 on Chamcook Creek, about 3 miles east of St. Andrews. It will be operational by 1974.

The participants include the Canadian and U.S. governments, the International Atlantic Salmon Foundation (a privately sponsored research and education foundation), the Huntsman Marine Laboratory (a consortium of universities and other agencies promoting teaching in the marine sciences), and the State of Maine.

The Plan

The hybrid strains will be developed from brood salmon selected from the Northwest Miramichi River in New Brunswick and a nearby river in Maine. The experimental hatchery is expected to produce annually about 300,000 one-year-old smolt salmon. About 135,000 of these will be released in the test rivers in New Brunswick and Maine. The remainder will be retained in the hatchery to develop the selective breeding program.

As desirable traits are acquired by the salmon through selective breeding procedures, populations will be released through production hatcheries to reestablish stocks in rivers that have lost their runs, strengthen existing populations, and establish populations in streams that never had them.

The planners say the selective breeding programs to be undertaken by the experimental hatchery do not lessen the necessity of programs to restore river conditions so that natural reproduction of Atlantic salmon will be enhanced. However, they add, some salmon rivers may never be restored to the best environmental quality levels. Because existing salmon stocks also have been seriously depleted by overfishing, natural reproduction alone cannot be relied on to maintain the North American Atlantic salmon resource.

The planners emphasize that this serious situation indicates the need for immediate use of specialized resource development and management techniques. One of these is the experimental hatchery research program.

A Correction

Marine Fisheries Review, July-Aug., 1972, page 2, stated: "Canada catches about 95% of the North American Atlantic salmon taken off Greenland." "Catches" should be replaced by "produces".--Ed.

INITIAL SUCCESS IN ESTIMATING REARING-POND SHRIMP POPULATION

K. N. Baxter

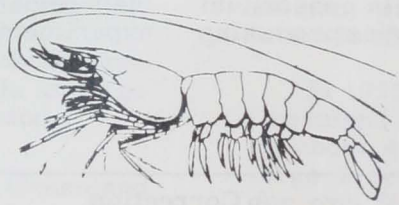
In late 1971, Galveston Laboratory personnel of the National Marine Fisheries Service estimated shrimp-population size in four ½-acre ponds at Texas A&M's field research site near Angleton, Texas. The estimates were needed to determine shrimp-feeding rates. The lab did this at the request of Texas A&M University's Sea Grant Mariculture Program.

Shrimp from four ponds were injected with a fluorescent pigment-petrolatum mixture. Marked shrimp were returned to the ponds. Then samples of shrimp were collected from each pond for population-size estimates according to the Petersen method. Then the ponds were drained and all shrimp counted. Estimates were within an average of 20% of the actual number of shrimp recovered after draining. The following table shows results obtained in the pond experiments:

Pond	Number Marked	Population size: Estimated	Population size: Actual	Difference in percent of actual population size
A	1,210	7,798	6,644	17
B	1,820	14,970	11,469	30
C	1,000	5,978	5,050	18
D	1,200	3,957	4,049	2
Combined	5,230	32,701	27,212	20

The author is a Fishery Biologist, National Marine Fisheries Service, Galveston Laboratory, Galveston, Texas 77550.

Contribution No. 347, National Marine Fisheries Service, Galveston Laboratory, Galveston, Texas 77550.



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SOUTHERN RIGHT WHALES DISCOVERED OFF ARGENTINA

U.S. Navy researchers aboard the 'Hero' off Argentina recently discovered an extensive population of the rare southern right whales (Balaena glacialis australis) in the near-shore waters off Punta Rosa, about 200 miles north of Golfo San José. Before, it was thought the distribution of these whales ended at San Jose.

This was reported by Dr. William C. Summings and Dr. James F. Fish of the U. S. Naval Undersea Research and Development Center (NUC). They traveled aboard the National Science Foundation's Hero.

The scientists said the sighting of about 35 southern right whales "could easily represent an increase of the Argentine population by 30 to 50%." Previously, the only known breeding ground was near Golfo San José.

It is believed that overfishing has brought the right whale to its present status of endangered species.

The Research Cruise

During the trip, Aug. 4-25, 1972, Dr. Cummings, Dr. Fish and Paul O. Thompson, all of NUC, found that this whale produced the most numerous and diverse underwater sounds during courtship. At other times, it rarely made sounds.

During breeding periods, the whales frequently were in threesomes--presumably two males and one female. This behavior duplicates the habits of the gray whale observed in Scammon's lagoon in Baja California.

The researchers sighted baby southern right whales in the breeding areas. They said it was the first evidence that the whales not only courted, but also gave birth, there.

Whale Migrations

The researchers said the Argentine population of southern right whales is believed to make a 4,000-mile migration to and from Antarctica every year. Gray whales migrate from Mexican waters past Point Loma on their trip to and from the Arctic.

The adult southern right whale averages 55 feet in length. It has an enormous head, about one-third as long as the rest of the body. It has no dorsal fin.

Hippopotamus? No. It is the southern right whale, about 60 feet long, photographed in the breeding grounds off Argentina. The head region shown here has horny growths. The most characteristic feature of the right whale is the terminal growth, called 'bonnet', on its snout. (Official Photo U. S. Navy)

NEW WEATHER SERVICE IN 1973 FOR PACIFIC DEEP-WATER SAILORS

The National Weather Service and the U.S. Coast Guard announced in November 1972 that a new marine weather service for deep-water sailors in the Pacific would begin in February 1973. The agencies were giving mariners ample time to get the radiofacsimile equipment needed to take full advantage of the new service.

The service will consist of up to 8 hours a day of forecasts and warnings transmitted by Morse telegraphy, voice, and radiofacsimile from the new Coast Guard radio station at Point Reyes, about 35 miles northwest of San Francisco. The transmissions will provide the first large-scale forecast and warning services designed especially for commercial shipping and fishing in the eastern North Pacific.

Around the Clock

The two agencies stated: "The transmissions will be made around the clock at frequent intervals timed to coincide with shipboard watch schedules in the North Pacific. Primary emphasis will be on predictions and warnings of storms, high winds, and waves. Areas of restricted visibility also will be emphasized."

One highlight of the new marine weather service will be transmission of radiofacsimile weather charts covering the eastern two thirds of the North Pacific--and more detailed weather charts of coastal and offshore areas of western North America.

To receive these charts, radiofacsimile receivers will be needed. These rent for $100 to $250 a month. The receivers should be capable of copying a transmission rate of 120 scans a minute and have an index of cooperation of 576. The receivers also will be capable of receiving radiofacsimile weather charts on major shipping routes "elsewhere around the world."

HOW TO TELL A MULTIMILLION-YEAR SHARK VERTEBRA

A shark's vertebra found in a manganese nodule recovered on the ocean floor west of Hawaii has been dated at 8.7 million years by Dr. Jeffrey Bada of the Scripps Institution of Oceanography. He used a new dating method he developed based on amino acids. The nodule had been dredged up in August 1970 from the submerged Horizon Guyot by the Scripps research vessel 'Thomas Washington'.

Dr. Bada has disclosed research he uses to date bones older than 30-40,000 years. These bones are too old to be dated by using carbon-14. Before his finding, there had been a void between dating bones too old for radiocarbon (carbon-14) techniques and too young for other chronological dating methods.

Dr. Bada uses a process called racemization of amino acids, which he initiated in 1970. Amino acids are the molecules that make up the proteins in living organisms. Amino acids can have two optical forms--the L- and D-isomers. Only the L-amino acids are found in living systems.

Over long periods of geological time, L-amino acids produced originally by living organisms undergo conversion to D-isomer. This process continues until ratio of L to D amino acids is 1.0. In modern material, only small amounts of D-amino acids are found; with increasing age, larger and larger amounts of D-isomer are produced.

In proteins found in living organisms, the amino acids are all L-form. After death, however, this pattern is transformed slowly by the racemization process, which produces the D-form. By measuring ratio of D to L forms, the bone's age can be estimated. The greater the proportion of D-isomer in amino acids, the older the bone. To determine the amino acid age, the environment's temperature must be known, and this temperature should not have varied greatly since the time the bone was deposited.

An advantage of the amino-acid dating method is that only a few grams of bone are needed for dating; for radiocarbon analysis, a large sample of a bone (in pound quantities) is necessary.