ALASKA LEGISLATURE COMMITTEE FILES 1991-1992 8672
7609 SENATE RESOURCES

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*This publication produced by Public Communications Section

OFFICE OF THE COMMISSIONER

A. FUNCTIONS:

1. Statutory basis.

Title 16, 37, 39, 44

2. Duties.

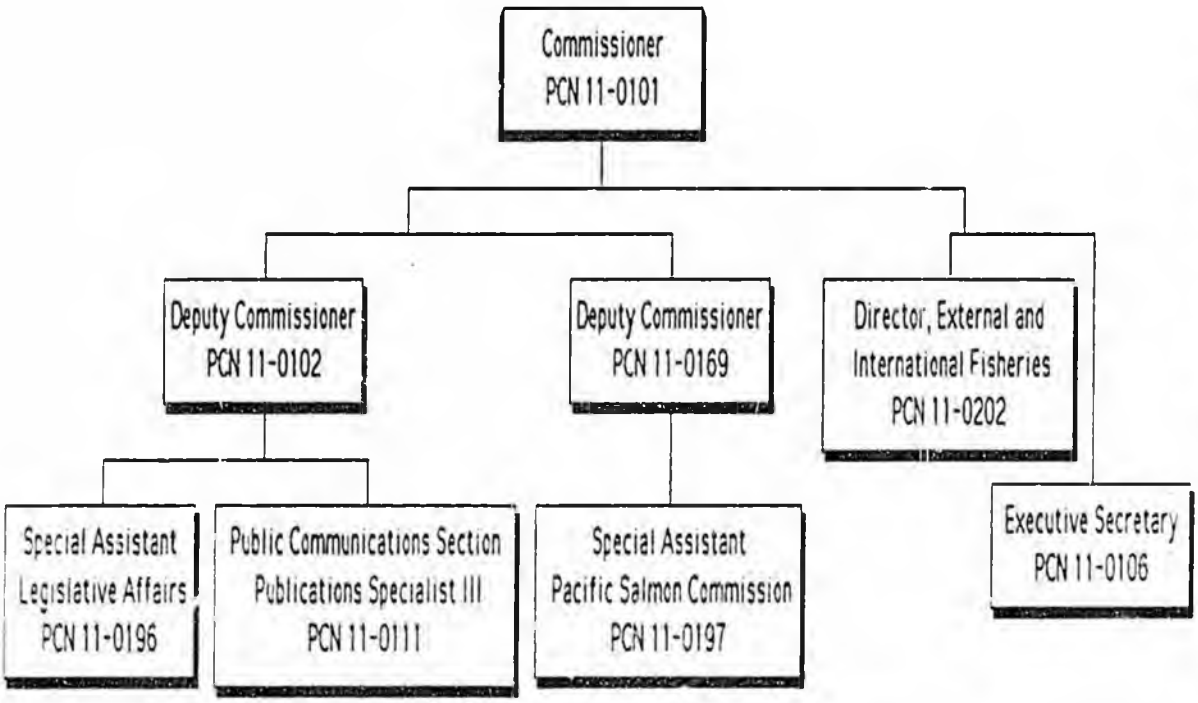
The Office of the Commissioner provides departmental leadership and policy guidance and has full responsibility for the department's mission of managing Alaska's fish and wildlife resources. Included within this component is the department's Office of External and International Fisheries, grants to the Alaska Zoo and the Eskimo Walrus Commission. and funding for representation on the Pacific Marine Fisheries Commission, the Pacific Salmon Commission, and other interstate and international bodies.

3. Staffing and Location.

A chart showing number of staff positions and organization follows.

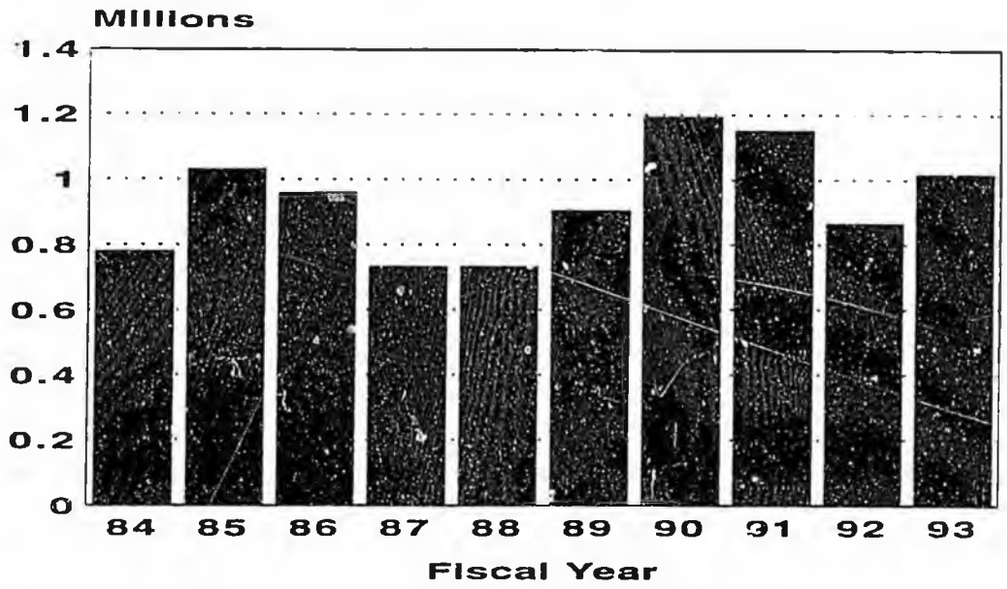
Location	PFT
Juneau	10*

*This number does not include PCS staff.



B. CHANGES TO FY92 BUDGET:

COMMISSIONER'S OFFICE
General Fund Dollars



General Funds Include Program Receipts, Fish and Game Fund, and Other General Funds.

C. **FY93 BUDGET REQUEST:**

An additional increment above the FY92 budget has been requested to restore funding for the two deputy commissioner positions in the Commissioner's Office budget.

D. **REORGANIZATION PLANS:**

No proposed reorganizations at this time.

E. **MAJOR ISSUES:**

1. Increased emphasis has been placed on the development of a Yukon River treaty with Canada. Negotiations are underway with full participation by the State of Alaska. The major goals are the maintenance and enhancement of the shared resources and the protection of Alaskan interests.

2. Preparations are being made for negotiations of major annexes to the U.S./ Canada treaty affecting southeastern Alaska.

3. The Commissioner's Office is taking a lead role in dealing with increasing national and international concerns with the implementation of the Endangered Species act. Strict interpretation of the act may well jeopardize major Alaskan fisheries.

4. Increasing preemptive actions by the federal agencies in Alaska have resulted in the development of new legal and administrative efforts to protect Alaskan jurisdictional authorities.

5. The Commissioner's Office has the major leadership responsibilities to implement the Governor's strategies to bring a major portion of the Alaska bottom fishery processing from offshore to onshore, providing more benefits to Alaskans and year-round quality fishery products.

PUBLIC COMMUNICATIONS SECTION

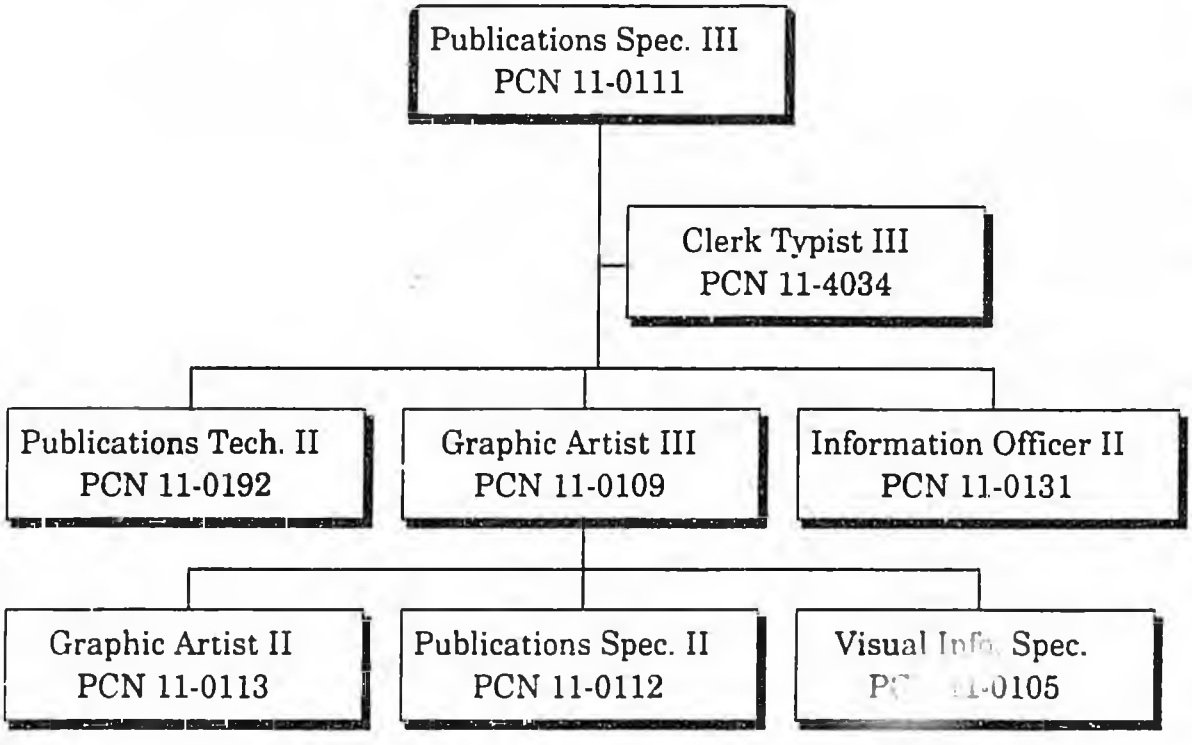
A. DIVISION FUNCTIONS:

1. **Statutory basis.**
   Title 16

2. **Duties**
   The Public Communications Section component (PCS) informs and educates the general public to improve the general level of understanding and acceptance of the department's regulations, policies, and activities. PCS produces the department's regulation booklets, publishes the *Alaska's Wildlife* magazine six times a year, and answers general inquiries from the public.

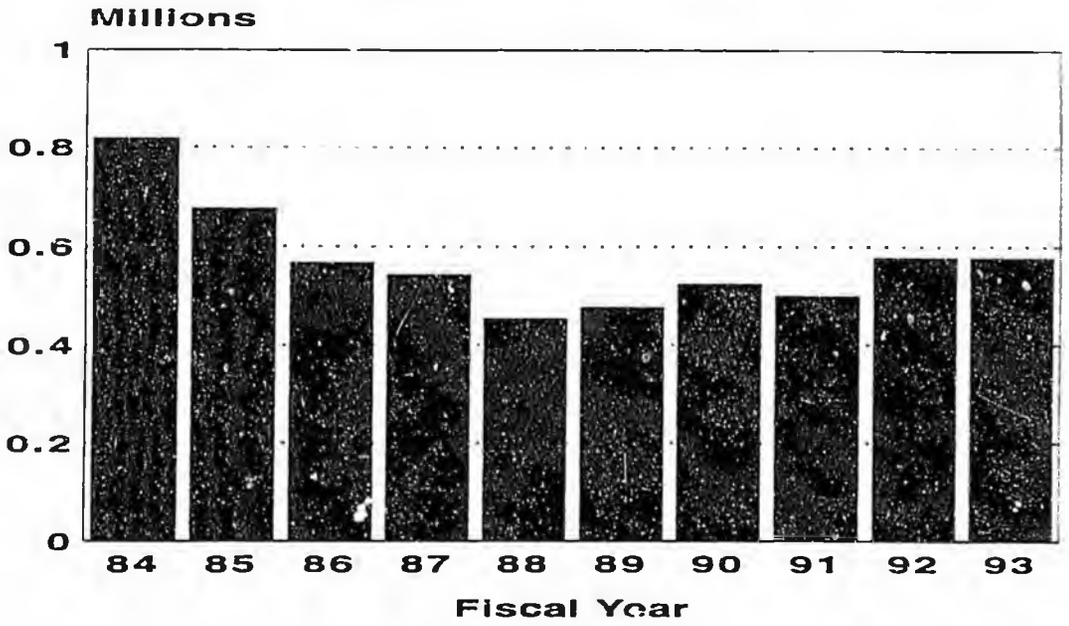
3. **Staffing and locations.**
   An organizational chart showing structure and number of full-time and seasonal staff follows.

Location	PFT	PPT
Juneau	6	2



B. CHANGES TO FY92 BUDGET:

PUBLIC COMMUNICATIONS SECTION
General Fund Dollars



General Funds include Program Receipts, Fish and Game Fund, and Other General Funds.

An existing publications technician was transferred from the Division of Boards of Fisheries and Game to PCS, where the position has in fact been historically housed and supervised. The incumbent works on development of regulation books for the regulations promulgated by the boards. Reduced travel has lessened considerably the coverage of the Boards of Fisheries and Game meetings, and reduced production capabilities have limited development and issuance of special publications.

C. FY93 BUDGET REQUEST:

No significant changes in the Public Communications Section are contemplated in FY93. Continuing effort will be made in FY93 to increase the level of program receipts relating to magazine subscriptions and other publication sales to the public. Additional options for program direction and marketing, and potentially for increased program receipts from users, will be pursued. The FY93 request represents a basic continuation budget from FY92, with the effect of increased personal services costs and inflationary costs in other line items absorbed by increased personnel vacancy factor (difficult to achieve in a small section) and production efficiencies.

D. REORGANIZATION PLANS:

No proposed reorganization plans at this time.

E. MAJOR ISSUES:

Publication of Fish and Game's *Alaska's Wildlife* magazine.

DIVISION OF ADMINISTRATION

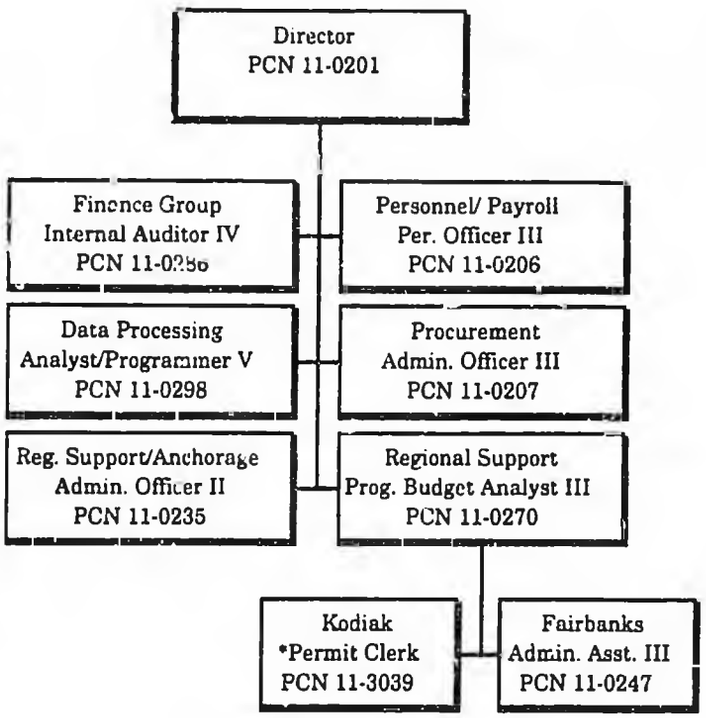
A. DIVISION FUNCTIONS:

1. **Statutory basis.**
   Titles 16, 37, 39, and 44

2. **Duties.**
   The Division of Administration provides administrative management support services to help the department accomplish its goals and objectives in an efficient, cost effective, and accountable manner. To meet this goal the division offers support services in budgeting, fiscal management, accounting, contracting, leasing, reimbursable services agreements, federal billing, supply, purchasing, property control, personnel management, payroll, and labor contract administration. The responsibility for the fish and game licensing system, and administrative support for the OSIAR Division, is also placed with the Division of Administration. The division is organized into five primary sections (Finance/Licensing, Personnel/Payroll, Procurement/Contracting, Data Processing and Director's Office), and has four regional offices.

3. **Staffing and locations.**
   An organization chart showing structure to the regional level and number of full-time and seasonal staff follows.

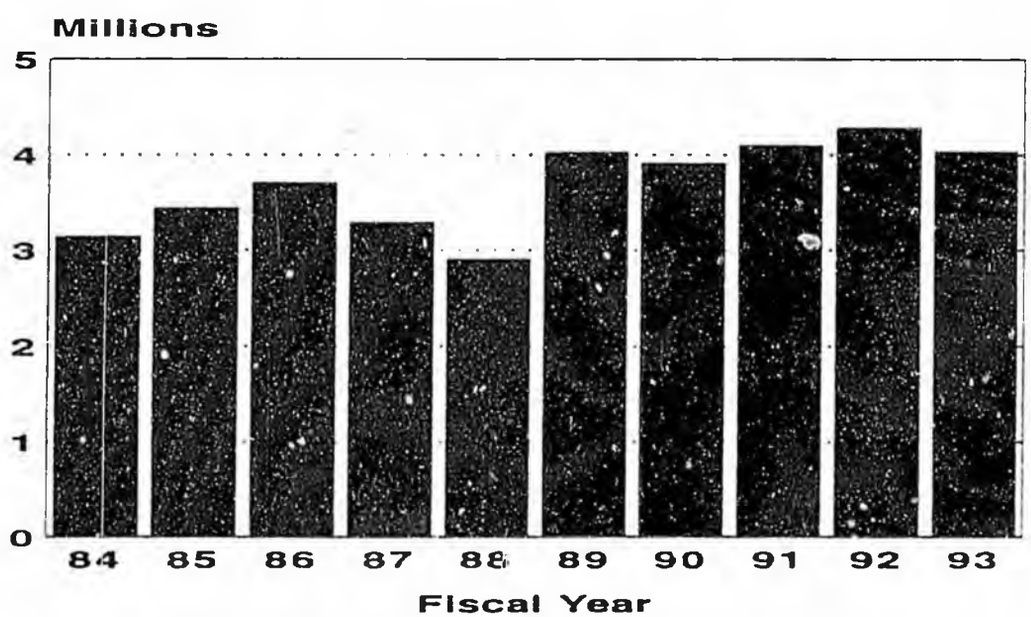
Location	PFT	PSEA	NP
Juneau	50	1	12
Anchorage	7		
Fairbanks	4		1
Kodiak	2		
	63	1	13



*CFEC PCN funded 50% by Administration

B. CHANGES TO FY92 BUDGET:

DIVISION OF ADMINISTRATION
General Fund Dollars



General Funds include Program Receipts, Fish and Game Fund, and Other General Funds.

The level of services provided by the Douglas Regional Office was considerably reduced for FY92, resulting in transfer of some functions to headquarters and the delegation of remaining functions to other divisions in Douglas. In personal services, the Deputy Director and a Clerk Typist position were eliminated from the Director's office.

C. FY93 BUDGET REQUEST:

1. Projects/programs deleted or reduced
   The Division of Administration will be eliminating the direct sales of fish and game licenses in the Juneau headquarters and Anchorage/Kodiak/Fairbanks regional offices. Numerous private license vendors are available in those cities for license sales. The reduction of this service results in the deletion of the equivalent of five full-time positions in the Division of Administration for FY93. The reduction of positions in the Kodiak Regional Office will result in reorganization of that office, and transfer of some functions to the existing Anchorage Regional Office staff of the Division of Administration. Also, in FY93 the division will necessarily maintain an exceptionally high, and perhaps unrealistic, vacancy percentage for personal services.

2. No new or expanded projects/programs.

3. No capital items.

D. PLANNED REORGANIZATIONS:

There are no planned reorganizations at this time for FY93, other than reassignment of certain functions relating to the Kodiak Regional Office. Should organizational, program, or funding changes in the OSIAR Division occur in FY93, some reorganization of the Division of Administration may result due to the level of funding currently provided to Administration for the purpose of administrative support to OSIAR.

E. MAJOR ISSUES:

The ability, under the considerably reduced General Fund level for FY93, for the division to provide adequate management support to the Commissioner and the department in meeting goals and objectives is of concern. Future reductions in General Fund support for the Division of Administration may result in the further reorganization or closure of the Douglas and Kodiak regional offices of the division.

DIVISION OF BOARDS

A. DIVISION FUNCTIONS:

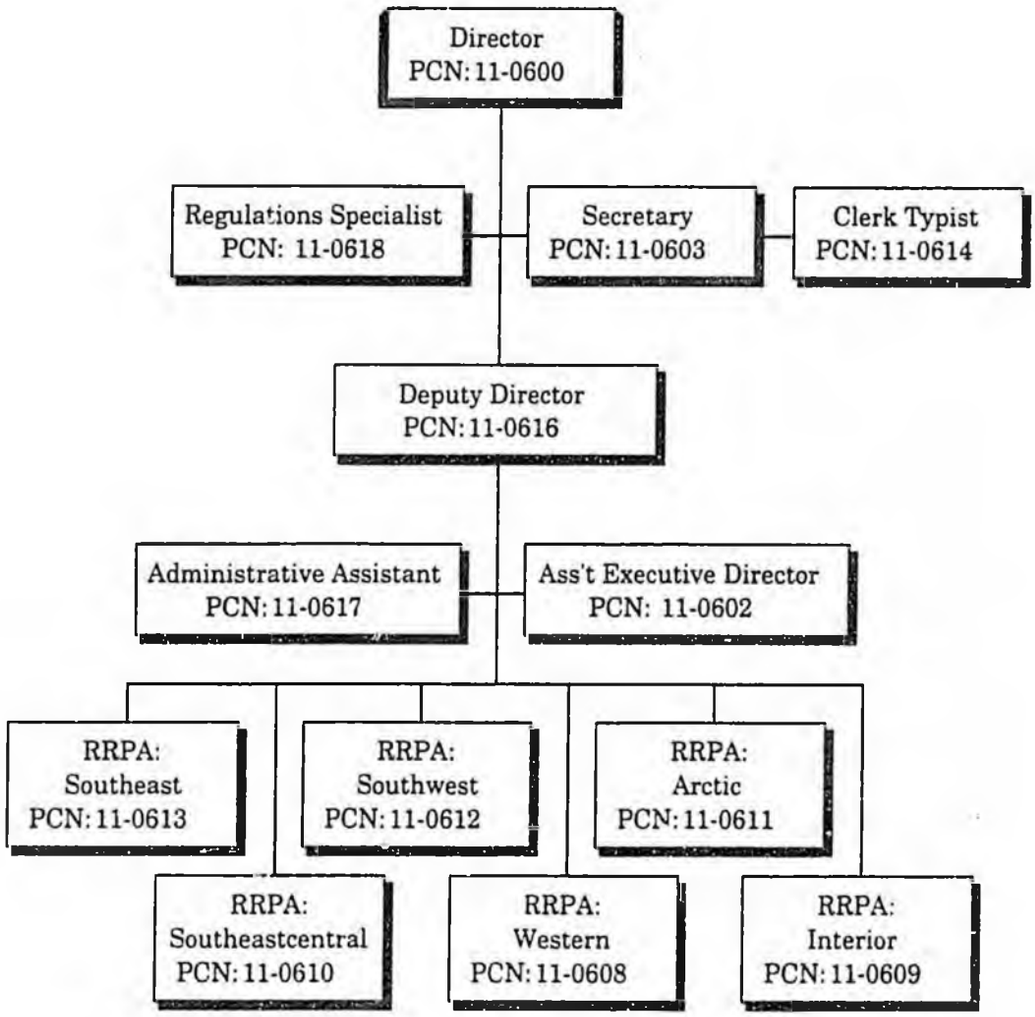
1. **Statutory basis.**
   Title 16.05, 220-255, 260 and Public Law 96-487

2. **Duties.**
   The Board of Fisheries, the Board of Game, and the Joint Boards of Fisheries and Game promulgate regulations for the conservation, development, and utilization of Alaska's fish and wildlife resources - or more simply, allocate the allowable harvest of fish and wildlife resources. The Division of Boards provides support for the boards and this regulatory process. This includes staff support to the boards, 80 local advisory committees and six regional councils. At least three times annually the division of boards publishes a Call for Proposed Changes to the regulations which results in as many as 1,000 proposals for changes. These changes are deliberated upon, as required under the Administrative Procedure Act, in public hearings which during FY92 were scheduled for approximately 100 days. Resulting changes are codified and published in 21 regulation books. Regional Coordinators are located in Bethel, Fairbanks, Juneau, Anchorage, Kotzebue, and Dillingham.

3. **Staffing and locations.**

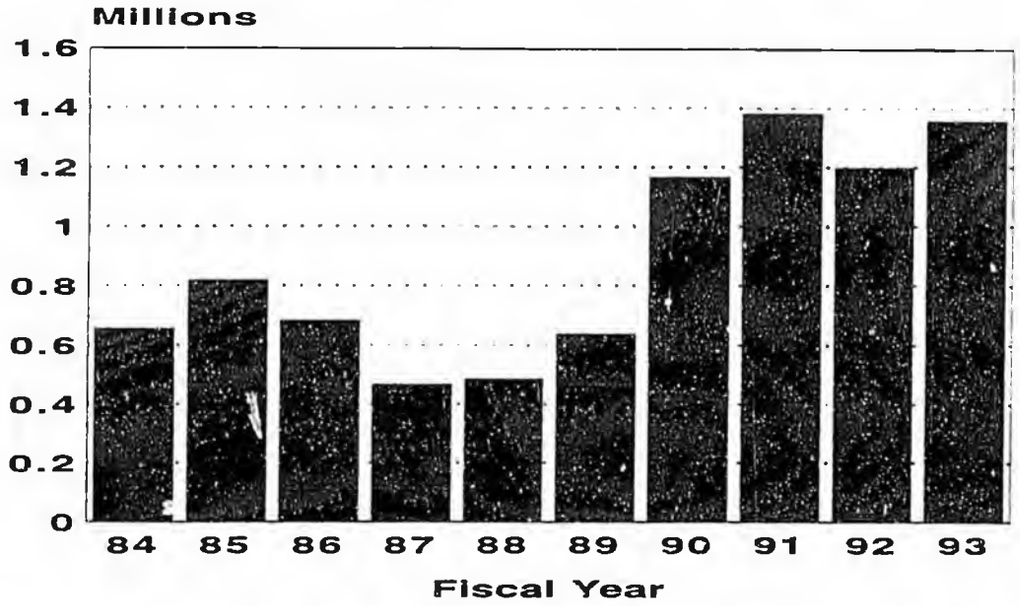
Location	PFT	PSEA	Location	PFT	PSEA
Juneau	7		Juneau/Reg	*2	
Anchorage	*2		Fairbanks	*2	
Bethel	*1	1	Dillingham	*1	1
Kotzebue		*2		5	1
	10	3			

*6 Clerical positions are shared with other divisions and some are counted in other division's totals.
RRPA=Regional Regulatory Program Assistant


Director
PCN: 11-0600
Regulations Specialist
PCN: 11-0618
Secretary
PCN: 11-0603
Clerk Typist
PCN: 11-0614
Deputy Director
PCN: 11-0616
Administrative Assistant
PCN: 11-0617
Ass't Executive Director
PCN: 11-0602
RRPA:
Southeast
PCN: 11-0613
RRPA:
Southwest
PCN: 11-0612
RRPA:
Arctic
PCN: 11-0611
RRPA:
Southeastcentral
PCN: 11-0610
RRPA:
Western
PCN: 11-0608
RRPA:
Interior
PCN: 11-0609

B. CHANGES TO FY92 BUDGET:

DIVISION OF BOARDS
General Fund Dollars



General Funds include Program Receipts, Fish and Game Fund, and Other General Funds.

The absorption of increased cost due to general inflation and increased board activity relating to the subsistence issue reduces the division approximately $44.0 in providing last year's program this year. To accomplish these savings the division instituted the following reductions:

1. Advisory Committees were reduced from three meetings annually to two meetings annually.

2. Regional Councils were reduced from two meetings annually to one meeting annually.

3. The Board of Fisheries was reduced by eight meeting days.

4. There are no Joint Board meetings scheduled for FY92.

C. FY93 REQUEST:

In addition to maintaining the reductions shown above in FY92, there are two additional reduction areas for FY93:

1. It is anticipated that federal funding shortfalls in FY93 may result in reduction of clerical support by 50 percent.

2. Board meeting time will be cut by an additional three to five days. Another three to six days will need to be removed from either the Board of Fisheries or the Board of Game to allow for the Joint Board to meet.

D. REORGANIZATION PLANS:

There are presently no plans to reorganize the Division of Boards. Board staff consists of ten full-time positions, three seasonal positions, and six shared clerical positions.

E. MAJOR ISSUES:

The uncertain status of receipt of funding from the federal government severely jeopardizes the validity of this FY93 budget submission. Negotiations with the federal government continue at this time for determination of funding levels, but until such time as the final federal regulations for subsistence management of fish and game on public lands is determined and a decision is made on whether the Federal Subsistence Board will rely on the state-created advisory committee/ regional council system or create its own, it is not possible to predict the level of future funding. Even at this late date, we are uncertain of the level of funding that will be available during FY92. The division could well be in a situation where supplemental funding is required in FY92 and either additional general funds in FY93 or a complete overhaul of the current system.

The Division of Boards has been considerably impacted in the past by the ongoing controversy surrounding the subsistence issue. Depending on what happens with the Governor's proposal on subsistence, the boards could once again be looking at emergency or special board meetings to deal with subsistence. This could create the need for considerable commitment of staff time and the need for supplemental funding.

DIVISION OF COMMERCIAL FISHERIES

A. DIVISION FUNCTIONS:

1. **Statutory basis.**
   Title 16, primarily in chapters 5 and 10

2. **Duties.**
   The division is responsible for the management of the state's commercial, subsistence, and personal use fisheries. It also plays a major role in management of fisheries in the 200 mile Exclusive Economic Zone and in international fisheries negotiations.

3. **Staffing and locations.**
   The division is organized into a headquarters office located in Juneau and four regional offices. The regions and their geographic areas of responsibility are as follows:

   Southeastern: the waters of the southeastern archipelago and eastern Gulf of Alaska from Dixon Entrance to Cape Suckling.

   Westward: the waters of the western Gulf of Alaska and southern Bering Sea, including the Kodiak, Chignik, Alaska Peninsula, and Aleutian Islands areas.

   Arctic-Yukon-Kuskokwim: northern Bering Sea waters and river drainages north of Cape Newenham.

   The following is an organizational chart showing key headquarters and region staff

Southeastern Region & Headquarters

Location	PFT	PPT
Juneau Hq.	31	3
Douglas Reg.	37	27
Douglas Area	4	14
Craig	0	5
Haines	1	13
Hoonah	0	1
Hyder	0	1
Ketchikan	6	29
Klawock	0	1
Pelican	0	1
Petersburg	10	18
Port Alexander	0	1
Sitka	8	17
Snettisham	0	2
Wrangell	1	4
Yakutat	1	8
	99	145

Central Region

Location	PFT	PPT
Anchorage Reg	17	7
Cordova	10	23
Dillingham	5	30
Galena	0	0
Homer	7	8
King Salmon	2	28
Soldotna	6	34
Tutka Lagoon	0	1
Central total	47	131

Arctic-Yukon-Kuskokwim Region

Location	PFT	PPT
Anchorage	18	9
Anvik	0	2
Bethel	5	24
Emmonak	0	10
Fairbanks	4	12
Kotzebue	1	7
Nome	3	11
Saint Mary's	0	23
AYK totals	31	98

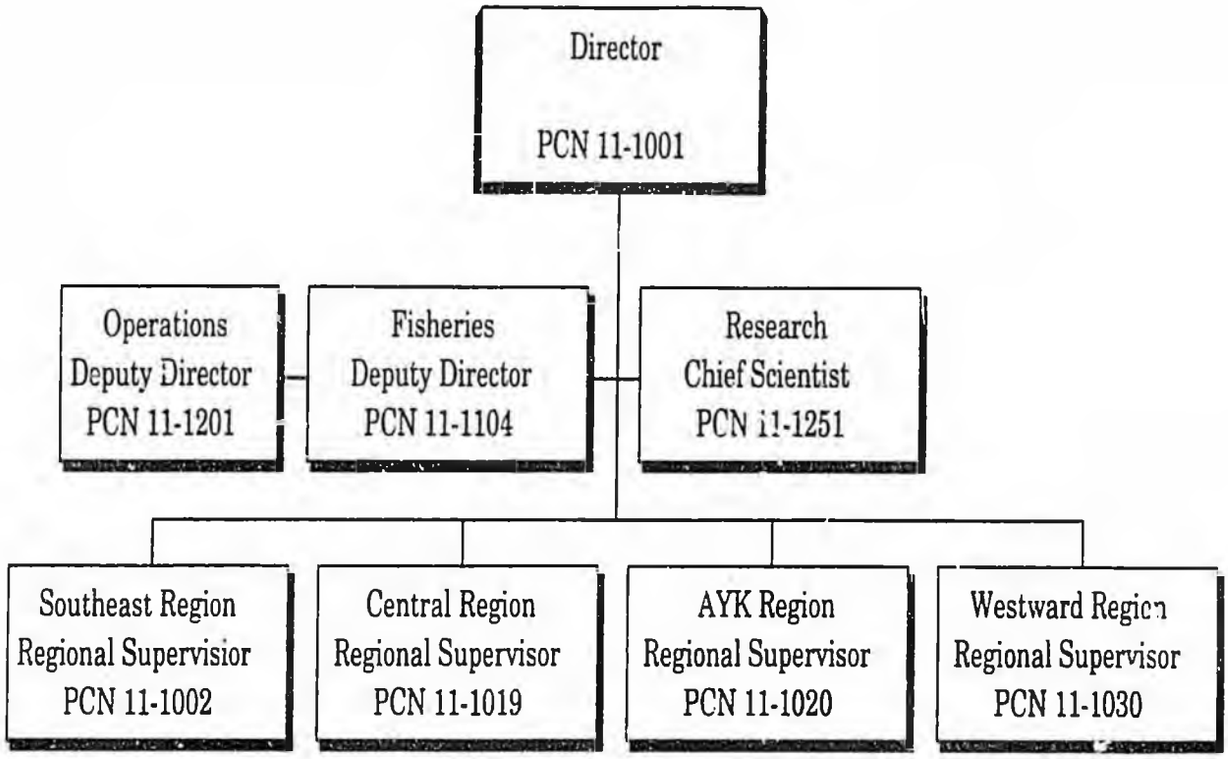
Westward Region

Location	PFT	PPT
Kodiak	31	58
Belkofsky	0	1
Chignik	1	8
Cold Bay	0	4
Dutch Harbor	4	9
King Cove	0	4
Bear River	0	2
Sand Point	1	7
Port Moller	0	3
Westward totals	37	96

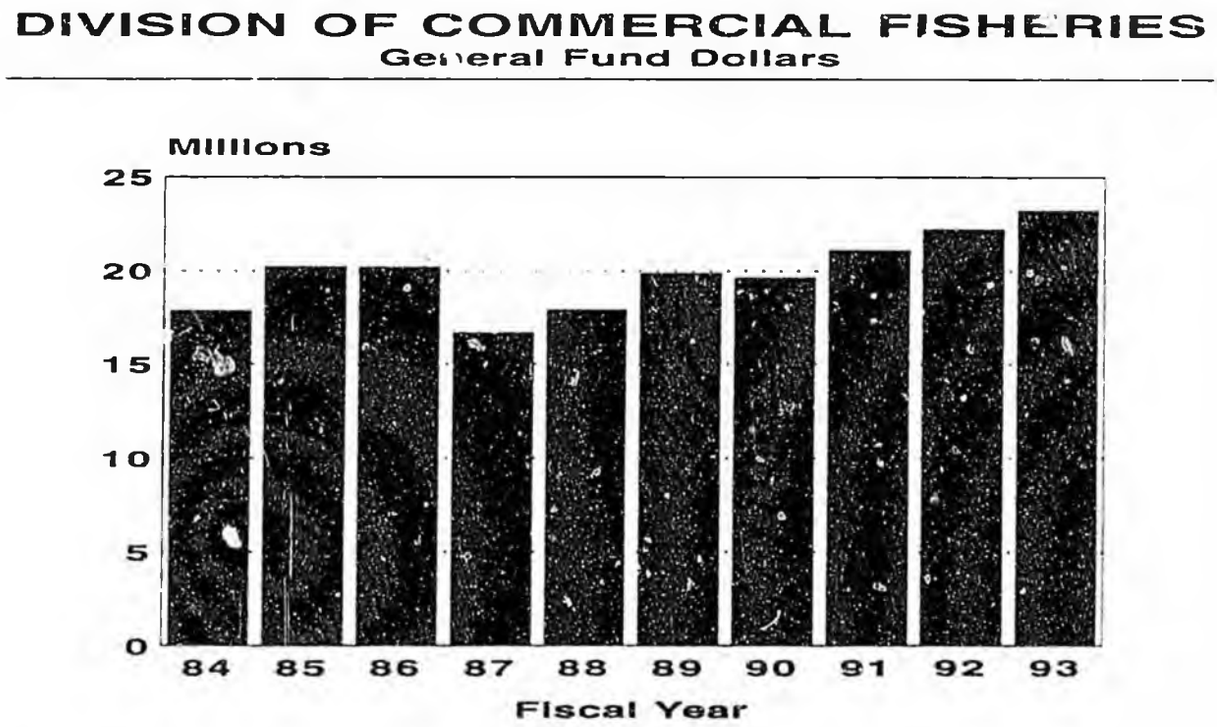
Division Totals

Comm Fish	180	338
Special Projects	34	132
Division totals	214	470

The above organizational chart shows key headquarters and regional staff, as well as office staffing levels. Note that temporary positions are included with permanent part time (PPT) positions in the above table.



B. CHANGES TO FY 92 BUDGET:



General Funds include Program Receipts, Fish and Game Fund, and Other General Funds.

The division has not made any substantive changes between the way the FY92 budget was authorized and the way it is being spent. The division was required to reduce its General Fund service level by about $1.7 million below that provided in FY91.

C. FY93 BUDGET REQUEST:

1. Project/programs deleted or reduced
   The FY93 Governor's budget request will allow the division to continue the level of services it provided in FY92. Those programs and projects that are being operated during FY92 will be operated again in FY93.

2. New or expanded projects/programs
   The Governor's FY93 budget request contains funding for a number of new or expanded projects.

   Bering Sea/Aleutians Crab $141.5
   Biological information on crab landed at shoreside processing facilities will be collected, and quality of similar information collected at sea will be improved. Such information is critical to the setting of preseason harvest levels and ensuring that the allowable harvest is not exceeded.

   Kuskokwim Herring $42.5
   Herring returning to the five Kuskokwim area herring fisheries will be sampled for biological information. The local herring stocks are currently experiencing a decline in recruitment. It is imperative that the Kuskokwim herring program be improved to ensure that the stocks are not overharvested and that the stocks be rebuilt.

   Prince of Wales Island Herring Pound Fishery $44.8
   During its winter 1990/1991 meeting, the Board of Fisheries established a herring roe-on-kelp in pounds fishery that will take place in the waters off Prince of Wales Island. This increment will provide the funds needed to manage that fishery, which has a potential exvessel value of $1.2 million.

   Norton Sound Crab Fishery $22.5
   This increment will provide the funds needed to reopen the Norton Sound summer red king crab fishery. The last time the fishery was open, about $580 thousand worth of crab were harvested.

   U.S./Canada Pacific Salmon Treaty $884.2
   This increment provides increased federal funds for a number of U.S./Canada Pacific Salmon Treaty activities such as assessment of wild chinook stocks in

southeastern Alaska, estimates of the contribution of British Columbia stock to the southeastern Alaska fisheries, identification of Yukon River stocks, improved escapement estimations for Yukon River stocks, and improved information on subsistence salmon uses along the Yukon River.

D. REORGANIZATION PLANS:

The division is not contemplating any major reorganization during FY93. However, the division will be investigating ways to utilize position vacancies to solve high priority programmatic needs.

E. MAJOR ISSUES:

The following are several major issues that confront the state's commercial, subsistence, and personal use fishery management programs for FY93 and beyond.

Vessel Maintenance

The division has five large research and support vessels, with a total replacement value in excess of $10 million, that require regular maintenance and periodic overhaul. These vessels are integral to a variety of finfish, shellfish, and groundfish stock assessment programs, as well as providing platforms for inseason management of several specific fisheries. Maintenance must be provided to protect this capital investment and to ensure safety and efficiency of the vessel support program. In addition, one of the vessels, the R/V *Steller*, has recently been found to be unstable to the degree that it has been pulled out of service. It will most likely have to be eventually replaced with a new vessel. In the meantime, vessel contracting will have to be employed.

Groundfish Management

Federal and cooperative management of groundfish in the Exclusive Economic Zone (EEZ) off Alaska (3-200 miles) is quickly becoming so complicated that the state is losing the ability to protect its legitimate interests. Allocation of allowable harvests and limitation of impacts on state-managed resources are issues of great import to Alaska residents, yet these concerns are not adequately addressed with current fiscal resources.

Genetic Stock Identification

Ascribing harvests of mixed-stock fisheries to stock of origin is fundamental to the protection and optimal exploitation of distinct reproductive populations; such stock ID work is also increasingly important in allocation, bycatch, and interception disputes. Although existing stock ID methods have shown general patterns, new and more reliable techniques (such as use of genetic markers) will be necessary to adequately address the detailed questions being asked.

Developing Fisheries
In recent years there has been a growth in exploitation of previously underutilized species such as sea cucumbers, sea urchins, and clams. These growing industries, however, are exploiting stocks not normally assessed or managed by the division. In order to best take advantage of these development opportunities, more assessment and management planning will be required.

Bering Sea Herring
Western Alaska herring stocks support locally important commercial and subsistence fisheries, yet some of the stocks themselves are showing signs of decline. Existing rudimentary aerial survey techniques may not be sufficient to assure adequate protection, and certainly will not provide for optimal utilization, of these distant fishery resources.

Pink Salmon Quality
As exemplified in 1991, it would be desirable for management of commercial fisheries to account not only for spawning escapement and harvest of optimum numbers, but also assist the industry in harvesting fish of high quality. Pink salmon harvested some distance away from their natal streams can be of higher quality than those harvested in terminal areas. But such distant harvests present real risks of overexploiting some stocks in mixed-stock fisheries. Studies to distinguish separate stocks at distances from spawning streams, combined with marketability analyses for quality, will be necessary to achieve an optimum balance.

Shellfish Stock Assessment
Almost all of the king, Tanner, and Dungeness, as well as other shellfish, stocks in Alaska are managed on very rudimentary information about stock status, reproductive potential, and optimum exploitation rate. This has resulted in very conservative management in many areas and has allowed for some boom and bust cycles in the past. Given lower prices for salmon in recent years, shellfish fisheries hold substantial potential for increased income and revenue, but such expansion will require significant increases in assessment information and management precision.

U.S./Canada and Southeast Salmon
Currently much of the salmon management and research program in Southeast Alaska relies upon federal funding pursuant to the Pacific Salmon Treaty and ongoing U.S./Canada negotiations. If any substantial portion of those federal funds were lost, either through competition with other participants in the treaty process, lack of annual Congressional appropriation, or other circumstances, then the Southeast salmon program would be at risk. The challenge will be to wean core management from and research projects off this federal funding and to secure stable state funding to ensure an adequate program.

DIVISION OF FISHERIES REHABILITATION, ENHANCEMENT AND DEVELOPMENT (FRED)

A. DIVISION FUNCTIONS:

1. Statutory Basis

AS 16.05.092; AS 16.10.380; AS 16.10.440; AS 16.10.443; AS 16.10.375; AS 16.05.092; AS 16.40.150; AS 16. 40.105

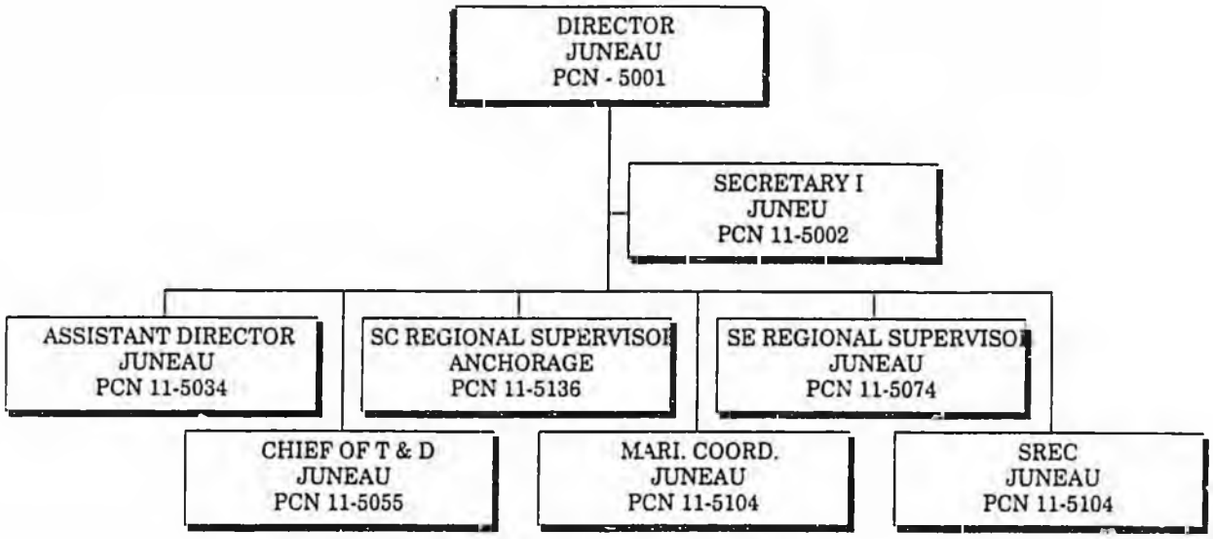
2. Duties

The primary mission of the FRED Division is to sustain and enhance Alaskan fisheries through the development and application of technologies in supplemental production and natural stock rehabilitation. The division operates five laboratories that serve the Alaska Department of Fish and Game (ADF&G) and other state, federal, and private agencies. The Fish Pathology Section has two laboratories, one in Anchorage and another in Juneau, to provide diagnostic services and brood stock evaluations for state, federal, and PNP programs. The Limnology Section provides technical supervision of all lake enrichment projects, and the Limnology Laboratory in Soldotna conducts analyses for the nutrient content of water, zooplankton, and in-lake fish populations sampled for lake productivity studies. The Coded-Wire Tag Processing Laboratory in Juneau decodes metal tags implanted in fish, and supplies resultant information for hatchery and natural stock evaluation and harvest management of chinook salmon in concert with the U.S./Canada Pacific Salmon Treaty. The Genetics Laboratory in Anchorage has an active program designed to protect Alaskan fish stocks and to provide new tools, such as stock identification, for fishery enhancement.

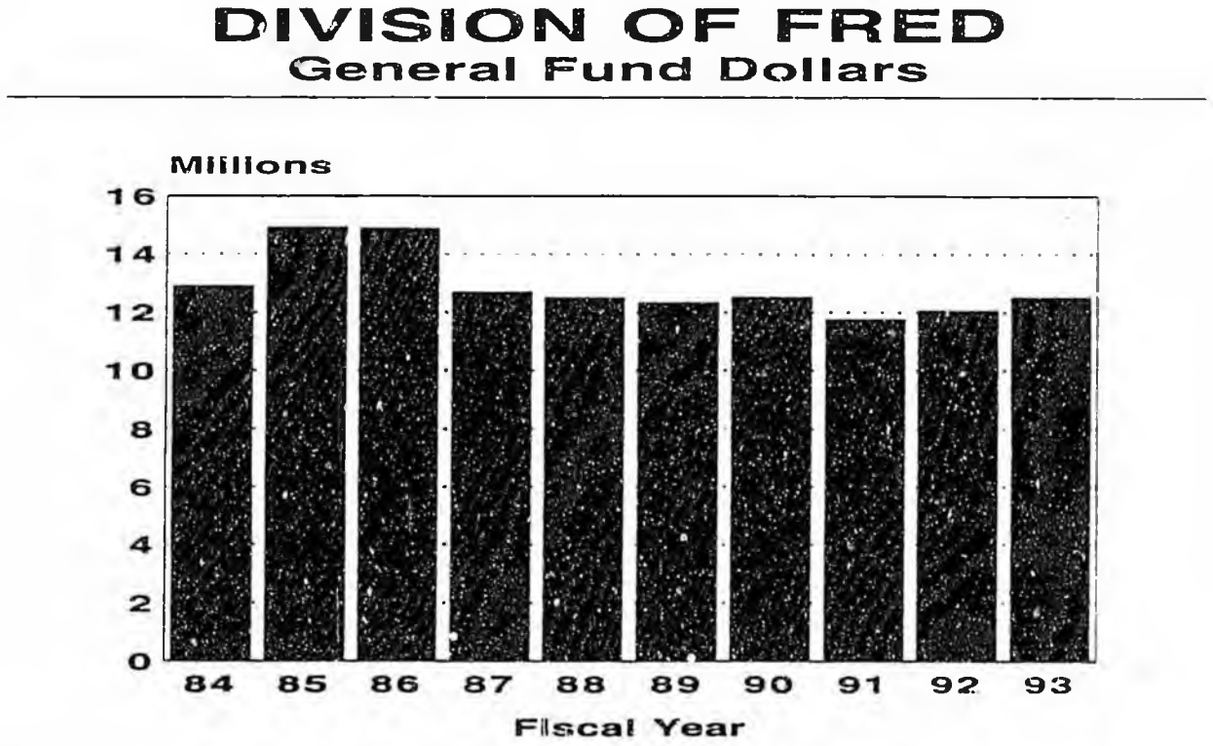
3. Staffing and Locations

An organizational chart showing structure to the regional level and number of full-time and seasonal staff follows.

Location	PFT	PSEA	Location	PFT	PSEA
Anchorage	20	3	Ketchikan	8	5
Big Lake	2	7	Kitoi Bay	4	10
Clear	3	2	Klawock	7	4
Cordova	1	1	Kodiak	1	4
Crooked Creek	2	3	Kotzebue	3	7
Crystal Lake	5	3	Little Port Walter		
Elmendorf	5	1		1	2
Ft. Richardson	10	6	Nome	1	1
Glennallen	1	5	Petersburg	1	5
Homer	1	8	Russel Creek	2	10
Juneau	43	25	Snettisham	3	6
			Soldotna	4	7
Totals	PFT=128	PSEA=132			



B. CHANGES TO THE FY92 BUDGET:



General Funds Include Program Receipts, Fish and Game Fund, and Other General Funds.

In FY91, a one-year supplemental was obtained for the operation of the Main Bay and Tutka Hatcheries. Long-term contracts for operation of these two facilities

by local aquaculture associations were obtained in FY92. Although funding was lost in FY91 for various hatcheries and hatchery programs, the FRED Division was able to continue these projects through program receipts (monies received from aquaculture associations) and approved revised program requests. The revised programs were approved again in FY92 to operate the Gulkana, Pillar Creek, and Kitoi Bay Hatcheries. In FY93, funds will be brought back into the division's base in the form of a program receipt increment in the amount of $813.1.

The FY92 General Fund budget request was reduced by $294.4, resulting from a 10 percent loss of travel and a 2 percent loss of personal services funds, as well as a further reduction of personal services funds for mid-level management funding in the amount of $127.4. In addition, $903.1 in program add-ons that were approved by the Legislature in 1991 were vetoed.

C. FY93 BUDGET REQUEST:

1. Project/Programs Deleted or Reduced
   Overall, the FRED Division's FY93 operating appropriation has been reduced by 7.5% in general funds and 8.6% in federal funds. Reductions in general funds ($776.6) included the FY92 operating funds for the Tutka Hatchery. The budget was also reduced $213.2 in anadromous fish federal funding left unfunded by Congress. As a result no operating funds have been identified for the Big Lake and Deer Mountain Hatcheries.

2. New or Expanded Projects/Programs
   The FRED Division's continuing vision for the 1990s includes a king crab rehabilitation project, expansion of the mariculture program, and expansion of the Coded-Wire Tag Processing Laboratory to include otolith mark evaluation to benefit various user groups, stimulate economic development, and implement a user pays funding mechanism once these programs are developed. These programs were not funded in the operational budget; however, remaining in the divisional request is the expanded planning and development request to further the statewide comprehensive salmon plans and to develop regional salmon plans for the Norton Sound and Kotzebue Regions.

D. MAJOR ISSUES:

1. Enhancement as an Active Management Tool
   Fisheries enhancement, in the broad sense of the word, includes all of the functions normally associated with FRED Division programs: <u>rehabilitation</u> to restore fish stocks to former levels; <u>enhancement</u> (in the narrow sense) to add production to a fish stock to raise it above its former levels; and <u>development</u> to initiate a new run where one has never existed. Most people know and

understand the various functions. What seems to elude many is the fact that enhancement is truly an active management tool.

When it first became apparent that successful enhancement might alter traditional management programs, insightful people began to develop deliberate strategies using enhancement as a management tool. Using hatcheries, limnology/biology, genetics, and pathology, the FRED Division provides fish to users in locations where they were never previously available. This acts as a management tool by (1) providing fish when natural production is low, (2) taking pressure off wild stocks by moving some of the user effort to other areas, and (3) providing population estimates and migration patterns and timing through the use of fish marking. In fact, the preponderance of information on stock movements has been accumulated because of and since the FRED Division's origin.

Fisheries development and rehabilitation programs in many areas help to relieve the fishing pressure on more fragile wild stocks and accelerate wild stock restoration. Three of the most graphic examples involve FRED programs at Homer Spit and Crocked Creek, the Chena River, and Karluk Lake. The extremely successful king salmon programs at Homer Spit and Crooked Creek have reduced the sport fishing pressure on more fragile, southern Kenai Peninsula wild stocks. With extremely depressed king salmon runs to the Kenai River and resulting closures, sport fishermen have focused on these newly developed runs.

The Chena River near Fairbanks once supported the world's largest grayling sport fishery. Overharvest of this wild stock a decade ago led to severe population declines and very restrictive management in recent years. The Sport Fish Division has concluded that even with severe area and time restrictions, it could take 20-30 years to restore the Chena River Arctic grayling population and fishery. As such, the FRED and Sport Fish Divisions are now jointly pursuing an aggressive 4-year restoration program through the Clear Hatchery.

Karluk Lake (Kodiak Island) sockeye salmon populations have been declining since the 1920s and have not responded to traditional management for the last 60 years. A cooperative sockeye salmon restoration program established in 1985 that uses the technique of lake enrichment has resulted in sockeye salmon populations of between 2.2 and 2.5 million in 1990 and 1991, respectively. These are the highest returns of Karluk Lake sockeye salmon since the early 1920s.

The FRED Division provides a deliberate, proactive component to management when simple time and area closures are not enough. The division provides fish to be caught while protecting endangered natural stocks, or providing harvestable stocks so that managers can spread out the fishing effort, be it sport or commercial. The use of enhancement as a management tool is not new, but the

concept of deliberately planning to do this is new to our thinking. Though this strategy is still young, it has been used recently in both commercial and sport fish management to solve problems and meet overall resource management goals.

2. Complying with Board of Fisheries Requests
   For the past seven or eight years, the FRED Division has had little direct communication with the Board of Fisheries (BOF). This past year, the BOF, recognizing the statewide scope of enhanced fisheries, realized it knew little about the state's enhancement program or FRED Division, and its oversight responsibilities for the program. At the BOF meeting in Anchorage, FRED Division staff presented an overview of the FRED program and look forward to interacting with the BOF on an annual basis. An issue was raised, however, in that many of the things that have come from the interaction with the board, such as increased planning for enhancement projects, require new monies that have not yet been identified.

3. Decreasing Budget
   The FRED Division faces decreasing revenues. Unlike some agencies, the division has incurred significant cuts in its General Fund appropriations in the past seven years. For FY92, FRED general funds have decreased to 66 percent of their FY85 level, not accounting for inflation. Considering inflation, the division's FY92 General Fund allocation has only 53 percent of the purchasing power of the FY85 General Fund allocation.

4. Alaska's Need for Economic Development
   In the 1990s, the FRED Division plans to expand its programs to regions of the state not yet directly benefiting from enhancement projects. The division plans to continue to lead the salmon enhancement program and its private sector partners through planning, technological development, and application of technical services. In addition, the division plans to aggressively move into new and critical areas, such as king crab rehabilitation and mariculture, to expand fisheries habitat rehabilitation efforts, and to continue its involvement with restoration programs in oil spill-affected areas. Based on the past success of the salmon enhancement program, there is a growing interest in using fisheries enhancement as an economic diversification tool for Alaskan communities. Full utilization of the biological and economic potential of Alaska's fisheries resources can be achieved through carefully planned fisheries rehabilitation, enhancement, and development.

DIVISION OF HABITAT

A. DIVISION FUNCTIONS:

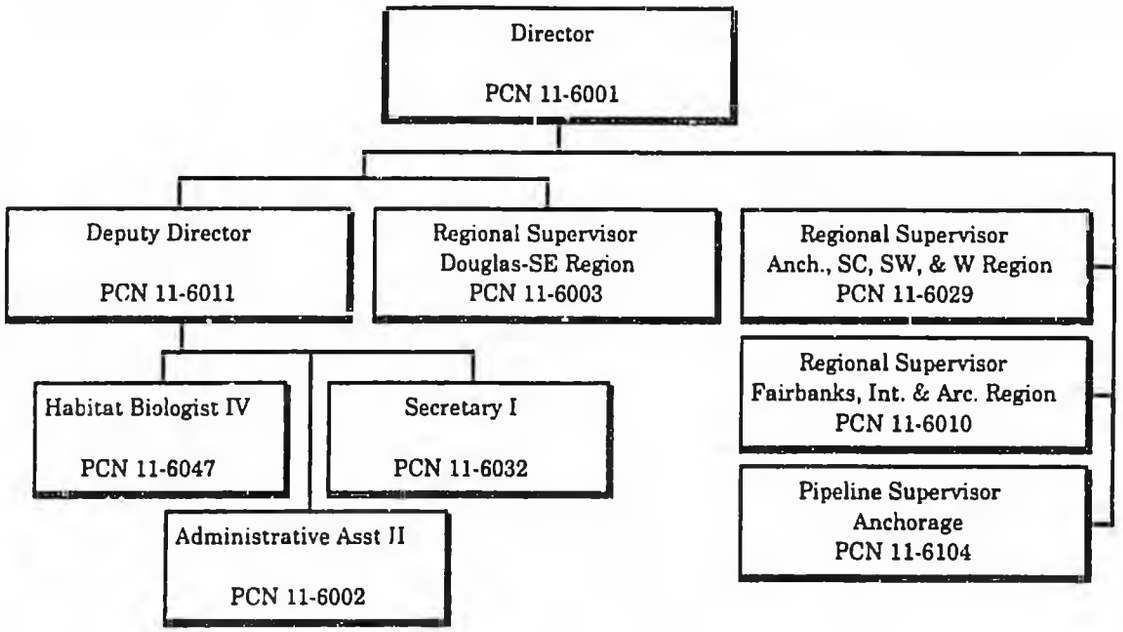
1. **Statutory basis.**
AS 16.05.020; AS 16.05.050; AS 16.05.840; AS 16.05.870; AS 16.20.
5 AAC 95.010; 5 AAC 95

2. **Duties.**
Maintain fish and wildlife for public use and enjoyment through issuance of permits for activities affecting fish-bearing waters and game refuges, critical habitat areas and game sanctuaries, and participation in land use planning activities to ensure that fish and wildlife needs are addressed. The division is involved in such land and resource use activities as timber harvest, mining, oil and gas exploration and development, land disposals, urban expansion, hydro development, and agriculture.

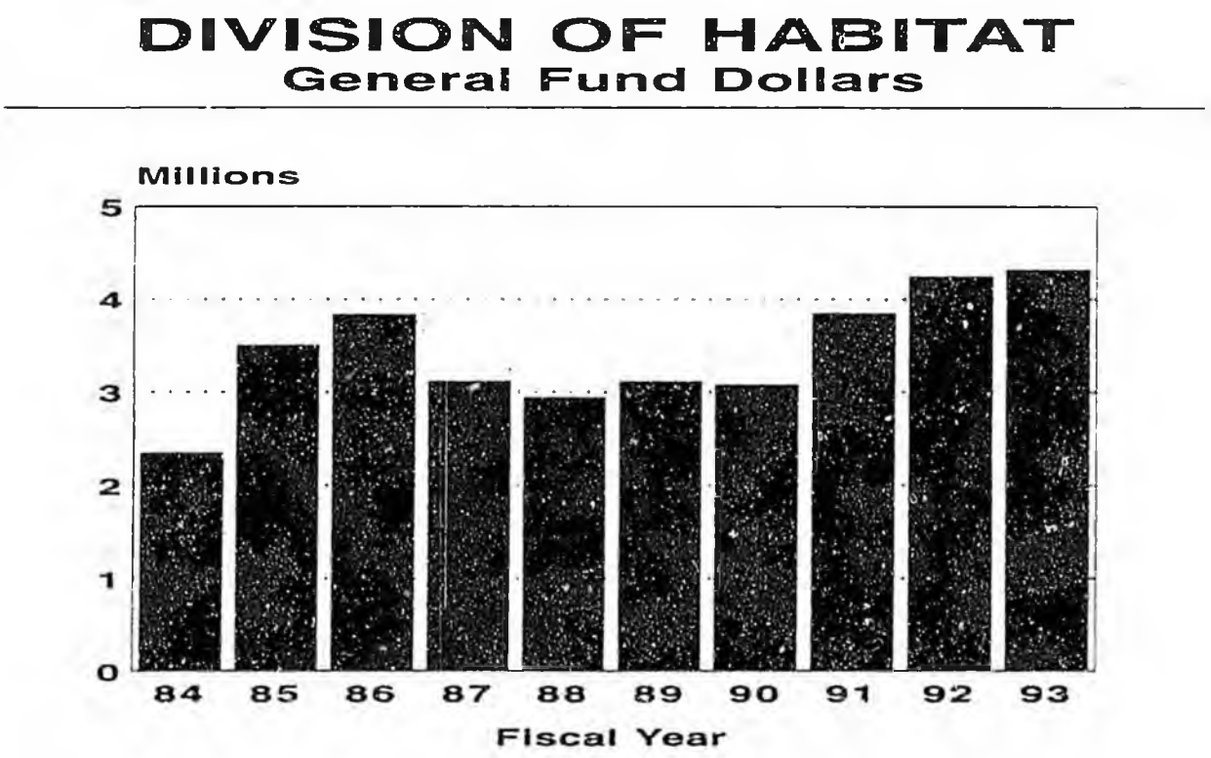
For each plan or project review, the division acquires and analyzes fish, wildlife, and habitat data; analyzes potential adverse effects; and develops recommendations or stipulations to protect habitat while allowing development activity to proceed. Major tasks in FY93 include the review of approximately 2,600 permit applications; participation in planning for use of at least 50 million acres of Alaska lands, about 118 million acres of federal lands, and for up to 12 federal and state oil and gas lease sales; assistance to as many as 12 coastal districts in preparing and implementing coastal management plans; participation in planning for approximately 15 million acres of National Forest land; and permitting and planning for approximately 3.0 million acres of legislatively designated state game refuges, critical habitat areas, and game sanctuaries.

3. **Staffing and locations.**
An organizational chart showing structure to the regional level and number of full-time and seasonal staff follows.

Location	PFT	PSEA	Totals	
Juneau/HQ	5	1		PFT = 62
Juneau/SE	4	1		PSEA = 11
Ketchikan	4	1		
Petersburg	1	1		
Sitka	2	1		
Anchorage	34	3		
Fairbanks	10	1		
Anchorage Pipeline Supr	2	2		



B. CHANGES TO FY92 BUDGET:



General Funds Include Program Receipts, Fish and Game Funds, and Other General Funds

There were no major changes in the Habitat Component budget between the FY92 authorization and the FY93 request.

In the Special Projects Component, there was a net gain of $191.9 from the FY92 authorized to the FY93 request. This is a combined result of: 1) shift of $166.7 in federal and industry oil spill contingency planning from the Habitat component to the Special Projects component, and 2) the addition of $25.2 COLA for FY93.

C. FY93 BUDGET REQUEST:

No project/programs are expected to be added, deleted or directly reduced. There will, however, be an indirect reduction in services as a result of increases in workload due to the increased pace of resource development activities and in increased personal services costs.

D. REORGANIZATION PLANS:

No proposed reorganizations at this time.

E. MAJOR ISSUES:

Unfunded increment
Carry forward increment of $115.5 in Special Projects Component. This will require the division to submit an RPL in order to receive federal funds and program receipts that were made available in state FY92 and which, because of the three-month difference between state and federal fiscal years, will carry over into state FY93. These funds consist of two federal EPA wetland grants and Red Dog Mine funds, the latter provided by Cominco for subsequent pass through from ADF&G to the U.S. Geological Survey.

DIVISION OF SPORT FISH

A. DIVISION FUNCTIONS:

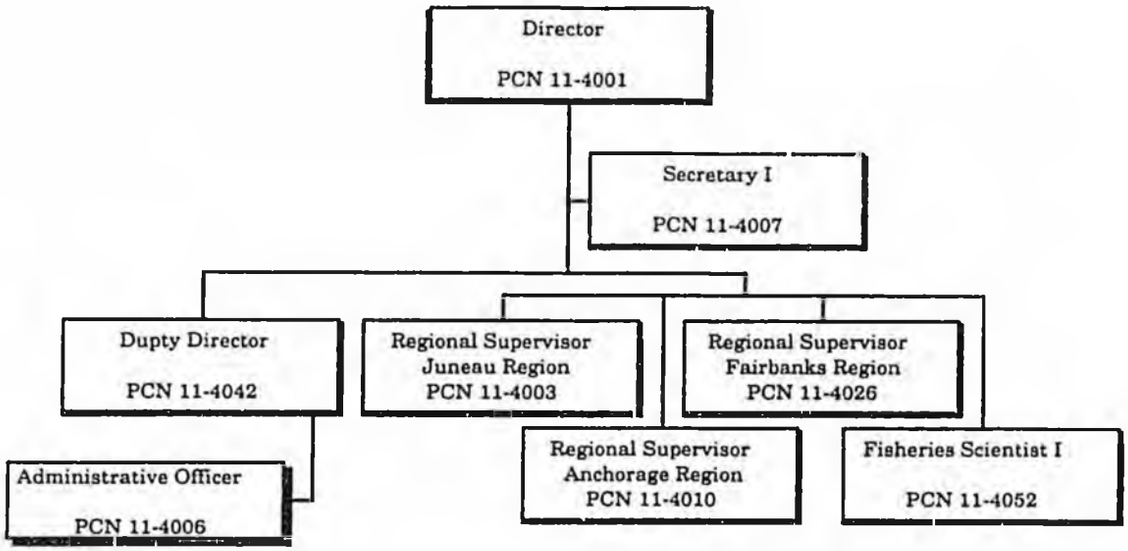
1. **Statutory basis.**
   AS 16.05.020; AS 16.05.060

2. **Duties.**
   The major responsibilities of the Division of Sport Fish are to manage, protect, maintain, improve and extend the state's recreational fishery resources so as to provide a diverse mix of sport fishing opportunities that address the desires of the angling public and contribute to the Alaska economy. Sport fishing is the most popular recreational activity in Alaska and provides significant economic benefits to the state. The Division of Sport Fish collects data to assess the size and condition of fish stocks, impacts of environmental conditions, and to forecast the size of future runs. Harvest surveys are conducted to determine sport fishing effort, catch and harvest of fish, and details of the composition of the catch. This information is used to manage fish stocks for sustained yield and maximum public benefit.

   Under provisions of the federal Wallop-Breaux program, a minimum of 10 percent of our federal apportionment must be spent on recreational boating access. This will provide for a variety of public access projects that will benefit anglers and communities throughout Alaska.

3. **Staffing and locations.**
   An organizational chart showing staff structure to the regional supervisor level and number of full-time and seasonal follows.

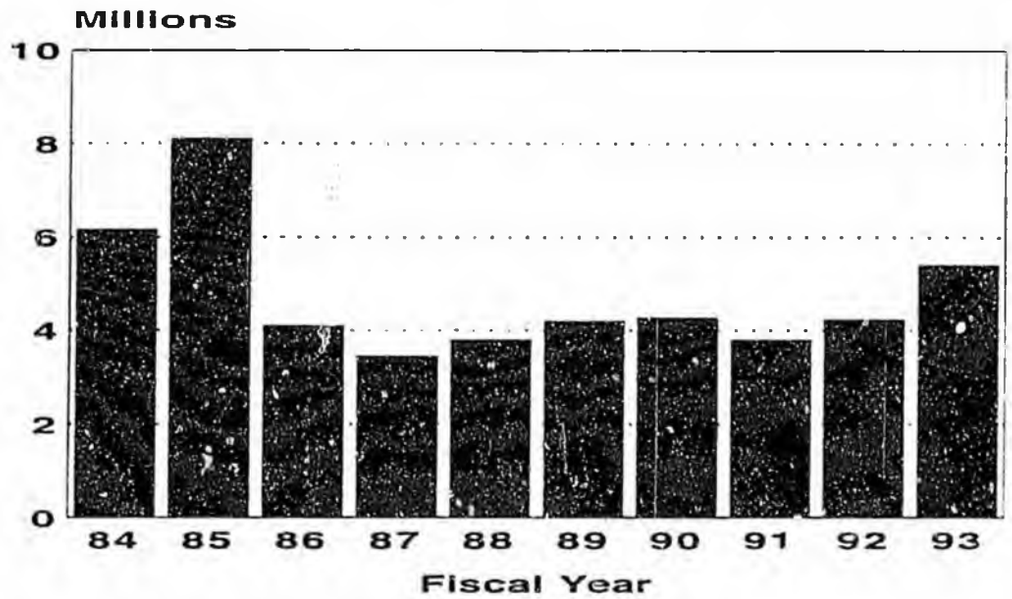
Location	PFT	PSEA	Location	PFT	PSEA
Juneau/HQ	11	0	RegionII:		
Anchorage/RTS	15	5	Anchorage	13	12
Region I:			Soldotna	6	19
Douglas	13	15	Palmer	4	20
Haines	0	2	Dillingham	2	5
Ketchikan	2	6	Kodiak	2	5
Petersburg	0	1	Glennallen	1	7
Sitka	1	5	Seward	0	1
Yakutat	0	2	Russian River	0	1
Klawock	0	1	Homer	0	1
			King Salmon	0	1
			Valdez	0	1
Totals	PFT = 88		RegionIII:		
	PSEA=135		Fairbanks	16	18
			Delta Junction	2	7



B. CHANGES TO THE FY92 BUDGET:

DIVISION OF SPORT FISH

General Fund Dollars



General Funds include Program Receipts, Fish and Game Fund, and Other General Funds.

The funding and project structure in the FY93 Sport Fish BRU base budget is largely unchanged from FY92. However, two relatively large increments are being requested: Coho Salmon Management ($630.8), and Steelhead/Resident Species Projects ($477.2). As with all other programs in the Sport Fish BRU, these increments are funded entirely with non-general fund monies.

Most of the project changes in the Sport Fisheries component for FY93 are minor and reflect increased contractual services costs associated with a statewide economic survey of sport fisheries, decreased spending on equipment, completion of some activities (for example, Situk River steelhead kelt outmigration estimates, and stock composition studies of Upper Cook Inlet salmon), and the addition of several new projects which were requested in the coho and steelhead/resident species increments (for example, Kenai River coho harvest and escapement estimates, urban coho enhancement, southern Southeast coho monitoring, and Situk River smolt estimates).

C. FY93 BUDGET REQUEST:

D. REORGANIZATION PLANS:

No proposed reorganizations at this time.

E. MAJOR ISSUES:

Increased Management Complexity of Sport Fisheries
Increasing numbers of fishermen, conflicts between user groups, subsistence issues, federal management, and increased demands on fishery resources have made fisheries management more complex than ever before. Sport, subsistence, and personal use fisheries often occur on anadromous stocks in freshwater or inshore of commercial fisheries. Because subsistence fisheries receive allocative priority, the burden of conservation is often left to the sport and personal use fisheries which are managed by the Division of Sport Fish. Specific management plans and policies are needed to guide fishery decisions, and precise and timely data about harvest and escapement on an increasing number of fisheries are essential to prevent overharvest.

Funding is Inadequate
Increased funding is needed to meet the sport fish management needs of fisheries that continue to be more heavily used, complex, and competitive. The public is demanding that diverse fishing opportunities and more and better facilities be provided. As fishing pressure intensifies, costly hatchery programs are required in urban areas and innovative management approaches are needed to protect wild stocks. There is a need for increased enforcement of fish and game laws in many areas of the state. All operational costs of the Sport Fishery BRU are paid by sport fishermen and recreational boaters. The 1990 Legislature approved an

increase in nonresident license fees. The department has been asking the public to consider the need for increases in resident sport fishing license fees (last increased in 1977) and other user pay approaches to increase funds available for sport fishery programs throughout the state.

Between 1977 and 1990, sport fishing effort in Alaska increased nearly 108 percent from 1.2 million days to 2.5 million days fished. During 1990, the last year for which complete figures are available, 425,000 people sport fished and paid nearly $4.8 million in state license fees. About 59 percent of these anglers were Alaska residents; 46 percent of the resident population participated in the sport. In 1985, sport fishing contributed $204.7 million to the state economy and provided over 3,000 full-time jobs. In Southcentral Alaska alone, sport fishing provided 2,178 jobs.

Alaska's expanding sport fisheries have placed increased pressures on the resource and have resulted in increasing conflicts between users. The Division of Sport Fish provides the needed information about fish population structure, harvest, effort, economics, and public interest regarding management options. With this information, the fisheries are managed to provide maximum benefit to users without jeopardizing the resource.

The Sport Fish BRU is a "user pay" program, receiving funding from federal taxes on expenditures by sport fishermen (Dingell-Johnson/Wallop-Breaux Act) and Alaska fishing license sales (Fish and Game Fund). The BRU is managed statewide in three regional offices located in Juneau, Anchorage, and Fairbanks, and the headquarters office in Juneau. Smaller area offices are located in communities in each major region. By maintaining these offices, we are striving to provide direct service and benefits at the local level. Activities within this BRU are classified into four major categories: area fisheries management, research/data collection, information/education, and public fishing access.

Area management biologists are responsible for sport fisheries in their areas. Area biologists or assistant area biologists are stationed in 15 communities located throughout the state. They evaluate harvest, escapement, and other biological data during each fishing season to determine if sustainable yield will occur. If conservation concerns are indicated, appropriate management/regulatory actions are taken. Management biologists are the primary source of area-specific information for the public, and they are also the primary providers of information to the Board of Fisheries during the regulatory process. Each area biologist has the authority to make emergency orders and emergency regulations for the sport and personal use fisheries in their areas.

Research and data collection are primary responsibilities of the department. To meet our constitutional mandate of maintaining sustainable yield, timely and precise population and fishery data are required throughout the state.

DIVISION OF SUBSISTENCE

A. DIVISION FUNCTIONS

1. **Statutory basis.**
   AS 16.05.090; AS 16.05.094; AS 16.05.258

2. **Duties.**
   Compile existing data and conduct studies to gather information, including data from subsistence users, on all aspects of the role of subsistence hunting and fishing in the lives of the residents of the state.

   Quantify the amount, nutritional value, and extent of dependence on food acquired through subsistence hunting and fishing.

   Make information gathered available to the public, appropriate agencies, and other organized bodies. Assist the department, the Board of Fisheries and the Board of Game in determining what uses of fish and game, as well as what users and what methods, should be termed subsistence users, uses, and methods.

   Evaluate the impact of state and federal laws and regulations on subsistence hunting and fishing and, when corrective action is indicated, make recommendations to the department.

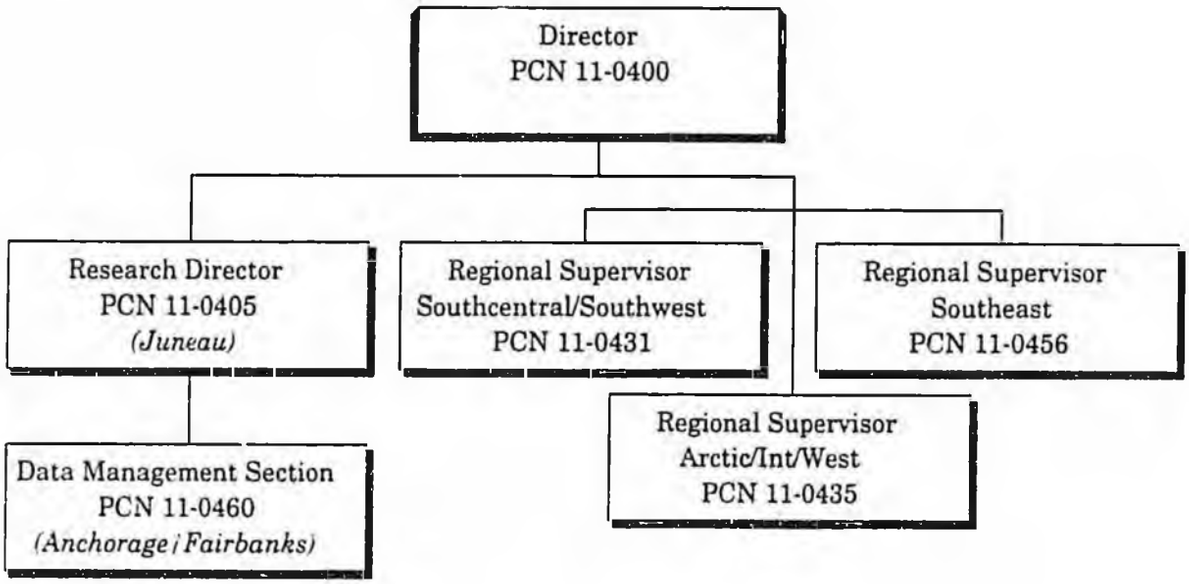
   Make recommendations to the Board of Fisheries and the Board of Game regarding adoption, amendment, and repeal of regulations affecting subsistence fishing and hunting.

   Participate with other divisions in the preparation of statewide and regional management plans so that those plans recognize and incorporate the needs of subsistence users of fish and game.

3. **Staffing and locations.**
   1. An organizational chart showing structure to the field office level, and the total number of full-time and seasonal staff follows.

Division Staffing: Statewide

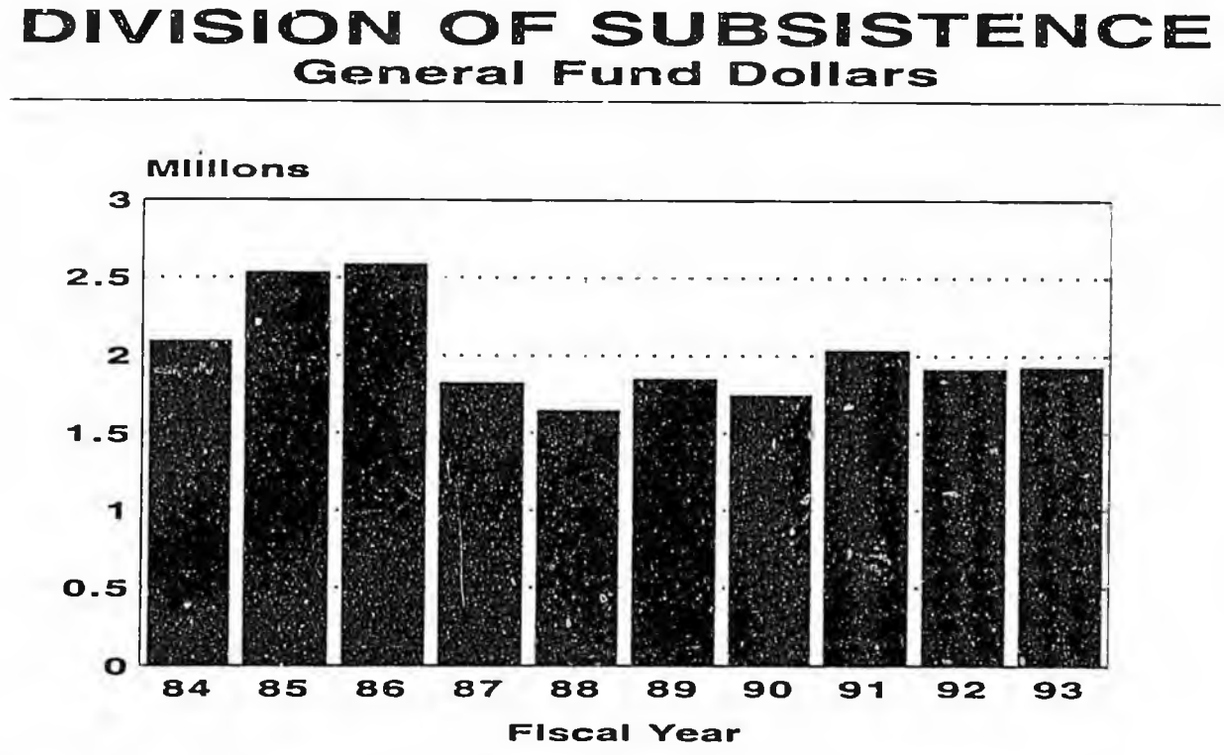
Location	PFT	PSEA
Juneau/Douglas	9	1
Angoon	0	1
Anchorage	6	4
Dillingham	1	2
Bethel	2	1
Fairbanks	6	2
Ft. Yukon	0	1
Kotzebue	0	4
TOTAL	24	16



2. Efficiencies, Cost Control Measures

In FY92 the Division of Subsistence initiated cost-cutting measures in two ways. First, in order to reduce personal services costs the position of the deputy director was eliminated. This was accomplished through attrition. Additionally, both cost and management efficiencies were achieved with the reorganization of the division's regional management structure; the Arctic, Western, and Interior region programs were combined under one regional program manager, rather than two.

B. CHANGES TO FY92 BUDGET:



General Funds Include Program Receipts, Fish and Game Fund, and Other General Funds.

C. FY93 BUDGET REQUEST:

Operational Funding. The Division's FY93 budget request represents a slight decrease in funding from FY92. Overall, the division's spending level has remained fairly stable in recent years, though programs have been impacted by inflation and cost-of living increases. Some instability in the division's budget has resulted, since FY91, from federal funding uncertainties. The state is presently out of compliance with subsistence priority provisions of ANILCA, and the federal government has not yet articulated a policy for continued funding for state subsistence programs. Prior to 1990, federal funding approximated $400,000 annually. In recent years, federal reimbursement for specific subsistence research projects has been negotiated on a year-to-year basis, but has consistently been less than that amount. For FY93, continuation-level funding from federal sources is hoped for, but not guaranteed.

D. REORGANIZATION PLANS:

No proposed reorganization at this time.

E. MAJOR ISSUES:

As in the past year, a high degree of uncertainty surrounds implementation of the state subsistence law and the federal subsistence management program on federal lands. The Division of Subsistence needs stability in funding in order to continue to provide reliable data on subsistence uses, and to assure people that the state is serious in its commitment to address subsistence uses.

Recent court decisions and the reality of dual federal/state management of subsistence in Alaska have resulted in several specific challenges for the Division of Subsistence:

Research Coordination
Gathering information on subsistence uses and users is an important element of both the federal and state programs, but uncoordinated research can be counter-productive. The Subsistence Division has initiated subsistence research training seminars for federal staff entering this field. The division also has worked with federal agencies to promote high ethical and technical standards in the collection and use of subsistence information, to ensure data compatibility, and to make efficient use of available research funding. Maintaining these standards as new research entities emerge has become a significant issue for the division.

Fish and Game Management Coordination
Fish and game management decisions are being made by both the federal subsistence boards and the state boards, at their regular meetings. State involvement in the federal board process has been limited by the board to where we have little more than observer status. Understanding the rationale for federal subsistence board actions, the implications of those decisions, and the appropriate state response has become a major issue for the division.

All Alaskans Eligible for Subsistence
Since the McDowell supreme court decision, all Alaskans potentially have become eligible subsistence users. The implications of this have dramatically affected the work of the division and the department as a whole, due to the expanded pool of eligible fishers and hunters and a complex legal framework for providing for subsistence uses. Developing a new subsistence law that limits eligibility has also become a significant new issue in which the division has played, and will continue to play, a significant role.

DIVISION OF WILDLIFE CONSERVATION

A. DIVISION FUNCTIONS:

1. **Statutory basis.**
   AS 16.05; AS 16.20; AS 16.55

2. **Duties.**
   The division serves as the state's primary wildlife conservation agency irrespective of land ownership status. Primary duties and functions include:

   Management programs consisting of habitat and population management, annual surveys and inventories of big game, furbearer and waterfowl populations, and assessment of harvests of these game species. These projects are conducted to determine the biological status and trends of wildlife populations and to enhance wildlife populations important for human use.

   Research programs include studies to provide new biological information or develop improvements in investigation techniques for application to management activities.

   Information and recommendations from management and research programs are summarized for presentation to local fish and game advisory committees, regional councils, and the Alaska Board of Game for the state's regulatory process.

   Public service projects include response to public inquiries on wildlife-related issues, development and distribution of wildlife educational materials (e.g., Project WILD, Alaska Wildlife Week), and a statewide hunter education/ safety program.

   Technical assistance is provided to other state and federal agencies, public institutions, and private organizations.

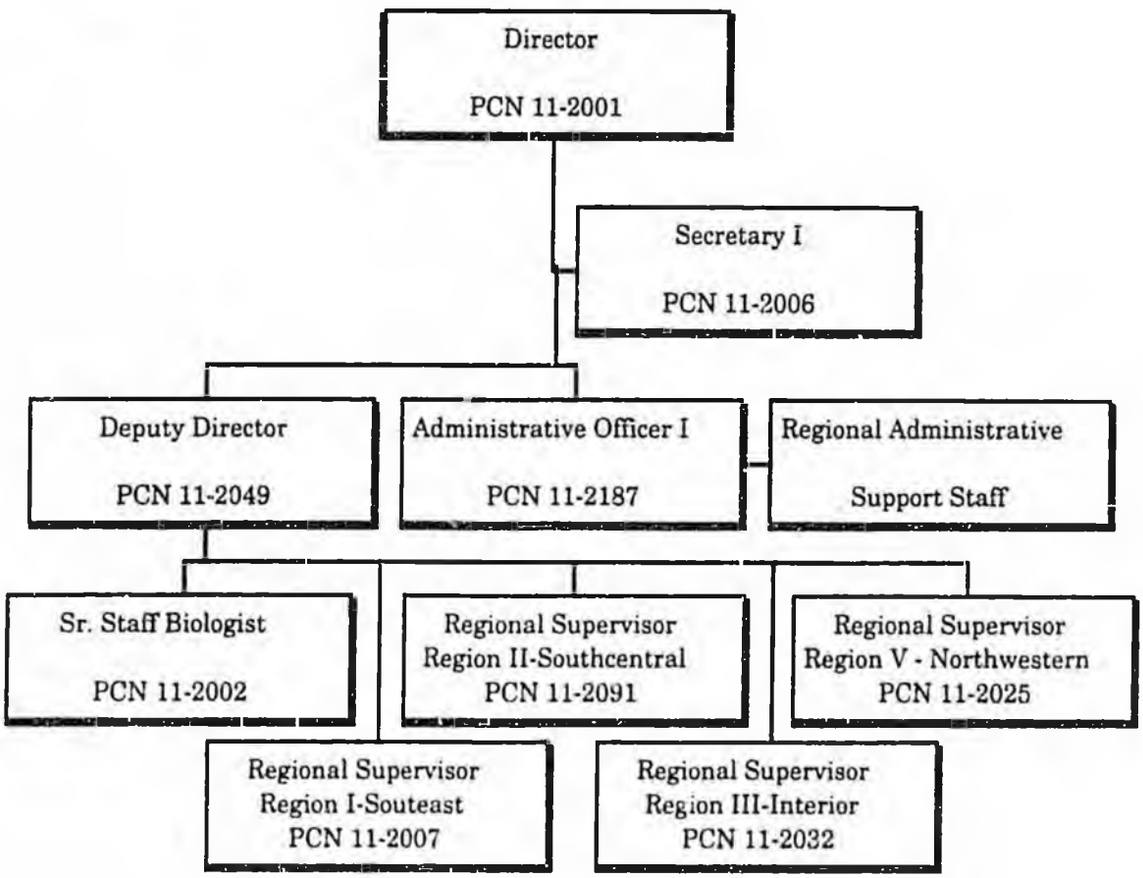
3. **Staffing and locations.**
   The division is organized into four regions with 18 area offices. The headquarters office is located in Juneau. Distribution of the division's 167 PCNs is shown on the following chart.

Location	PFT	PSEA
Anchorage	46	6
Fairbanks	35	7
Juneau	20	8
Nome	3	1
Soldotna	3	1
Kotzebue	2	
Palmer	5	
Glennallen	3	

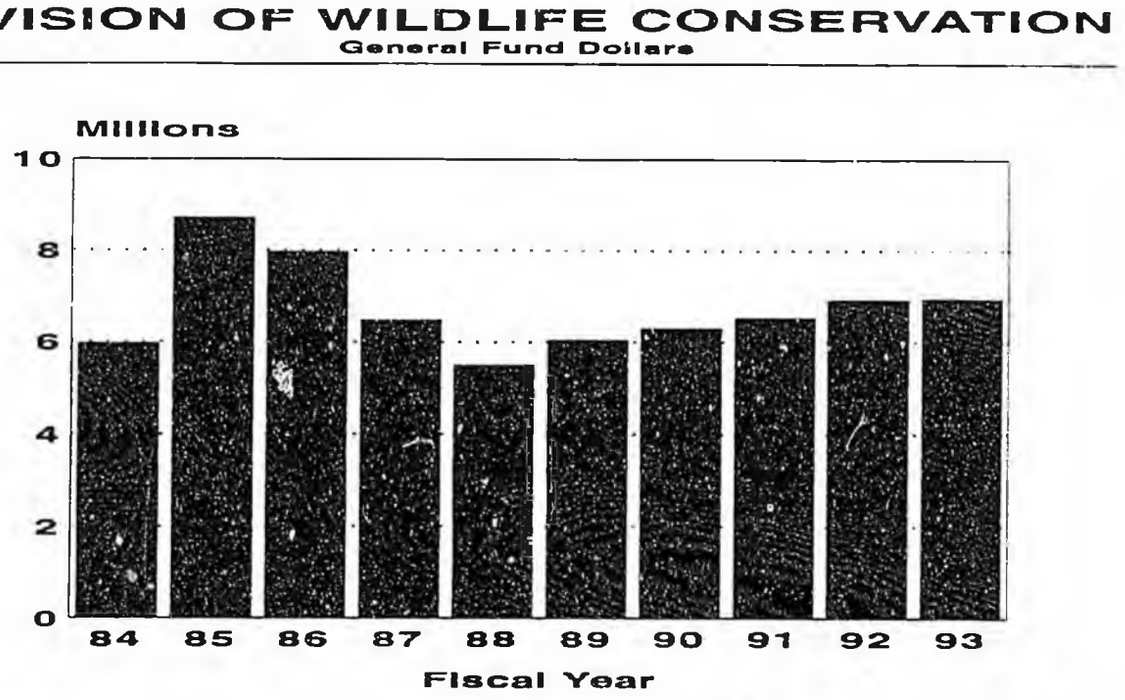
Location	PFT	PSEA
King Salmon	1	2
Ketchikan	1	
Cordova	2	
Sitka	2	1
Delta Junction	1	1
Bethel	1	1
Petersburg	1	1
Kodiak	1	1

Location	PFT	PSEA
Homer	1	1
Tok	1	2
Barrow	1	
McGrath	1	
Dillingham	1	1
Galena	1	

Totals	PFT	PSEA
	133	34



B. CHANGES TO FY92 BUDGET:



General Funds Include Program Receipts, Fish and Game Fund, and Other General Funds.

The FY92 budget has been increased over the authorized version by $500,000 in federal funds under RPL 11-92-0077. These funds are available under the Pittman-Robertson act and will be used to supplement and expand existing wildlife resource management studies for the following species: moose, brown bear, caribou, elk, goat, bison, and wolf. The availability of increased P-R funds will continue through FY95 and this increased level has been incorporated into the FY93 budget request (an additional $200,000 above the revised FY92 level). Even with these increased funds, the FY93 budget request represents essentially a maintenance level budget with only minor internal shifts in program priorities based on current and anticipated needs.

C. FY93 BUDGET REQUEST:

1. Projects/programs deleted or reduced
   The only reductions for FY93 are related to either the cyclical nature of some population surveys (elk), or a restructuring of projects to more accurately reflect actual services provided (nongame). There are no major project or program deletions planned for FY93.

2. New or expanded projects/programs
   Increases in both the General Wildlife ($278.8) and Public Services ($144.)

programs are due primarily to the continued fine-tuning of the division's budget to more accurately reflect services. Projects previously shown under Nongame Management are now shown under either the General Wildlife or Public Services programs. Increased costs due to implementation of subsistence regulations are also shown in these two programs. The increases in the Bison Management program ($51.4) are due primarily to increased management costs for the Delta Bison Range. The increases in Marine Mammal Management ($31.0) reflect more accurate accounting for the costs of the Round Island Sanctuary project including salary costs not previously shown for this project. The major program increase is in Wolf Management ($176.3) and reflects the costs associated with implementation of the Strategic Wolf Management Plan adopted by the Board of Game at the Fall 1991 meeting.

D. REORGANIZATION PLANS:

Early in FY92 the Ft. Yukon area office was closed and the area biologist position and management functions for GMU 25 were transferred to Fairbanks. In addition the regional supervisor for our Northwestern Region was transferred from Nome to Fairbanks and that region is now being managed from our Interior Region office. The reduced salary costs will be offset somewhat by increased travel costs, but an overall savings is anticipated. Additional consolidation or reorganization plans are being considered but no specific decisions have been made at this time.

E. MAJOR ISSUES:

Unfunded increments

As submitted the FY93 budget request contains no unfunded increments.

Need for or impact of proposed legislation

The Division of Wildlife Conservation is funded primarily with hunting and trapping license revenues (Fish and Game Fund) and federal Pittman-Robertson (P-R) monies. To a much lesser extent, appropriate projects are financed from the General Fund. License revenues, although increasing nominally each year, have not kept up with the demand for improved or enhanced services or for program expansions necessary to meet current needs for more active management and additional information upon which to base wildlife management decisions in Alaska. Increased levels of federal P-R funds cannot be expected to continue past FY95 and may in fact decline, so this funding source cannot be expected to sustain necessary increases in funding needed for Alaska's wildlife programs. As a consequence, Alaska must face the need for developing other funding sources, including an increase in resident license fees and the development of new funding sources for watchable wildlife and nongame management to help fund necessary wildlife management programs.

Jan 16, 92 M43

Alaska State Legislature

Sen. Lloyd Jones, *Chair*
Sen. Sam Cotten, *Vice-Chair*
Sen. Dick Ellason, *Member*
Sen. Steve Frank, *Member*
Sen. Rick Halford, *Member*
Sen. Curt Menard, *Member*
Sen. Fred Zharoff, *Member*

P.O. Box V
Juneau, AK 99811

907 465-4907
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Senate Resources Committee

MEMORANDUM

To: Senate Resources Committee Members

From: Senator Lloyd Jones, Chairman
Senate Resources Committee

Subject: Fish and Game overview

Date: January 16, 1992

The Senate Resources Committee will meet tomorrow at 1:30 p.m. to hear a presentation by the Department of Fish and Game. Commissioner Rosier will be present, along with directors to present a report to the committee on the activities of the department.

Attached is a packet prepared by the department.

Seafood Quality

Hrg. 2-10-92

EXPERT WITNESS

Doug Donegan of Trident Seafoods in Anchorage will speak from the processors perspective as to what he sees can and should be done to assure a good product at the retail end. Anchorage

Mr. Dunnigan was recommended by Rick Lauber of Pacific Seafood Processors.

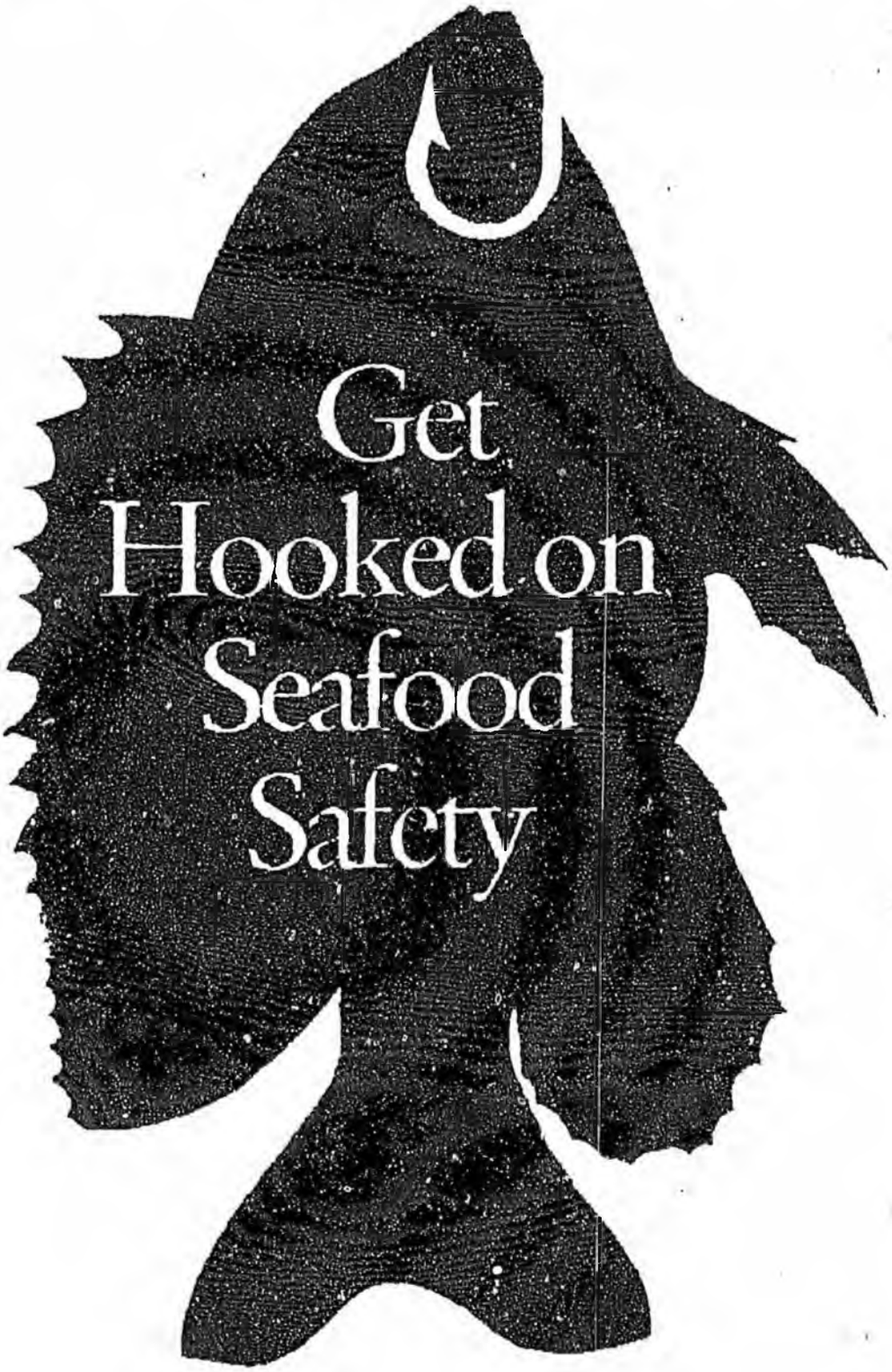
Mr. Tom Billy of the FDA's Office of Seafood, Washington, D.C. and/or Roger Lowell of the Seattle FDA office is going to give a presentation of FDA's current efforts and plans at assuring quality seafood. *

Mr. Lee Weddig, Executive Director, National Fisheries Institute will give a talk on NFI's efforts towards assuring a high quality product is consistently delivered to the American consumer. Washington DC

Ms. Kit Ballentine, Chief Environmental Sanitation Seafood Section, DEC will discuss her agency's undertakings in Alaska to assure better seafood quality from the fishing boat to Alaska's markets intrastate and interstate. *

Mr. Kim Elton, Executive Director of the Alaska Seafood Marketing Institute will speak to his agency's efforts to assures high quality Alaska Seafood.

* at Long Beach.



Get Hooked on Seafood Safety

FDA CONSUMER
A REPRINT FROM FDA CONSUMER
DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service, Food and Drug Administration, Office of Public

by Roger W. Miller

What food is nutritious, wholesome, tender, easy to digest, and yet subject to a bad press? The answer: seafood.

Yet, despite its growing popularity in a country in which counting cholesterol has become almost as important as counting calories, seafood has often been pictured in the media as unsafe. Last year, for example, editorial writers for the *New York Times*, *Washington Post*, *Atlanta Constitution*, and the *Dallas Morning News* all quoted statistics claiming that eating fish was 25 times more likely to make you ill than dining on beef and 16 times more likely than downing poultry or pork. Both CBS TV's "This Morning" program and TV station WABC in New York City repeated those statistics in features on fish safety.

The editorial writers and the TV producers also called for new legislation to provide more government inspection of fish so that we'd be better able to keep down our seafood.

All of which caused then Acting FDA Commissioner James S. Benson to tell the *New York Times* in a letter to the editor: "You have been severely misled."

Supporting Benson was a report last January from the National Academy of Sciences. Completing a two-year study of seafood safety, the academy concluded: "Most seafoods available to the U.S. public are wholesome and unlikely to cause illness in the consumer."

The statistics used by the editorial writers applied to "outbreaks" of illnesses reported to the national Centers for Disease Control in Atlanta, the federal agency responsible for collecting and analyzing health statistics. (An outbreak is two or more illnesses linked to a common source.) The news people failed to pick up the distinction between outbreaks and illnesses, and failed to appreciate that CDC only tabulated those incidents reported voluntarily by state and local health authorities. These authorities tend to report only major incidents, such as outbreaks involving two or more people.

To get a truer picture of the safety of seafood, FDA's Center for Food Safety and Applied Nutrition, in cooperation with CDC, did a risk assessment study. It showed about one illness per million servings for seafood when raw or partially cooked molluscan shellfish (mussels, scallops, clams and oysters) were excluded from the calculations. (In comparison, the risk assessment for chicken is about one illness for every 25,000 servings.)

Beware Raw Mollusks

Now add raw mollusks to the statistical stew and, as Hamlet said: "Ay, there's the rub." According to the FDA risk assessment, the chance of illness for seafood overall with the raw shellfish jumps to something like 1 in 250,000 servings. That's still 10 times safer than eating chicken, but the agency figures that those raw oysters, clams and mussels—so savored by gourmets—account for a whopping 85 percent of all the illnesses caused by eating seafood.

Mollusks are troublemakers because most cannot move and have to feed by filtering water through their systems, pulling out nutrients in the process. In so doing, they also can pick up and store harmful bacteria and viruses that can cause a string of illnesses. When people eat these pathogen-packed shellfish raw they ingest the viruses and bacteria.

Or, as Anthony Guarino, director of FDA's fishery research branch on Dauphin Island, Ala., asks: "What other animal do we eat, digestive tract and all, without cooking it first?"

These mollusks have long been consumed raw by humans, and no doubt they have made people ill throughout history. However, the threat they pose today may be greater because of increased pollution of the waters in which they live. Mollusks are usually found in estuaries, which is where rivers and seas meet. And estuaries these days are more likely to be closer to cities and thus more apt to be polluted than offshore waters.

FDA's risk assessment study concluded that 1 out of every 1,000 to 2,000 servings of raw mollusks is likely to make someone ill. For that reason, these shelled creatures could stand a little *more* press attention. Not enough people realize the danger in eating them uncooked, particularly when they are taken from contaminated warmer waters or held and shipped without adequate refrigeration. The warmer the temperature, the quicker the bacteria multiply.

Two states—Louisiana and California—now require warning notices about eating raw shellfish at places where they are sold. In Louisiana, the following notice is required:

WARNING

Raw oysters, raw clams, and raw mussels can cause serious illness in persons with liver, stomach, blood or immune disorders.

The California notice requires a similar tag on the sack or container of oysters from the Gulf of Mexico. The message is much the same. That state specifies that retail establishments must display the notice in signs, menu warnings, table tents, or "other visible warnings at point of sale . . . ."

Oysters taken from the Gulf of Mexico, particularly from March through October, may contain a naturally occurring pathogen called *Vibrio vulnificus*, which is particularly pernicious to persons with liver disease, such as heavy drinkers. Cancer patients, people with iron metabolism disorders, and those with weakened immune systems (such as AIDS victims) may also be vulnerable. The risks are high. The fatality rate for at-risk individuals who become infected is more than 50 percent, with death usually occurring within two days.

(For more on *Vibrio vulnificus*, see "Fewer Months 'R' Safe for Eating Raw Gulf Oysters" in the June 1988 *FDA Consumer*.)

While raw or undercooked shellfish continues to pose problems, the fact that, overall, seafood is a safe and nutritious part of the diet means that it's likely Americans will continue to put more seafood on their forks in the coming years. Indeed, the National Fisheries Institute, a trade organization, has set a goal of 20 pounds per citizen by the year 2000. Seafood consumption in 1989 was figured at 15.9 pounds per person, not including recreationally caught fish (which adds another 3 to 4 pounds per person). That was an increase in consumption of commercially caught fish of 25 percent since 1980. These increases occurred while beef and pork consumption declined (poultry eating also gained). All of which probably reflects health concerns of consumers.

FDA Steps Up Programs

Reflecting this growing preference for fish, FDA has stepped up its programs to ensure the safety of seafood. Last March, the Office of Seafood was created within the agency's Center for Food Safety and Applied Nutrition to strengthen the agency's domestic and imported seafood programs. The office will reinforce the agency's mandate to conduct enforcement, research, educational, and training activities on seafood. Creation of the new office was announced in a *Federal Register* notice published Feb. 26, 1991. Na-

FDA inspector Al Canarras checks the temperature of clams being shucked in a seafood warehouse in Baltimore, Md.

tion wide, FDA presently has some 300 people engaged in various seafood safety programs. An additional 270 scientific and inspectional staff positions will be added to the program over the next two years. Congress has authorized approximately $9.5 million for 122 new positions for seafood programs in the current fiscal year, and FDA has requested another $15 million for 150 more positions for the 1992 fiscal year beginning Oct. 1.

The responsibilities of the new Office of Seafood include:

- overseeing seafood inspection programs undertaken by FDA in cooperation with other federal and state agencies
- researching and testing methods to detect and evaluate the effects of chemical and microbial contaminants that may present public health hazards in fish caught in the ocean and coastal waters, and in seafood products developed through aquaculture
- developing methods to identify economic fraud
- administering the National Shellfish Sanitation Program, which works to maintain the safety of shellfish
- evaluating the effectiveness of the agency's seafood initiatives
- participating in programs to increase industry awareness of FDA seafood regulations and enforcement programs
- overseeing the development of training programs in seafood safety for FDA, state and local inspectors. This would result, in part, in upping the number of FDA shellfish specialists from 12 to more than 50.

Together with the states, FDA is developing a program to more comprehensively monitor waters from which fish and shellfish are taken, and, in March, FDA announced that it had launched a special inspection of the nation's seafood processing plants and other seafood establishments and has begun the first of several pilot programs aimed at further ensuring the safety and quality of seafood through surveillance from ship to final sale.

FDA plans to complete its special inspection of all seafood establishments listed with the agency within the year to get a picture of the state of current seafood handling and any new or generalized problems in the various parts of the industry.

The new pilot program is a cooperative effort with the National Marine Fisheries Service (NMFS) of the Department of Commerce. It applies the techniques of identifying and controlling critical processing points (a system called Hazard Analysis Critical Control Point methods), which FDA has already applied with great success to the canning industry.

FDA also is strengthening its work with the coastal states and NMFS, aimed at making criminal cases against "shellfish bootleggers," who harvest and sell shellfish illegally from contaminated waters.

In announcing the inspection program, Assistant Secretary for Health James O. Mason, M.D., explained, "These new programs do not mean that fish are not safe food. What these new programs do mean is that FDA is enhancing its seafood inspection program to keep up with this increasingly important part of the American diet."

Mason said the Institute of Medicine backed the kind of regulation FDA and NMFS are trying in their pilot program with eight seafood processors—with representative facilities producing fin fish, crab, surimi (fish processed to taste like lobster or other shellfish), and other specialty products.

In these plants, what are known as "critical control points" have been identified. These are points in the process where problems can arise. The firms will monitor and record data at each of these points for review and inspection.

Mason said participating firms will eventually have a special seal with which to label their products—and it will be up to consumers to demand the new system when they buy.

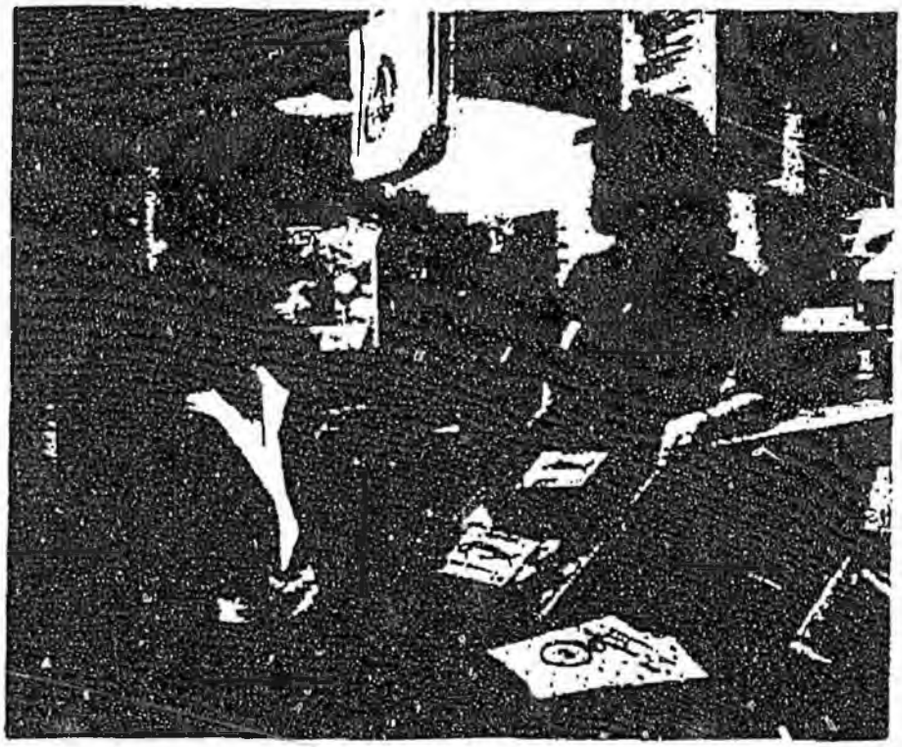
Pilot projects are also planned soon to bring Hazard Analysis Critical Control Point principles to shellfish, as well as imports and retail operations.

The stepped-up programs also include more oversight of imported fish products (more than half of the fish Americans consume is imported) and of the fast-growing aquaculture industry. (Some 360 million pounds of catfish alone were grown on U.S. "fish farms" in 1990.)

Other Seafood Sicknesses

In addition to molluscan shellfish, the other popular raw fish dish, sushi, may also present dangers to the diner. Larvae of parasites—including roundworms, tapeworms, flukes, and flatworms—can end up in the meat of fish. Symptoms are usually mild and temporary, but in a few cases severe abdominal pain can result. If you want to eat sushi, find out if the fish was previously frozen, as freezing kills the larvae. Consumers should not prepare sushi at home.

More common among the seafood maladies are illnesses traced to the Norwalk



Amy Watkins buys marlin and mahi-mahi from Damye Hahn, manager of a seafood market in Baltimore, Md.

virus and the naturally occurring scombroid and ciguatera poisonings. While *Vibrio vulnificus* is the No. 1 killer among seafood pathogens in immune-compromised individuals, the Norwalk virus causes most *illnesses* that result from eating molluscan shellfish.

Gastroenteritis (inflammation of the stomach and intestines) is the characteristic symptom of the Norwalk virus infection. The virus comes from fecal contamination of waters where the mollusks live. Those polluted waters are the ones that authorities try to detect and close down to harvesters. However, some watermen may work the areas anyway and offer their "bootlegged" products to the public.

Human sewage can also contain bacteria that cause cholera and other illnesses, and mollusks can pick up those microbes. While cholera has been all but wiped out in waters around more developed countries, it is almost a constant in some Third World areas and has been a particular problem for some South American countries this year.

Yet another legacy of untreated sewage that finds its way into shellfish is the virus that causes hepatitis A. The symptoms are relatively mild, but some people can be left with severe liver damage.

Two other diseases that can result from consuming shellfish—even if well cooked—are paralytic shellfish poisoning (PSP) and neurotoxic shellfish poisoning (NSP). Both are caused by naturally occurring toxins. PSP can be fatal but both it and NSP are extremely rare, thanks to excellent monitoring programs. Symptoms can appear within 30 minutes of ingestion; they include tingling, numbness or burning sensations in the lips, gums, tongue, and face. NSP is similar to PSP but milder. Symptoms include tingling in the extremities, vomiting and diarrhea.

Both NSP and PSP occur in humans after they've eaten mollusks that have fed in some "bloomed" waters. These blooms, more commonly known as "red tides," contain plankton (dinoflagellates) in such numbers as to discolor the water. The plankton aren't toxic to the shellfish, but may be dangerous to humans. Not all "blooms" contain toxic dinoflagellates, but when they do the shellfish may be carrying the plankton several days before the water changes color.

A few species of fin fish can also be the source of illness even if thoroughly cooked. Dinoflagellates can also cause ciguatera poisoning, although the plankton doesn't need to be present in such numbers as to add hues to the water. Found mostly in warmer waters, the toxic plankton moves up the food chain to predatory reef fish, notably groupers, snappers, barracuda, and Spanish mackerel. Ciguatera causes an estimated 30 percent of all fin fish-borne food poisonings in the United States, some 3,000 cases annually. Most cases occur in Hawaii, Guam, Puerto Rico, and the Virgin Islands. Many cases occur when sports fishermen sell their catch to restaurants; commercial fishermen avoid such reefs.

Symptoms are called "moderately severe," affecting both the gastrointestinal and neurological systems. The symptoms, which can occur almost immediately, include diarrhea, nausea, vomiting, chills, and sweating.

FDA hopes to test a kit that could detect ciguatera contamination this year.

Scombroid poisoning is usually associated with tuna, bluefish and mahi-mahi (dolphin fish). These fish naturally contain high levels of histamine, which is released as the fish decompose. The disease runs its course, and the usually mild symptoms include nausea, vomiting, diarrhea, rash, and tingling and burning sensations around the mouth.

Sports Fishing

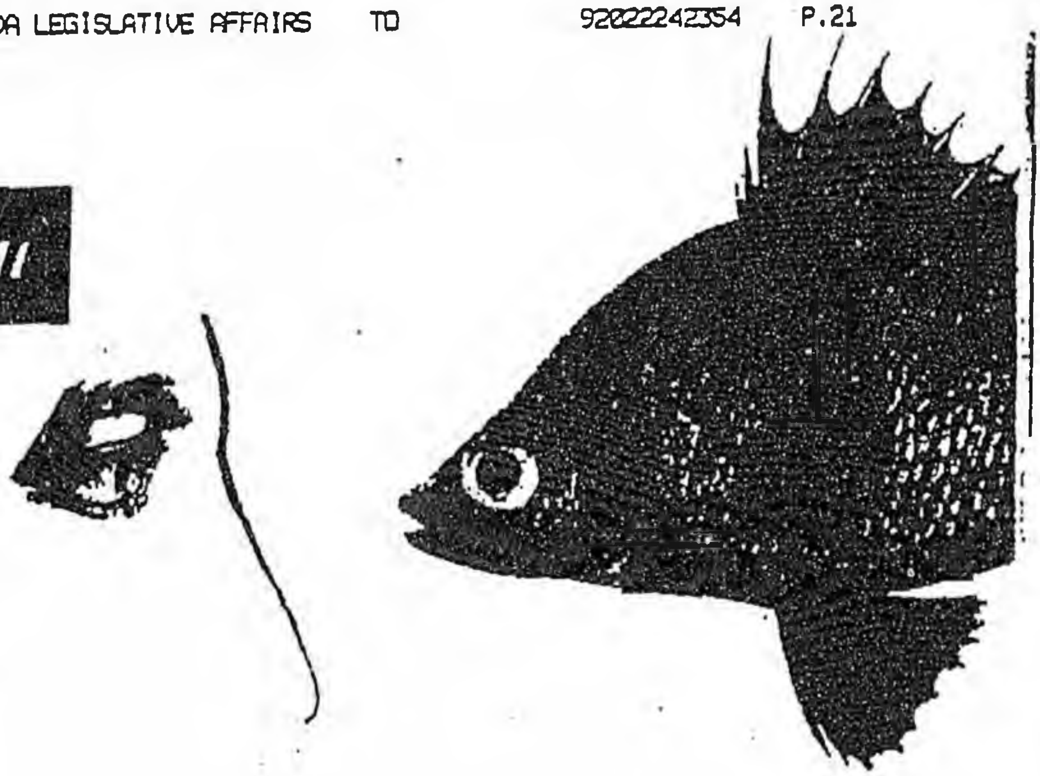
Ciguatera and scombroid poisonings point up another area of concern for health officials—recreational fishing. It's estimated that people casting lines in water and digging clams along the seashore may add 3 to 4 pounds to the nearly 16 pounds of seafood that each American, on average, consumes each year. The reef fish associated with ciguatera are prized by sport fishers, as are the scombroid-susceptible bluefish and, to a lesser extent, tuna.

State health officials often issue advisories to warn anglers of the poisoning possibilities in the fish they catch and to caution them against trying to sell such disease-prone fish to vendors or the public.

Sport fishers also need to be careful about doing their thing in waters contaminated by chemicals and metals. These contaminants may include pesticides (such as DDT and dioxin), mercury, and PCBs (polychlorinated biphenyls). The latter were widely used in the past as insulators in transformers and were generously dumped into any convenient body of water after use.

Mercury (or, more correctly, the form known as methylmercury) and PCBs are the main pollution problems. Both can

The Eyes Have It



You literally have to look a fish in the eye to tell whether it's fresh. The eyes should be clear and bulge a little. Only a few fish, such as walleye pike, have naturally cloudy eyes.

Look for firm and shiny flesh in either whole fish or fillets. Press the fish with a finger, and if it leaves an indentation, it's not the freshest. Dull flesh may also mean that the fish is old.

Make certain there is no darkening around the edges of the fish or brown or yellowish discoloration, especially if these areas appear dry and mushy.

If you're still uncertain about how fresh the fish is, ask to have it rinsed under cold water and then smell it. Fresh fish should have no fishy or ammonia smell.

The shells of hard clams, mussels or oysters should be closed, or should close when their shells are tapped. The necks of steamer clams should twitch when their shells are tapped. Crabs should move when touched. Lobsters' tails should curl under their bodies when (carefully) picked up.

When buying frozen fish, select packages that are not open, torn, or crushed on the edges. Avoid packages that are above the frost line in the store's freezer.

If the package has a transparent cover, look for signs of frost or ice crystals, for the crystals could mean that the fish has either been stored for a long period or thawed and refrozen. Nor should there be evidence of drying out, such as white or dark spots, discoloration, or fading of red or pink flesh.

One other point: Don't buy cooked seafood such as shrimp, crabs or smoked fish if they're displayed in the same case as raw fish. They're good candidates for cross-contamination—and a bellyache.

—*R.M.*

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cause birth defects, and both have been the subject of numerous advisories to anglers. (Swordfish are particularly known for accumulating methylmercury, and consumption of that fish on a regular basis may not be advisable for women who are pregnant or likely to become pregnant.)

In its recent report, the National Academy of Sciences concluded that "only a small portion of seafood is contaminated with appreciable concentrations . . ." of chemicals. But the academy cautioned that the area had not been studied well enough, and it called for better efforts to alert fishermen and the rest of the public about contaminated waters.

What Consumers Can Do

While FDA is working to ensure that the seafood sold to the public is safe, consumers themselves can do a lot to make sure that their seafood doesn't cause illness. Indeed, it is estimated that as much as half of all seafood problems could be eliminated by better handling and preparation in the home and in restaurants and other food service establishments. Two accompanying articles give tips on how to select and store seafood.

As to seafood preparation, the household chef can't go wrong by following good sanitation practices, such as washing hands thoroughly before starting to prepare a meal and after handling foods—such as meat and fish—that contain bacteria, keeping equipment such as knives and cutting boards clean, and keeping hot foods hot and cold foods cold. (For more on safe food preparation, see "The Unwelcome Dinner Guest: Preventing Food-Borne Illness" in the January-February 1991 *FDA Consumer*.)

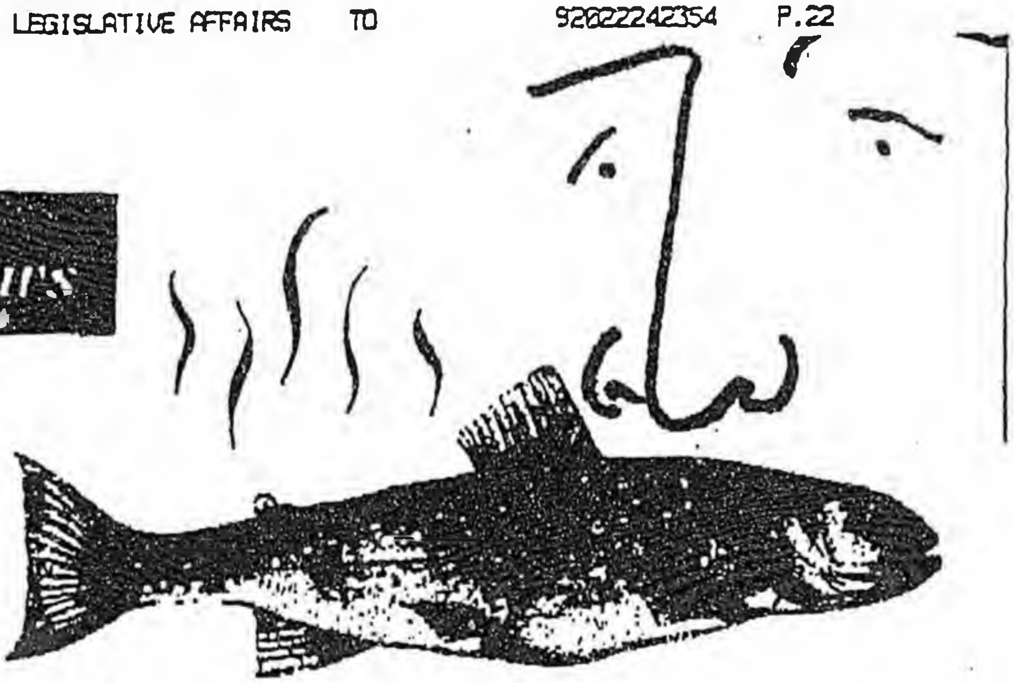
Sufficient cooking is most important of all when it comes to seafood safety. Fish is done when it is no longer translucent, when it flakes easily with a fork. Oysters and clams should be placed in boiling water, and then cooked for four to six minutes after the water begins to boil again, or steamed for six to eight minutes. Virtually all bacteria and other harmful agents will be killed with proper cooking.

Seafood lovers who can't live without raw shellfish would be wise to limit their consumption to the cold weather months, when the mollusks are less likely to be carrying disease-causing organisms. Always buy from a reputable dealer. Roadside stands that offer low prices may be offering "bootleg" shellfish—that is, shellfish taken from off-limit (polluted) waters. Shellfish shippers have to meet federal standards and are certified by state shellfish control authorities.

So what's the bottom line on eating seafood? For the most part, seafood is wholesome, nutritious, easy to prepare and digest, best eaten when fully cooked—and safe.

Roger W. Miller is a writer in Chevy Chase, Md., and a former editor of FDA Consumer.

The Nose Knows



Ben Franklin said that "fish and house guests begin to smell after three days." He should have said two days, at least for fish, for it's unwise to keep unfrozen fish for more than two days. In fact, fresh fish that is subject to scombroid poisoning, such as tuna, bluefish and mahi-mahi, should be used within 24 hours of purchase.

Some other points that Ben may not have mentioned:

• Refrigerate fish at home as soon as possible and keep the fish at 32 to 37 degrees Fahrenheit.

• Before refrigerating, remove the fish from its package, rinse under cold water, and pat dry with paper towels. To keep cleaned fin fish more than 24 hours, place the fish on a cake rack in a pan, fill the pan with crushed ice, and cover tightly with plastic wrap or foil. Rinse the fish daily, cleaning the rack and changing the ice.

• Throw out fish with a strong fishy or ammonia smell.

• If you intend to keep the fish more than two days, freeze it immediately after it's been caught or purchased. Rinse it under cold water and pat very dry with paper towels. Wrap tightly in plastic and then in aluminum foil before putting it in the freezer. Plan on using the fish as soon as possible for best quality.

• Always thaw frozen fish and seafood in the refrigerator.

• Store live oysters, clams and mussels in the refrigerator. Keep damp by covering with a clean, damp cloth or moist paper towel, but do not place on ice or allow fresh water to come in contact with them. Never place in an airtight container because it will kill them.

• Keep freshly shucked oysters, scallops or clams in their shells and store in the coldest part of the refrigerator, preferably surrounding the package with ice.

• Store live lobsters and crabs in the refrigerator in moist packages (use seaweed or damp paper strips), but not in airtight containers, fresh water, or salt water. Lobsters should remain alive for about 24 hours.

• Take towels and washcloths away from house guests after two days. Maybe they'll get the hint.

—*R.M.*

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Consumers Union

Publisher of Consumer Reports

NEWS

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FOR RELEASE: January 16, 1992

CONSUMER REPORTS INVESTIGATION FINDS MUCH FISH UNFIT TO EAT

YONKERS, N.Y., January 16 -- For health reasons, Americans are eating more and more fish -- but how good is the fish we're buying? *Consumer Reports* found that much of the fish sold today is barely fit to eat.

Results of a six-month investigation, appearing in the February issue, on sale January 28th, raise questions about the quality, wholesomeness, safety, and even the identity of the fish consumers are eating.

Almost 30% of the fish tested by *Consumer Reports* was already spoiled and another 9% was on the verge of spoiling. Nearly half was contaminated by fecal bacteria from human or animal wastes. Some species were contaminated by PCBs and mercury, which can pose health hazards.

Fish is one of the most perishable of all foods. Bacteria are the main culprits in the spoilage process. Most fish have a shelf life of seven to 12 days at best when they are out of water. But the fish that reaches your dinner table may have been out as long as 15 days.

Ideally, fish should be kept between 30 and 32 F for optimum shelf life and quality. Because time and temperature are so crucial in maintaining quality, the maxim in the industry is: "Keep it cold, keep it clean, keep it moving." However, *Consumer Reports* found ample evidence that the people handling fish are not keeping it cold enough -- or clean enough.

Fish quality can deteriorate anywhere in the distribution chain -- on the fishing boat, in the processing plant, on the loading dock, at the wholesaler, in the supermarket, on the way home, or in the kitchen. "It is retail store practices that put fish quality most at risk," notes Trudy Lieberman, a *Consumer Reports* Senior Editor. "Too long a storage time, high temperatures, lack of cleanliness and good sanitary habits by handlers -- all compromise the freshness and flavor of the fish we eat."

A general indicator of quality is the number of bacteria on the surface of a fish at any given time. Good-quality fish usually have bacteria counts lower than 500,000 colonies per gram. Almost 40% of the fish tested by *Consumer Reports* had counts between 1 million and 10 million colonies per gram.

-- more --

Consumer Reports Article

101 Truma

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When bacteria counts hit 10 million or more, fish should be headed for the grave instead of the dinner plate. Yet bacteria counts exceeded 10 million in nearly 30% of the fish purchased. And for nearly 25% of the samples, the counts exceeded 27 million colonies per gram, the upper limit of the test.

The bacteria found on the fish included fecal coliforms, an indicator that disease-causing bacteria may be present. The fecal coliforms indicate poor sanitary practices during processing or distribution, or where the fish were displayed for sale. Coliform counts of over 10 per gram indicate some contamination -- and 44% of *Consumer Reports* fish samples exceeded that level. And 22% had more than 100 coliforms per gram, of which 15% exceeded 500 -- levels that are cause for serious concern.

Fish also absorb potentially harmful substances that pollute oceans, lakes, and rivers. Polychlorinated biphenyls (PCBs) -- potential carcinogenic and reproductive hazards -- were found in 43% of the salmon tested, 25% of the swordfish, and 50% of the lake whitefish. Mercury, which can harm the nervous system, was found at significant levels in 90% of the swordfish. Some samples of catfish, lake whitefish, and swordfish contained residues of DDT and other banned pesticides, which persist in the environment (and fish) nearly 20 years after their use was outlawed. Only the flounder and sole tested were relatively free of pollutants.

The investigation also found that one-third of the fish samples were mislabeled -- either deliberately or out of ignorance. Misidentified inexpensive fish were sometimes sold at fancy-fish prices. Some merchants refer to the fish in their counters as "fresh" when it has actually been frozen and then thawed for display.

The U.S. Food and Drug Administration, which can seize fish and destroy it if mislabeled, has made only three seizures of misbranded fish in the last three years. And although the federal government inspects all beef and poultry plants, there is currently no mandatory federal inspection of seafood. State and local health departments play the major role in monitoring the nation's fish markets. But lack of money and indifferent enforcement have allowed problems at the retail outlets to persist.

Consumer Reports recommends that inspection programs at all levels be strengthened -- not only for cleanliness and temperature control, but for microbial and chemical contaminants in raw fish. States should consider requiring fish to be kept at temperatures lower than those now permitted. That would go a long way to improving quality.

CONSUMER REPORTS GUIDELINES FOR BUYING, COOKING, AND EATING FISH

* Think twice before you eat fish raw. Although raw fish may be fashionable at the moment and even taste good, you're taking a risk. Even if you think you know where the fish came from and trust your dealer or restaurateur, you can never be absolutely sure the fish does not harbor parasites or high levels of bacteria.

* Cook fish thoroughly -- until it is opaque and flakes easily with a fork. Overcooking makes it dry. The best way to learn the technique is to practice.

* Pregnant women or women who expect to become pregnant should avoid eating salmon, swordfish, and lake whitefish. These fish may contain polychlorinated biphenyls (PCBs), which can accumulate in the body and pose a risk to the developing fetus. Swordfish and tuna are also major dietary sources of mercury, which may also harm a fetus. Young children, too, should avoid those fish. Catfish, flounder, and sole are safer choices for a mother-to-be.

* Most healthy adults can eat fish with less worry, as long as the choices are varied. Don't eat salmon, swordfish, or lake whitefish more than once a week.

* When buying whole fish, look for bright, clear, bulging eyes. Cloudy, sunken, discolored, or slime-covered eyes often signal fish that is beginning to spoil. The skin of freshly caught fish is covered with a translucent mucus that looks a bit like varnish. The color is vivid and bright. Avoid fish whose skin has begun to discolor, shows depressions, tears, or blemishes, or is covered with sticky yellowish-brown mucus.

* When buying steaks or fillets, look for moist flesh that still has a translucent sheen. Watch out for flesh that's dried out or gaping (the muscle fibers are beginning to pull apart). That's a sign of over-the-hill fish.

* Note how the fish is displayed and look for clues that the temperature may be too high. Fish that are piled high, displayed in open cases, or sitting under hot lights are perfect places for bacteria to grow. If fish fillets are displayed inside separate pans surrounded by ice, that's usually a sign the retailer is paying some attention to quality. Whole fish should be displayed under ice.

* Carefully evaluate store specials and price reductions. Specials may be a way to move older fish. Most retailers would rather reduce the price than throw away fish. A "Saturday-get-rid-of-it special" will be cheap but may not make the tastiest meal.

* Look for evidence that fish has been frozen and then thawed. Note which fish have "fresh" display signs on them. Look for chunks of ice floating in the fish liquid -- a clue that the fish had been frozen. If you're not sure, ask. Although many shelf tags we saw were not honest, some of the clerks we talked to were. There's nothing wrong with frozen fish, but if you unknowingly buy fish that had once been frozen and then you refreeze it, its texture and flavor will suffer. It's probably better to buy frozen fish instead.

* Keep an eye out for pretty displays of cooked seafood sold next to raw fish. They're a potential health hazard, and buying anything from them can be risky.

* Use your nose. Fresh fish smell like the sea, but they have no strong odor. Fresh-water fish in good condition sometimes smell like cucumbers. Strong odors usually indicate spoilage.

* Once you buy fish, refrigerate it quickly. At home, store it in the coldest part of your refrigerator, keep it in the original wrapper, and use it fast -- within a day. If our shopping experience is any guide, a lot of fish has little shelf life left.

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TESTS OF ALL-WEATHER TIRES

FEBRUARY 1992

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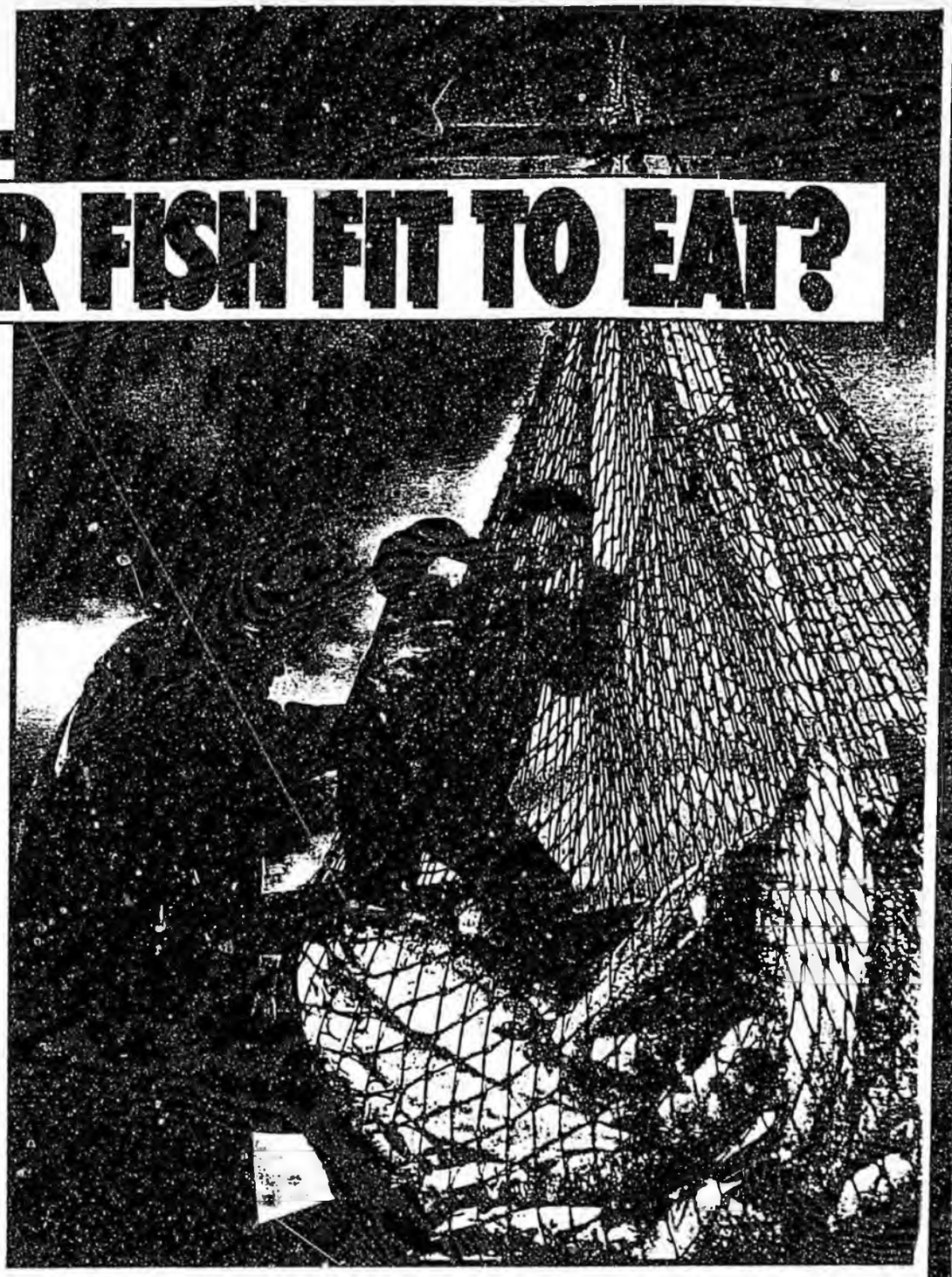
IS OUR FISH FIT TO EAT

IS OUR FISH FIT TO EAT?



A six-month investigation of fresh fish and shellfish raises serious questions about their quality.

Americans are eating more fish. Over the last decade consumption per person in the U.S. has risen nearly 25 percent—from 12½ to 15½ pounds a year. However, a six-month investigation by CU raises questions about the quality, wholesomeness, and, in some cases, the safety of the fish consumers are eating. Almost 40 percent of the fish we sampled was of fair or poor quality, and 30 percent was downright poor.

Nearly half the fish we tested was contaminated by bacteria from human or animal feces, most likely the result of poor sanitation practices at one or more points in the fish-handling process. Some species were contaminated with PCBs and mercury, which can pose health hazards to certain people (see What Else Is in Fish?, page 112).

We also found that many retailers were engaging in deceptive selling practices. Some merchants refer to the fish in their counters as "fresh" when it has actually been frozen and then thawed for display. Others mislabel the species of their fish, either deliberately or out of ignorance. As a result, consumers end up eating some fish other than the one they thought they had purchased, usually paying more than they should have. One-third of our fish samples were mislabeled.

To check for fish quality and chemical contamination, we bought seven popular and readily available species—salmon, flounder, sole, catfish, swordfish, lake whitefish, and clams—from supermarkets and fish stores in New York City, Chicago, and their suburbs. Except for clams, which were in their shells, we always purchased steaks and fillets, the cuts most people buy.

Our reporter, a CU shopper, and an expert on fish quality visited stores, observed display counters, and purchased samples. We bought whatever fish on our list the store had available; we did not search out fish of obvious poor quality.

We shipped our 113 samples in refrigerated containers by overnight delivery to a contract laboratory. The samples were all in their original store wrappings when they arrived at the lab.

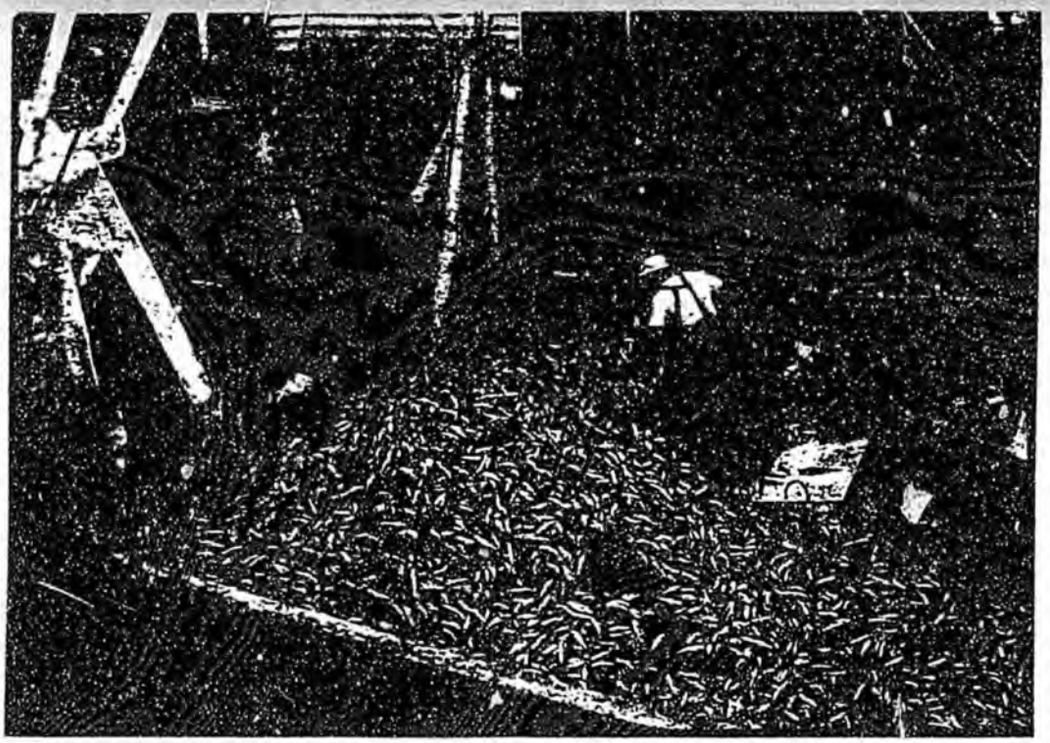
To check the accuracy of package labeling, we bought a different set of samples in metropolitan New York, metropolitan Chicago, and in the San Francisco-Santa Cruz area of California. A report on those results begins on page 116.

How good fish goes bad

Fish is one of the most perishable of all foods. Bacteria are the main culprits in the spoilage process, although natural enzymes that break down the flesh of dead fish and oxygen in the air do their part, too. When ocean fish begins to spoil, it produces a compound called trimethylamine, which causes the "fishy" odor that people associate with bad fish. Fresh fish has virtually no odor.

Time and temperature are the enemies of freshness and flavor. Bacteria multiply rapidly when fish are out of water too long or are stored at temperatures that are too high. Since fish are cold-blooded and live in cold environments, many kinds of bacteria that live on them also thrive at colder temperatures. As a result, those bacteria are quite comfortable at temperatures found in

Net worth
The U.S. fishing industry hauls in about 9.4 billion pounds of fish each year, worth roughly $3.5-billion. More than half the catch goes for human consumption, the rest for pet food and industrial products.



From sea to supermarket Fish endure a long journey before reaching your dinner table. Many spend several days on a fishing boat before they go to a processing plant. There they are cleaned and often cut into fillets. From the processor, they travel in refrigerated trucks or by airplane to retail stores around the country. Elapsed time: as many as 15 days.

home refrigerators, and many can easily grow there.

Most fish have a shelf life of seven to 12 days at best once they are out of water. But the fish that reaches your dinner table may have been out as long as 15 days. A fish may remain on a boat for five or six days after capture. It may spend another day or two at a processor or a wholesaler and in transit to a retailer. It may then wait in a retailer's display case for several more days until you come along and buy it.

If fish gets too warm at any stage, it will deteriorate even faster. Ideally, fish should be kept between 30° and 32°F for optimum shelf life and quality. Enduring a 34° temperature even for one day will cost a fish one day of its shelf life; 36°, two days; and so on. In general, for every 10-degree increase in temperature above 32°, anywhere along the way, shelf life is cut in half.

Fatty fish, such as herring and mackerel, have a shorter shelf life than, say, cod or halibut, which are leaner. (Oxygen attacks the fatty tissues and causes rancidity.) And fish caught in colder waters will remain fresh for a shorter time than those from tropical waters. (Bacteria on warm-water fish don't reproduce as fast at refrigerator temperatures.)

Because time and temperature are so crucial in maintaining quality, the maxim in the industry is "Keep it cold, keep it clean, keep it moving." However, we found ample evidence that the people handling fish are not keeping it cold enough or clean enough.

Bacteria by the million

A general indicator of fish quality is the "aerobic plate count," a measure of the number of bacteria on the surface of a fish at any given time. Good-quality fish usually have bacteria counts lower than 500,000 colonies per gram. But even that is no guarantee of quality. Two of our samples with relatively low counts nevertheless smelled putrid, indicating advanced spoilage. Retailers in those instances may have washed the fish before we bought it, rinsing away surface bacteria and disguising the actual condition of the fish.

Many of our "good" samples had been frozen and were slowly thawing in the grocer's display case. Freezing retards bacteria growth, but once the retailer thaws it, the fish will suffer the same deterioration as fish that have never been frozen.

Though bacteria counts higher than 500,000 indicate deteriorating quality, fish truly begin to spoil when bacteria grow to between 1 million and 10 million colonies per gram. Almost 40 percent of the fish we tested had counts within that range, most likely because it had been stored too long or kept at temperatures that were too high.

Three clam samples bought from premier seafood sellers in Chicago and one from a New Jersey supermarket contained more than 1.6 million bacteria colonies per gram. Shellfish containing more than 1.5 million colonies per gram set off alarm bells at state agencies that monitor shellfish safety. Those agencies then monitor future shipments from that source.

When bacteria counts hit 10 million or more, fish should be headed for the grave instead of the dinner plate. Yet bacteria counts exceeded 10 million in nearly 30 percent of the fish we purchased. And for nearly 25 percent of our samples, including most of the catfish, the counts exceeded the upper limits of our test method, 27 million colonies per gram.

A total aerobic plate count doesn't indicate what types of bacteria are present. We checked our samples for coliform and fecal coliform bacteria, common types that can indicate the presence of harmful organisms. Coliform bacteria are generally found in the intestinal tracts of humans and other warm-blooded animals.

Fecal coliforms can include disease-causing organisms, such as some strains of *E. coli*, which produce severe diarrhea. In general, the higher the level of fecal coliforms, the higher the probability that harm-

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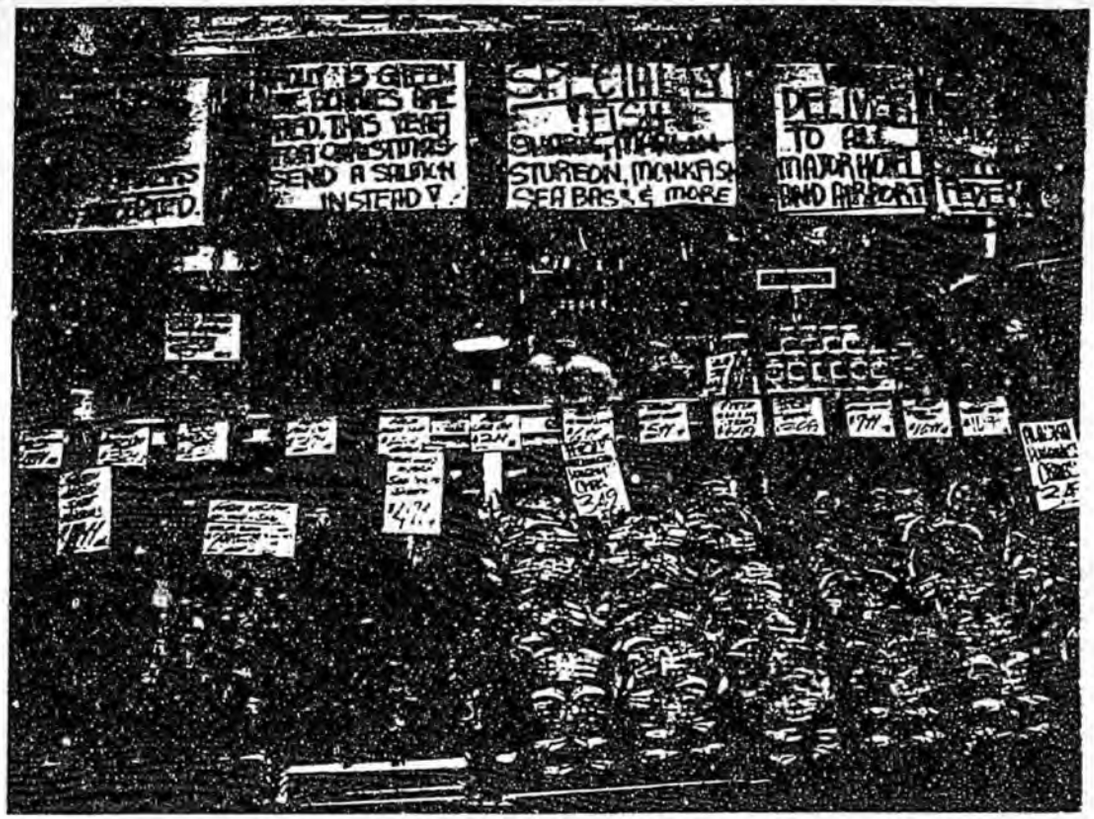


ful organisms are present.

Shellfish might pick up fecal coliform bacteria if they are harvested from polluted waters, but fecal coliforms are not normally found on finfish when they are caught. So any that show up were most likely introduced as the result of poor sanitary practices during processing or distribution, or when the fish were displayed for sale.

According to experts in seafood microbiology, a fecal coliform count greater than 10 per gram indicates some contamination. Counts over 100 are cause for serious concern because they indicate something more than ordinary environmental contamination.

A disturbingly high percentage of our samples—44 percent—contained more than 10 fecal coliforms per gram. More than half of our New York samples contained 10 or more fecal coliforms. One-third of the Chicago samples did.

Twenty-two percent of our samples had fecal coliform counts that exceeded 100 per gram, and 15 percent had counts greater than 500. Most of the latter came from stores in the New York area.

The Federal government sets no standards for the number of fecal coliforms permissible in raw finfish. But for shellfish, which may become contaminated as living organisms, and often are eaten raw, the Interstate Shellfish Sanitation Conference draws the line at 330 fecal coliforms per hundred grams, or 3.3 per gram. When shellfish has counts that high, health agencies can order further tests to determine whether they should be destroyed. (The Interstate Shellfish Sanitation Conference is a group of officials from states that ship and receive shellfish. The group develops model regulations for states to use in monitoring shellfish safety.)

Despite those efforts, eight of our 21 samples of clams, or 38 percent, contained fecal coliforms far exceeding the standard of 3.3 per gram. Counts for five of the eight were more than 10 times higher than the regulatory limit.

Will you get sick?

Spoiling fish smells and tastes bad. But thorough cooking kills the bacteria, along with the parasites that sometimes inhabit raw fish. So, thoroughly cooked fish, even though spoiled, probably won't make you sick. One exception is red-muscled fish, such as tuna, which produce toxins that can cause histamine poisoning in some people; heat will not destroy those toxins.

But if you eat uncooked or partially cooked fish, such as raw shellfish, sushi, or [illegible] lightly seared fish steaks that are in vogue at many restaurants, you may be putting yourself at risk.

The bacteria or organisms from fish can also make you sick if they get on food that is already cooked or on food that needs no cooking. Such "cross-contamination" can occur in your kitchen if you chop other foods on a cutting board where raw fish was sitting, or at the supermarket where cooked seafood salads are often displayed right next to raw fish (see page 107).

The Centers for Disease Control (CDC) says that from 1978 to 1987, fish and shellfish caused 3.6 percent of all reported cases of food-borne illness and 10.5 percent of all outbreaks. (An outbreak usually consists of two or more people getting sick from the same apparent cause around the same time.)

Those numbers, however, may not adequately describe the size of the problem. "The CDC data greatly underrepresent the actual total of seafood-borne illness and are skewed toward the highly visible, readily identifiable syndromes such as those associated with toxins," says Dr. John Liston, professor emeritus at the University of Washington's Institute for Food Science and Technology.

Indeed, most of the cases reported to the CDC were caused by shellfish or by naturally occurring toxins in red-muscled fish and in fish that live in tropical reefs, such as snapper.

"For finfish, it's amazing how little has been reported," says Dr. Sanford Miller, dean of the Graduate School of Biomedical Sciences at the University of Texas Health Science Center. "If someone gets a stomach ache, they don't associate it with the catfish they ate last night."

The road to ruin

Fish can, of course, get too warm or become contaminated anywhere in the distribution chain—on the fishing boat, in the processing plant, on the loading dock, at the wholesaler,

Favorite fish
The seafoods Americans eat most:

1. Tuna
2. Shrimp
3. Cod
4. Alaska pollock
5. Salmon
6. Catfish
7. Clams
8. Flounder/sole
9. Scallops
10. Crabmeat

Source: U.S. Dept. of Commerce

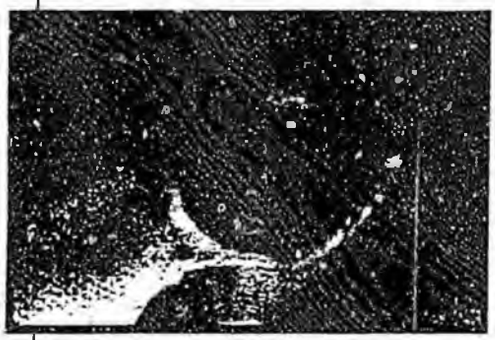
Photo above by Joel Gordon

BUYING FRESH FISH

HOW TO PROTECT YOURSELF

These pages tell a sorry tale of an excellent high-protein, low-fat food degraded not only by sloppy handling in the distribution chain, but by environmental pollution. The sloppy handing results in high bacteria counts. The pollution (as detailed in What Else Is in Fish?, page 112) results in worrisome levels of hazardous chemicals and heavy metals.

What can you do? For pregnant women or women who expect to become pregnant, there's little choice but to avoid many popular types of fish. Salmon, swordfish, and lake whitefish may well contain polychlorinated biphenyls (PCBs), which can accumulate in the body to the point where they pose a risk to the developing fetus. Swordfish and tuna too often expose women to mercury, which could also harm a fetus. Young children, too, should avoid those fish.



Clued to the gills When buying whole fish, look for gills that are bright red and moist. Don't buy if the gills are clumped together, brown, or covered with mucus.

People in these high-risk groups can still enjoy such species as flounder, sole, and catfish. Other people can pretty much eat what fish they like, but prudence would suggest varying the fish diet to no more than one portion a week of a food likely to contain PCBs or one likely to be high in mercury.

For most people, the biggest challenge will be finding fish that is both fresh and clean—and then cooking it properly. Here are some guidelines:

- When buying whole fish, look for bright, clear, bulging eyes. Cloudy, sunken, discolored, or slime-covered eyes often signal fish that is beginning to spoil.

The skin of freshly caught fish is covered with a translucent mucus that looks a bit like varnish. The color is vivid and bright. Avoid fish whose skin has begun to discolor, shows depressions, tears, or blemishes, or is covered with sticky yellowish-brown mucus.

- When buying steaks or fillets, look for moist flesh that still has a translucent sheen. Watch out for flesh that's dried out or gaping (the muscle fibers are beginning to pull apart). That's a sign of over-the-hill fish.
- Note how the fish is displayed and look for clues that the temperature may be too high. Fish that are piled high, displayed in open cases, or sitting under hot lights are perfect places for bacteria to grow. If fish fillets are displayed inside separate pans surrounded by ice, that's usually a sign the retailer is paying some attention to quality. Whole fish should be displayed under ice.
- Carefully evaluate store specials and price reductions. Specials may be a way to move older fish. Most retailers would rather reduce the price than throw away fish. A "Saturday-get-rid-of-it special" will be cheap but may not make the tastiest meal.
- Look for evidence that fish has been frozen and then thawed. Note which fish have "fresh" display signs on them. Look for chunks of ice floating in the fish liquid—a clue that the fish had been frozen. If you're not sure, ask. Although many shelf tags we saw were not honest, some of the clerks we talked to were.

There's nothing wrong with frozen fish, but if you unknowingly buy fish that had once been frozen and then you refreeze it, its texture and flavor will suffer. It's probably better to buy frozen fish instead.

- Keep an eye out for pretty displays of cooked seafood sold next to raw fish. They're a potential health hazard, and buying anything from them can be risky.
- Use your nose. Fresh fish smell like the sea, but they have no strong odor. Freshwater fish in good condition sometimes smell like cucumbers. Strong odors usually indicate spoilage.
- Once you buy fish, refrigerate it quickly. At home, store it in the coldest part of your refrigerator, keep it in the original wrapper, and use it fast—within a day. If our shopping experience is any guide, a lot of fish has little shelf life left.
- After handling raw fish, be sure to wash all surfaces the fish touched.
- Cook fish thoroughly—just until it is opaque and flakes easily with a fork. Overcooking makes it dry. The best way to learn the technique is to practice.

One last bit of advice: Think twice before you eat fish raw. Although raw fish may be fashionable at the moment and even taste good, you're taking a risk. Even if you think you know where the fish came from and trust your dealer or restaurateur, you can never be absolutely sure the fish does not harbor parasites or high levels of bacteria.

in the supermarket, on the way home, or in the kitchen.

Our reporter observed problems all along the distribution chain. For example, in Montauk, N.Y., she saw squid piled up on a gravel driveway. It had overflowed from the pipeline meant to carry it from the fishing boat to a refrigerated truck. Workers simply shoveled the squid into the truck.

On a hot July day, she observed workers in a processing plant cutting tuna steaks in a room that was obviously too warm. She saw salmon covered with ice taken from dirty ice bins, and salmon waiting in a truck where the refrigeration unit had stopped running.

Such practices obviously do little for fish quality. But it was in retail stores where she most often found practices that put fish quality at risk. Consider the case of catfish.

Our reporter visited processing plants in Mississippi, which supply some 70 percent of the catfish sold in U.S. retail markets. She found the plants clean, modern, and operating under a voluntary inspection program run by the U.S. Department of Commerce.

Workers cutting the fish into nuggets and fillets appeared to follow good manufacturing practices—wearing gloves, hair covers, and aprons, and dipping their hands in a disinfectant whenever they entered the processing room. Furthermore, the catfish was hauled live to the plants from nearby ponds in tank trucks. It was never out of water before it hit the conveyor belt that whisked it to the processing room.

We could not check the bacteria counts on fish leaving the processing plants, but Dr. Gladden Brooks, a food science specialist at Mississippi State University and an adviser to the catfish industry, told our reporter that catfish fillets could be expected to have bacteria counts between 50,000 and 100,000 when they leave the plant. With those counts, he said, the catfish should last seven to eight days.

If that's the case, something went awry on the trip north or after the fillets had reached the supermarket. Most of the catfish we bought was past its prime, with bacteria counts exceeding 27 million. "When you get a count of 2 million, something is terribly wrong," says Brooks.

Part of what is terribly wrong is the temperature to which fish is subjected. Although fish should be stored at temperatures between 30°

and 32°, state health codes allow temperatures in retail display cases as high as 45°. That temperature is sufficient for controlling disease-causing bacteria, but not the bacteria that lead to spoilage. "Storage temperatures are way too high," says Dr. Robert Price, a seafood technologist at the University of California. "We've found them as high as 51°."

Other retail practices allow fish to get too warm. More often than not, we found fillets in display cases piled on top of one another. Those at the top of the heap are, of course, warmer than those sitting on the ice at the bottom.

At a Foodtown store in the New York area, where fish fillets were piled high, bacteria counts were also high. Counts exceeded one million on four samples from that store. Two samples had counts greater than 27 million, and two were contaminated with fecal coliforms exceeding 600 per gram.

At a Dominick's store in the Chicago area, we found swordfish sitting directly under the hot lights illuminating the display case. The clerk said the fish had been on display for two days. The bacteria count proved it. It exceeded 27 million.

It would seem axiomatic that stores selling fresh food must be clean. But cleanliness came up short in many stores we visited. As we approached their seafood counters, fishy odors were commonplace, indicating that either the display cases hadn't been adequately cleaned or the fish was very old.

Last summer, at Rhim's Fish Market, a small specialty fish store in Manhattan, flies buzzed about the fish, and the fly catcher looked as if it hadn't been cleaned in years. The state of the fish matched the state of the store. Flounder and salmon samples that we bought there had fecal coliform counts exceeding 200 per gram.

At a specialty fish store in the New York City borough of Queens, the cutting board smelled bad and looked as if it hadn't been cleaned in recent memory. New York State food laws require retailers to clean their equipment at the end of each day. Swordfish and salmon we sampled from that store had bacteria counts exceeding 1.7 million and fecal coliforms exceeding 600 per gram.

A clerk at a Pathmark store in the metropolitan New York area was cutting shark steaks with a knife covered with fish blood and mucus. When he finished, instead of washing the knife, he stuck it into the ice where other fish were displayed, potentially contaminating them with bacteria from the shark.

Even the most attractive display case may harbor dangerous bacteria. Retailers know that fish must look good if it's going to sell, and one way to make it appetizing is to display it with cooked seafood products, usually salads garnished with lemons and greens.

State food laws prohibit stores from displaying any raw food next to cooked foods because disease-causing organisms from the raw product might be transferred to the cooked. Yet in store after store, we found cooked shrimp and herring, squid, and surimi salads sold next to raw fish fillets and steaks.

At a Lucky store in California, cooked shrimp was actually touching raw salmon steaks. At a Jewel store in the Chicago area, the spoon from the herring in cream sauce was poking the scrod, and cooked shrimp was just about hugging the perch. At another Jewel, the bowl holding the herring salad brushed against the red snapper. At a fish market in Manhattan, squid salad was served from a bowl surrounded by an assortment of raw fish.

Such practices not only violate state health codes but, in many cases, a store's own policy. Wakefern Food Corp., the distribution and merchandising company for ShopRite stores on the East Coast, says it trains store personnel to separate cooked and raw fish. Yet at one ShopRite, our reporter found some over-the-hill flounder residing next to cooked shrimp and a surimi salad.

Getting fresh

In many stores the catch of the day might better be called the catch of the week. Some fish simply had been displayed too long. Many of the fish fillets we saw were tired, dull, dry, and gaping, with none of the translucence characteristic of fresh fish. In Chicago, for example, the fresh tuna sold in several supermarkets was greenish-brown and dull, suggesting the fish had been sitting around for several days.

One Thursday, at a Dominick's store in metropolitan Chicago, we bought Dover sole that the clerk said had come in on Monday. The "pull date" on the package noted it could be sold until Saturday. When we bought it, the quality had already vanished. Its total plate count approached 8 million.

At an Omni Superstore in Prospect Heights, Ill., we tried to buy lake whitefish, but the clerk dissuaded us. "You wouldn't be happy with it," he said. So why was it in the case? "It's just filling space in the display," he

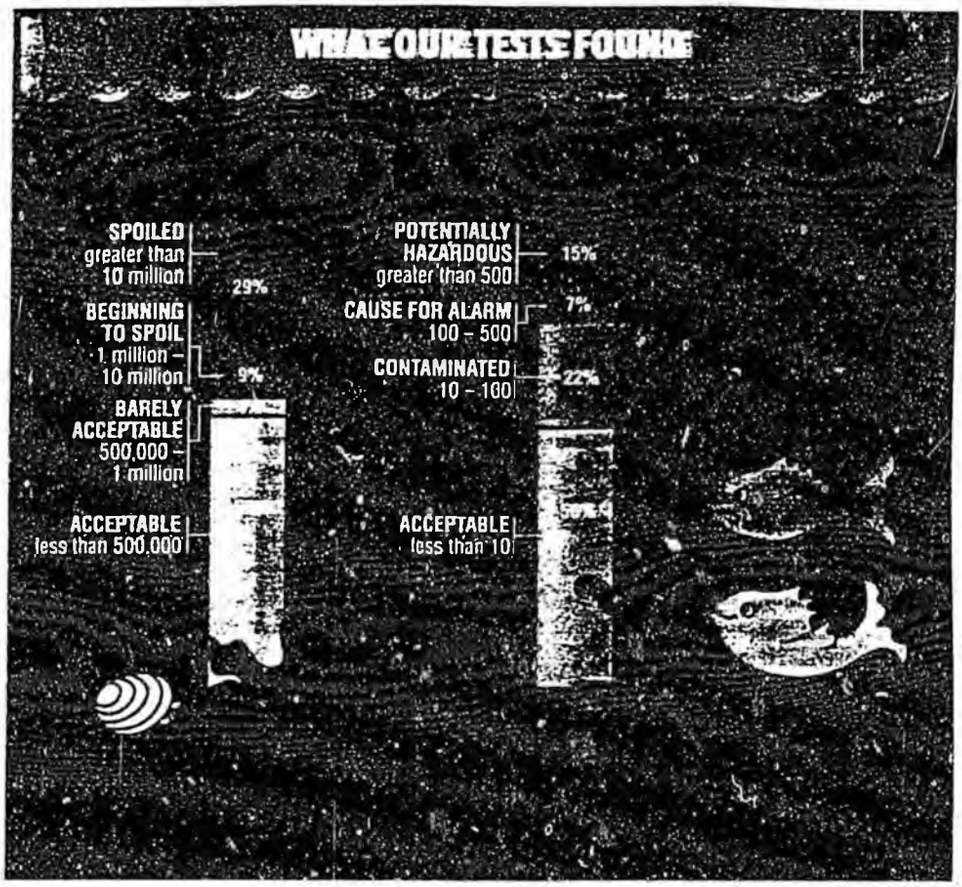


Chart by Jean Wisenbaugh

WHAT LURKS IN THE FREEZER CASE?

Frozen fish can have better flavor and texture than "fresh" fish that has spent several days journeying from sea to supermarket.

Rapid freezing causes fish to freeze uniformly, and that minimizes the loss of flavor and texture. The term "IQF"—for individually quick frozen—designates fish that have been fast-frozen. Halibut, catfish, and shrimp, for example, are often available as IQF products.

To buy good-quality frozen fish, you really need to know when they were frozen and how they were stored. But except for a label indicating the fish was frozen at sea, consumers have no way of learning whether a fish was frozen on the boat or after an unsuccessful stint in the supermarket's display case.

Icy, and dicey These frozen fish won't make the tastiest meals. The fish on top may have thawed out and then slid to one end of the package. It's also coated with ice crystals. Part of the fish in the lower package had poked through the plastic wrap.

Examining the packages in the freezer case, however, will give you some clues about how carefully the fish has been stored. Much of what we saw was freezer-burned and coated with ice crystals, indicating either that someone had allowed the fish to thaw and freeze again (and possibly again) or that it had been improperly packaged. Sometimes the fish was mushy—a sign that it had thawed and was at that moment freezing again.

At a ShopRite store in the New York area, for example, we found lobster tails that were totally freezer-burned. A portion of the meat was completely dried out. Frozen mussels in the same store were almost totally thawed out, and the halibut was covered with ice crystals.

At a Waldbaum's store in the New York area, crab legs were sticking out of a broken package, and at an Omni Superstore in Prospect Heights, Ill., much of the whitefish was freezer-burned, dried out, or exposed to air through holes in the package.

What to do? Check for signs of freezer burn—light colored, cottony spots. Also look for clues of rancidity—yellow discoloration of the fish's fatty areas as well as a rancid odor. Watch for ice crystals and broken wrappers. Sniff the package. If you detect a fishy odor, that could mean spoilage had set in before freezing or that some bacteria continued to grow even while the fish was frozen.

replied. And all the while possibly contaminating the ice and newer fish that might come in.

Because fish has the reputation for being a quick spoiler, the first questions consumers usually ask are: Is it fresh? Did it come in today? Retailers go to great lengths to tell their customers "yes," even if it means deceiving them.

To consumers the word "fresh" means fish right out of the water, fish that has not begun to spoil. To the industry "fresh" means fish that has never been frozen. As long as fish has never seen the inside of a freezer, it can be out of the water for days and still be called "fresh."

Cub Foods in the Chicago area advertises, "With Cub's 'Fish in a Flash,' you always get the freshest taste because we fly fish and seafood in overnight from the shore. That's how we know our fish are the freshest and that you'll have great tasting seafood every time." We bought sole at a Cub Foods store in Lombard, Ill., on a Thursday. A clerk told us it had come in on Tuesday. When we tested it, its bacteria count exceeded 27 million.

To give the impression that their fish is fresh, retailers often thaw fish that would have been better off had it remained frozen. Much of the orange roughy we saw was sold thawed out, even though most of it is imported frozen from New Zealand.

At an A&P in the New York area, we inquired whether the orange roughy was really fresh. The clerk said it was "frozen fresh," but "just came in today."

A clerk at a Dominick's store in the Chicago area also told us the orange roughy he was selling was "fresh frozen." When pressed, he offered a truly baffling explanation: "Fresh frozen is a play on words. It wasn't old so it was fresh, and it had been frozen once, so it was frozen fresh."

Other retailers simply stuck signs on the fish saying it was "fresh" when it had actually had been frozen. Still others use a hodgepodge of signs that give the general impression that *all* the fish in the case is fresh.

A Safeway store in California covered all bets. One sign read: "Fresh Bay Scallops, pre-frozen—$7.99."

Who's watching the store?

Although the Federal government inspects all beef and poultry plants, there is no mandatory inspection of seafood. Fish processors, wholesalers, and retailers can, however, pay to have inspectors from the U.S. Department of Commerce observe conditions in their plants or stores. They then receive seals of approval if their facilities meet certain standards.

Fish wholesalers and retailers can pay for different levels of inspection, each with its own seal. Just over 10 percent of all processors currently participate; they account for about 18 percent of all fish Americans eat annually. Here is what the seals mean:

- **Lot inspection** means that inspectors eyeball a batch of fish to check it for conformity with specifications set by the company requesting the inspection. An inspector may look over the lot for net weight and uniformity in size and color, or simply to be sure the proper number of fish have been shipped. Lot inspection doesn't mean that an inspector approves or even looks at every piece of fish.
- **Packed Under Federal Inspection (PUFI)** labels mean that the seafood products have been processed in the presence of Federal inspectors in Federally approved plants. The Government allows the use of this seal if the products are safe, clean, wholesome, and properly labeled when they leave the plant, and if the plant and its workers meet certain sanitation and hygienic stan-

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dards set by the Government.

■ **U.S. Grade marks** mean the products have been processed under Federal inspection and meet certain quality standards. The Government has established grade standards for a variety of fresh and frozen fish products. The U.S. Grade A mark, for instance, indicates the fish is relatively free from blemishes and defects, is in excellent condition, and has good flavor and odor.

Stores subscribing to the Government programs tout these seals of approval to help sell their fish. But the fact that a fish may have passed under the nose of a Government inspector doesn't mean it's of high quality when it finally reaches the consumer's shopping cart. A clerk at the Chicago Fish House, one of that city's premier seafood wholesalers, told us that a Government inspector is "present 24 hours." Yet clams and sole we purchased at its retail shop had total plate counts exceeding 27 million. The clams presented a possible health hazard if eaten raw.

ShopRite stores we visited sported signs near the fish case promoting their Grade A fish. Our reporter visited the company's processing plant and found it cold, clean, and modern. But some of the fish she saw in ShopRite stores was tired and dried out and didn't look like top quality, as implied by the Grade A shield.

The Jewel stores in the Chicago area advertise that their fish are "federally lot inspected." At one store, a package of mahi-mahi was even labeled "U. S. G. Insp.," giving the impression the fish had been checked by a Government inspector. In fact, there's no official seal known as "U. S. G. Insp." We didn't send that sample to our laboratory, but opened the package and inspected it ourselves. The fish was dried out, gaping (the fibers were pulling apart), and sprinkled with dirt and debris.

At a Treasure Island supermarket on North Clybourn Avenue in Chicago we found some packages of sole and perch labeled "USDA govt inspected." The U.S. Department of Agriculture inspects beef, pork, and chicken. It does not inspect fish.

States, too, play a role in fish inspection. The New York Department of Agriculture and Markets says it inspects each retail food store at least once a year, but some small stores may be inspected only every two years. In Illinois, local health departments, following rules set by the Illinois Department of Public Health, check on supermarkets and retail fish stores twice each year. If they find violations, inspectors return to see whether they have been corrected. Under each state's Freedom of Information Act, we requested inspection reports for the stores we visited.

In New York, inspectors had noted violations that ranged from dirt-encrusted walls to a lack of hot water in employee bathrooms. Sometimes violations paralleled conditions we observed.

For example, at Rhim's Fish Market in Manhattan, where we saw flies buzzing about the fish, the state's inspector noted that the front door did not have a proper screen. But that was more than two years before our visit.

Rosedale Fish Market, a fancy seafood shop on Manhattan's East Side, sold us clams with levels of fecal coliform bacteria that indicated a potential hazard. State inspectors had repeatedly noted poor hygiene on the part of employees there. The store also makes and sells prepared seafood dishes. But at the time the store was inspected, it didn't have the necessary license to do so. In fact, inspectors had cited the store at least three times for not having the license, but the store kept cooking.

In Illinois, some stores also may be ignoring the recommendations of local health inspectors. For example, inspectors told a Cub Foods store in Arlington Heights that the "fish was too warm" and to train employees to check fish.

But a year after their report, we found the store selling whitefish, sole, and catfish with bacteria counts over 27 million and clams with fecal coliforms that were almost 11 times higher than the accepted safety guideline.

At the Chicago Fish House, another store that sold us potentially dangerous clams, inspectors had repeatedly noted deficiencies in the handling of shellfish. In one report, inspectors ordered the store to stop storing fresh clams under boxes of fish that were dripping blood.

What's a shopper to do?

Go to a reputable fish store and ask questions. That's the advice we got from Thomas Billy, director of the FDA's newly created Office of Seafood, which is likely to play a larger role in monitoring seafood in the future.

We took that advice and still got bad fish. We found little difference between the fish sold by so-called specialty fish stores and that in ordinary supermarkets. Poor handling and too-warm temperatures were everywhere.

When we asked questions, the answers were not reassuring and often wrong.

Other common advice is to know where your fish comes from. If you could find out, that might help you avoid fish contaminated with chemicals or heavy metals. Take flounder, for example. Half of our New York samples contained pesticide residues, most likely because they were caught near shore, where pesticide levels are higher.

But, in reality, it's impossible to learn whether the flounder you're considering was caught near shore or far out at sea. At a Grand Union store in the metropolitan New York area, a shelf tag on the flounder simply read: "North Atlantic waters."

When we asked at a Lucky supermarket in California where the scallops came from, a clerk replied: "the ocean." At a Grand Union store in the New York area, we learned that the catfish came from "the warehouse in Mt. Kisco, N.Y."

Most states require that stores make available to public health officials and consumers the tags (or the information on them) that show who shipped a particular batch of shellfish and when and where it was harvested. Retailers must keep the tags available for inspection for 90 days after the shellfish is sold. "The tag is an assurance for consumers that the product was packed under the Shellfish Sanitation program," says the FDA's Thomas Billy.

In New York, however, we had trouble obtaining the tags for our clams. At a Pathmark store in the New York area, a clerk became defensive and demanded to know why we wanted it. Finally, he showed us part of the tag that identified the shipper. But when we asked where the clams came from, he shouted "certified waters," and gave no further information.

At Yaohans, a Japanese supermarket in Edgewater, N.J., the clerk told us the tag for the clams we purchased was missing. Nevertheless, he produced a tag from another batch. We can't be sure it matched our clams.

Our reporter called some of the stores where we bought clams and asked for tag information within the time period retailers must keep it on

Suspect seals The label "U.S.G. Insp." appears on the top package of mahi-mahi. There's no such label authorized by the U.S. Government. The bottom package of ocean perch claims the fish was inspected by the U.S. Department of Agriculture. The USDA doesn't inspect fish. For a look at some authentic labels, see page 113.

file. An employee at the Central Fish Market in Manhattan said: "We keep them a couple of weeks. After a month we throw them away."

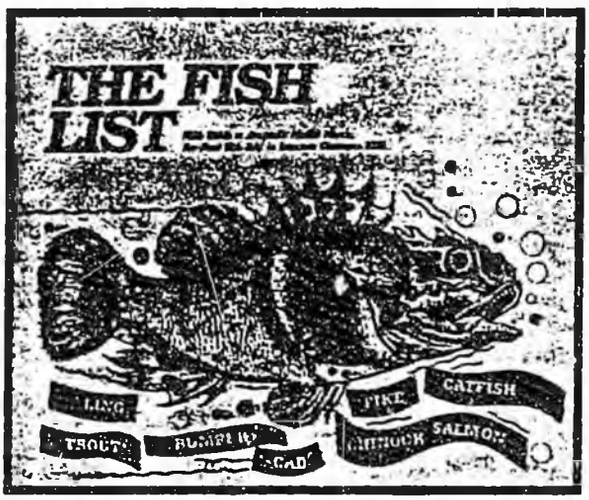
In Illinois, retailers were more cooperative. But some of their information was suspect. On August 20 we bought clams from a Cub Foods store in Arlington Heights. The tag we received said the clams had been plucked from Chesapeake Bay that very day. Even if they flew in on the Concorde, it's hard to see how they could have been packed, shipped to a wholesaler, and then repacked for Cub Foods—all before we picked them up that morning.

The tag at a Dominick's supermarket in the Chicago metropolitan area seemed to have come through a time warp. It said the clams were harvested from Mobjack Bay in Virginia on August 23. We had bought them on August 21.

THE LABEL SAID SNAPPER

When you buy seafood, you probably expect the fish in the package to match the name on the label. But that's not what we found when we bought fish for our species-identification test. About one-third of our samples turned out to be mislabeled. Though the labels promised swordfish, red snapper, sole, flounder, redfish, whitefish, bluefish, and scrod, the lab told us the labels lied.

"The typical consumer doesn't realize when one species is substituted for another. If it doesn't taste as good, they are likely to think [simply that] the quality is not what it should be," says Joseph Ferrara, assistant director of the food safety and inspection division at New York's Department of Agriculture and Markets.



Who's who in fishdom The FDA's Fish List is the last word when it comes to fish names. The list includes 1041 species of fish.

To sort out the myriad monikers that fish go by, the FDA in 1988 published the Fish List, the last word when it comes to fish names. For each of 1041 species, the list identifies the market, scientific, common, and regional name. The list is supposed to eliminate confusion and reduce mislabeling. But, as we found, it has barely begun to dent the problem.

We bought 97 samples of finfish and shellfish from retailers in metropolitan New York, metropolitan Chicago, and in the San Jose-Santa Cruz area of California. We sent those samples to the National Seafood Inspection Laboratory in Pascagoula, Miss., for identification.

THE LAB SAID BALONEY

There, chemists compared the proteins in our fish with those found in a reference fish that was known to be the same as the one listed on the package label. If the proteins in our fish did not match those of the reference sample, we knew our fish was mislabeled. Only 29 percent of the fish we analyzed matched the labels on their packages; 31 percent were definitely mislabeled. The lab couldn't tell us whether the remaining 40 percent were correctly or incorrectly labeled. It either had no reference standard or the protein bands were too similar to distinguish between closely related species. For example, the lab could identify salmon as salmon and tuna as tuna, but couldn't tell whether it was in fact silver salmon or bluefin tuna as the labels had claimed.

That's significant because certain species of salmon or tuna fetch more at retail. Silver salmon and bluefin tuna sell for a lot more than pink salmon or yellowfin tuna, which are the hamburger of the salmon and tuna families. Consumers have no assurance they're getting filet mignon and not ground chuck.

Snapper snafus

Only one species of fish—*Lutjanus campechanus*—can officially be called red snapper. It lives along the Atlantic coast off Florida and in the Gulf of Mexico off Louisiana, Texas, and northern Mexico. It's a scarce fish, commanding a high price in the marketplace. Retailers in the New York area sell a whole red snapper for $7.99 to $14 a pound, depending on the neighborhood.

Other snappers, which are found off the coasts of South America and in the Pacific Ocean, are less desirable. In New York City, they sell for as little as $3 to $4 a pound.

Retailers capitalize on red snapper's cachet. To see whether red snapper was really red snapper, we sent the lab eight packages labeled "red snapper," two packages labeled "Pacific red snapper," one package labeled "West Coast snapper," and two packages labeled "scarlet red snapper."

The lab told us only one of the first eight packages contained red snapper. Neither of the packages labeled Pacific red snapper contained Pacific red snapper. The package labeled "West Coast snapper" contained no such animal. The lab couldn't judge the "scarlet" red snappers because it had no official standard for them.

The only accurately labeled red snapper we found was at Burhop's Quality Seafoods, a fish store in Glenview, Ill. There it sold for $13.95 a pound. Also in the Chicago area that week, we bought alleged red snapper at three Jewel supermarkets and at one Omni Superstore. The fish sold for $4.19 per pound at Jewel, and only $3.98 at Omni.

Sole mates

Eight of the 14 samples of the sole we bought were also mislabeled. Grey sole wasn't grey sole, lemon sole wasn't lemon sole, petrale sole wasn't petrale sole, English sole wasn't English sole. A fish called Queen Charlotte sole was a complete mystery; it isn't even mentioned in the Fish List.

Those fish could have been any

one of the 57 species of flat white fishes that the Fish List identifies as sole, sole/flounder, or flounder. Our unknown soles were pricey, selling for as much as $10.99 a pound. If the retailer was substituting a cheaper flat white fish, consumers wouldn't be the wiser.

Another mystery came in packages labeled Dover sole. In the U. S., most Dover sole is a cheap, inferior-quality fish found off the West Coast, not to be confused with the prized European Dover sole, which is caught in North Sea waters. When available, European Dover sole commands high prices—$12 to $18 a pound at retail. Two packages labeled Dover sole that we bought were not even the cheap West Coast species. It's hard to imagine what fish retailers were substituting, but whatever it was, they got a good price for it. At a Safeway in California, our misbranded Dover sole was selling for $5.69 per pound. At a ShopRite in metropolitan New York, it went for $4.99.

Getting scrod

Scrod is a young cod, haddock, or pollock. It is not a species recognized by the Fish List. A few retailers correctly identify their fish as "scrod cod," but they are the exception. Most simply label the packages "scrod." We sent two packages of alleged scrod to our laboratory. The lab couldn't identify one package. The other turned out to be Alaska pollock. If scrod is a young fish, it's hard to say what "baby scrod" is. Last fall, the Jefferson Market, a well-known fish retailer in Manhattan, was selling it for $5.98 per pound.

Salmon shenanigans

In store after store we found salmon steaks and fillets labeled "Norwegian salmon." But there's no such species, according to the Fish List. Because the Norwegians were first in the U.S. market with good-quality, farm-raised salmon, they convinced wholesalers, retailers, consumers, and chefs to equate Norway with quality. The name Norwegian salmon stuck and is now attached not only to fish from Norway, but to those from Maine, Canada, and Chile. Today, in fact, Norway is no longer a major source of "Norwegian" salmon in the U.S.

Last spring, the International Trade Commission, acting on a complaint from Maine salmon farmers, ruled that Norwegians were dumping their salmon in the U.S. market—that is, selling the fish for less than it cost them to produce it.

The Commission imposed a tariff averaging 26 percent, which has priced most Norwegian salmon out of the market. That doesn't stop retailers, however, from selling "Norwegian" salmon, and perhaps jacking up the price a bit to make consumers believe their fish is Norwegian-raised.

Confusion doesn't stop with a salmon's national origin. Retailers, particularly in Chicago, advertise and sell "silver brite" salmon. Silver brite is not a species recognized by the Fish List, but a term that describes the skin color of chum salmon when they're caught in the ocean and their skin is still silvery bright.

It's easy to see why retailers prefer the name silver brite. Silver brite has more sales appeal than the humble chum, a fish that is also low on the salmon quality totem pole.

Ask the clerks?

Since package labels are often unreliable, are the clerks at the fish counter better able to tell you what's in the package?

A clerk at a Dominick's supermarket in metropolitan Chicago admitted that clams labeled "cherrystones" were not really cherrystones. They were "topnecks," he said. He explained that he did not have the right label, but he had to call them something.

At a Jewel store in metropolitan Chicago, the man behind the fish counter told us the kind of salmon offered for sale was called "brie"—as in the cheese. He thought for a moment, then corrected himself. No, he said, "it is brite—brite salmon."

His knowledge of other fish was similarly limited. When we asked what kind of snapper was in the display case, he replied: "a mild fish."

At a Lucky supermarket in California, we wanted to know if the Dover sole was the European variety. The clerk assured us it was, although its $4.28-per-pound price suggested that it was caught closer to home, perhaps in nearby Monterey Bay.

Read the signs?

You can also read the signs posted around the display case and hope they shed light on the fish you're buying. But, in our experience, the signs are just as likely as the package labels to keep you in the dark.

At Burhop's, the specialty fish store in Glenview, Ill., that sold us the only real red snapper we found, a sign near the fish said that it had come from Hawaii. We asked the clerk behind the counter, just to be sure. He said the snapper came from Florida, which was probably right since red snapper does live in the waters off the Florida coast, but not near Hawaii.

The blackboard behind the counter at an A&P in metropolitan New York told customers that the salmon it offered for sale was "fresh Norwegian salmon steak." Knowing there was little Norwegian salmon around, we inquired further. The clerk said that the salmon was really from British Columbia.

At Cub Foods in Lombard, Ill., a label next to the salmon steaks identified them as Atlantic salmon. However, the blackboard near the display case contradicted the label. It said the salmon sold that day was "king salmon from Alaska"—a different species, and a different ocean.

Rely on the FDA?

Fish that doesn't match the package label is misbranded, according to the Federal Food, Drug, and Cosmetic Act. The FDA can seize the fish and destroy it. The FDA's Fish List also frowns on calling fish by their regional names and warns that using them "may cause the fish to be misbranded."

However, as far as fish labeling is concerned, the FDA rarely takes legal action against anyone for using the wrong fish name, regional or otherwise. In the last three years, the FDA has made only three seizures of fish that were mislabeled.

Although the agency says it may have sent warning letters to other violators, it couldn't tell us how many such letters were sent. Mislabeled fish take a back seat to more pressing regulatory problems. "You wouldn't want us to spend our time seeing that red snapper is properly labeled and ignore botulism in tuna," says Mary Snyder, chief of the policy

Mystery packages We bought these packages labeled "rainbow trout" and "bluefish" and sent them to the National Seafood Inspection Laboratory for analysis. The lab said neither fish matched its label.

Handwriting on the walleye? Be suspicious of handwritten labels on packages of fish. A noticeable portion of our mislabeled fish bore labels written by hand, rather than printed by machine.

and guidance branch at the FDA's Office of Seafood. "We go after blatant violators and hope to set an example."

State regulators are also supposed to keep an eye on food labeling in supermarkets. We didn't find them overly concerned about counterfeit fish. Many state agencies have barely enough money to conduct sanitation inspections, let alone worry about fish labels. In New York, food inspectors don't even look for misbranded fish at every routine inspection.

In Illinois, inspectors from local health departments inspect retail grocery stores. They don't look for mislabeling, either. Says Kerry O'Shaughnessy, a health inspector for the village of Glenview, "I know red snapper has kind of reddish skin, but I couldn't tell you if the store substituted something else."

WHAT ELSE IS IN FISH?

AND HOW DID IT GET THERE?

The waters where fish live are often dumping grounds for potentially harmful chemicals that have been used on land.

Once in water, these substances make their way into the sediments at the bottom and into aquatic plants and animals at the base of the food chain. Little fish eat plants and little animals, bigger fish eat the little fish, and so on up the food chain. Fish also absorb these substances directly from water that passes over their gills. Older fish, predatory fish, and fatty species of fish accumulate more such substances in their tissues than younger, smaller, or leaner ones do.

Although the Environmental Protection Agency banned polychlorinated biphenyls (PCBs) and most chlorinated hydrocarbon pesticides in the 1970s, some residues that were released into the environment before these compounds were banned still remain. They do not decompose easily, so they linger in the water sediments and in the tissues of fish and humans for years.

In addition to our lab tests for bacteria, we analyzed all of our fish samples for PCBs, mercury, and for a long list of pesticides. We also looked for lead, cadmium, and arsenic in clams.

Forty-three percent of our salmon, 50 percent of our whitefish, and 25 percent of our swordfish contained detectable levels of PCBs. Ninety percent of the swordfish also contained detectable amounts of mercury. In some of these fish, the levels we found were significant, posing a possible health hazard to developing fetuses.

Here's a rundown of what our laboratory tests found:

PCBs

PCBs are synthetic liquids that were once used in electrical equipment, hydraulic fluid, and carbonless carbon paper.

PCBs promote cancer in laboratory animals, but researchers now believe that a greater hazard may be their effects on human reproduction. One study of women who ate fish contaminated with PCBs from Lake Michigan found they gave birth to smaller babies with significant developmental problems. These women reported eating fish for several years before they conceived.

By far the biggest source of PCBs in the human diet is fish, particularly fatty species, such as salmon. Like humans, all fish have PCBs in their tissues, but some have more than others. The concentration of contaminants in fish is related to the waters they live in.

The FDA established an official tolerance of 2 parts per million for

Text continued on page 114

WHAT ELSE WE FOUND

Fish	Key findings
 SALMON	Forty-three percent of our samples contained PCBs, a potential carcinogen and reproductive hazard.
 SWORDFISH	Ninety percent contained mercury, which may harm the nervous system. Twenty-five percent contained PCBs.
 CATFISH	An occasional sample contained residues of the pesticides DDT, DDE, and DDD, which can affect reproduction in mammals.
 CLAMS	Some samples were high in lead, which can impair behavioral development in young children.
 LAKE WHITEFISH	Fifty percent of our samples contained PCBs. Some contained traces of pesticides.
 FLOUNDER, SOLE	Our flounder and sole were virtually free of pollutants. Fifty-five percent had no detectable residues; the rest, barely detectable.

PCBs in 1979. The tolerance is the agency's basis for taking legal action and destroying contaminated samples of fish.

Although most of our samples were within the tolerance levels set by the FDA and would have passed the agency's inspection, that's scant comfort. As PCBs linger in the environment, their composition changes, and they gradually become more toxic. These "weathered" forms of PCBs are more toxic than those forms tested in studies on which the tolerance was based. And these more toxic forms are likely to be found in fish.

Advised, but not advertised States collect samples of fish from local waterways to test for contaminants. If a body of water is particularly polluted, states issue advisories, generally aimed only at sports fishermen. We found advisories inconsistent from state to state, often offering different advice about the same fish from the same waters.

Sygma Photo News-Patrick Forden photographer

Furthermore, the FDA set its tolerance before the hazards to human reproduction were documented, at a time when people were eating less fish, and before the toxicity of PCB breakdown in the environment was known.

The last factor is especially significant, since PCBs accumulate in body tissue. The PCBs that you eat today will be with you decades into the future.

Given these facts, we think even 1 part per million of PCBs in fish is too high. Our laboratory detected levels ranging from 0.2 to 2.1 parts per million in our whitefish, swordfish, and salmon. Three out of 10 samples of whitefish contained PCBs exceeding 1 part per million; three out of 20 samples of swordfish did.

Seven of 10 salmon samples we purchased in New York contained PCBs ranging from 0.7 to 1.3 parts per million. Thirty percent of the samples from Chicago had detectable levels, ranging from 0.2 to 0.8 parts per million.

Some of our Chicago salmon samples were probably species from the West Coast, at least that's what the store clerks told us. Those salmon may have come from less-contaminated waters than fish from the Atlantic or the Great Lakes, the possible sources of fish we purchased in New York. However, because the package labels, store [illegible] and signs were not always [illegible], we couldn't tell for sure where [illegible] fish was from.

Nor could we tell whether it was "farm-raised," as some salmon is. Just because salmon is farm-raised doesn't mean it's contaminant-free. Farm-raised fish spend part of their time in pens in the ocean. Their diet also consists of manufactured feed, which is based largely on fish that may have contained PCBs.

Mercury

Mercury is a poisonous metallic element that is released by burning fuels as well as by industrial and household wastes. Eventually it settles in waterways and oceans where it joins naturally occurring mercury. There, bacteria convert it to the toxic compound methylmercury.

Methylmercury is a poison that affects the development of the nervous system. Unlike PCBs, which linger in the fatty tissues of humans for many years, mercury eventually leaves the body, usually within two years, provided you stop ingesting it.

Mercury accumulates in large fish that live a long time, such as tuna, shark, and swordfish. Almost all of the mercury in fish is the compound methylmercury. The FDA has set an informal action level of 1 part per million for methylmercury in fish.

Ninety percent of our swordfish samples had detectable levels of total mercury, ranging from 0.46 to 2.4 parts per million. The average of those samples was 1.14 parts per million. Forty percent contained mercury that exceeded the action level.

The high levels of mercury we found in swordfish are not surprising, since mercury is present in oceans throughout the world. There's no way to prevent swordfish from accumulating it in their tissues.

The FDA told us, however, it is "actively reevaluating the action level for methylmercury," a step in the right direction. The Canadian Health Protection Board has a lower standard for mercury in fish—0.5 parts per million. Eight-five percent of our swordfish samples would have exceeded the Canadian limits.

Pesticides

Residues of pesticides used on farms and forests, and for mosquito control ultimately find their way into rivers and oceans. There they remain for many years. For example, although the EPA banned the use of DDT in 1972, several of our fish samples had measurable levels of DDT and the products it creates when it breaks down—DDD and DDE—in their tissues.

DDT and its breakdown products, as well as the pesticides dieldrin and endrin, can all affect the human nervous system. DDT, DDE, and dieldrin have also caused liver tumors in rodents, and all of these pesticides affect reproduction in mammals.

The FDA has set an informal action level of 5 parts per million for DDT in fish and 0.3 parts per million for dieldrin and endrin.

Two of our samples, one of catfish and one of sole, contained more than 6 parts per million of DDE. Several others, notably catfish, had lower levels of DDT and its breakdown products. The presence of DDT in catfish is not surprising, since they are often raised in ponds on land once used for agriculture.

Our lab reported levels of the pesticide dieldrin over the action level for two samples of lake whitefish and levels of endrin from 0.1 to 0.2 parts per million for four samples of swordfish, salmon, and flounder.

The species most free of pesticides were flounder, sole, and clams. We detected no pesticide residues in half of our New York flounder samples; the other half contained only trace amounts. Six of the 10 sole samples purchased in Chicago had no detectable levels of pesticides; the others contained levels of DDE ranging from a trace to more than 6 parts per million.

DDT and its breakdown products are widely dispersed in the environment and will show up in the human diet for decades to come. While its use has been banned in the U.S., DDT is still used in other countries. However, since only an occasional sample of our fish had significant pesticide residues, the overall hazard from this group of contaminants appears relatively low.

What's in clams?

We found no measurable levels of pesticides in clams. But a number of our samples had relatively high levels of arsenic and lead. The hazards posed by arsenic in shellfish are not clear. Lead, even at very low levels impairs behavioral development in young children. The FDA has set no action level for lead in seafood.

About half of our samples contained lead ranging from 0.31 to 7.8 parts per million. Compared with other foods, such as fruits and vegetables, which typically contain 0.01 parts per million, the lead levels in clams are high. ■

FISHY, FISHY

WHY DOESN'T THE U.S. INSPECT MORE FISH?

In 1967, soon after Congress put the finishing touches on the Wholesome Meat Act, Michigan Senator Philip Hart introduced a bill that would have required the same kind of Federal inspection for seafood.

Senator Hart, along with consumer advocate Ralph Nader and representatives of organized labor, wanted to station Federal inspectors in every fish-processing plant. But the fish industry and its allies in the Congress and the Nixon Administration pressed for spot-checking rather than "continuous inspection."

"Fish needs the same kind of inspection as meat and poultry because it can carry just as many disease-causing organisms," Hart argued at the time. Although he held hearings in 1967, 1968, 1969, 1971, and 1974, no bill requiring seafood inspection ever passed. When Hart died in 1976, his push for fish inspection died too.

Fish inspection was largely a dormant issue through the 1980s. Then in 1990, the U. S. Senate and the House both passed bills requiring mandatory inspection of all fish-processing plants. Each house, however, had its own idea of how fish should be checked, and neither bill became law.

The big hang-up this time was which Federal agency should monitor the nation's fish supply. The fish processors pushed for the U.S. Department of Agriculture to get the job. But some consumer groups, including CU, preferred that the Food and Drug Administration inspect fish. The Agriculture Department's historical coziness with industries it regulates, plus its recent attempts to weaken its own regulatory authority over meat and poultry, didn't bode well for strong fish inspection.

In the meantime, the FDA has assumed the role of chief seafood cop. "We think we have an outstanding mandatory fish inspection program," says Thomas Billy, director of FDA's newly created Office of Seafood. "Under the Food Drug and Cosmetic Act, we have authority to inspect every seafood plant in the country."

Starved for money

In CU's view, the FDA's "mandatory" program falls short. The FDA has authority to inspect every seafood plant. But starved for money, it has used that authority sparingly, inspecting plants once every four years on average.

The FDA can't compel the seafood-processing plants it inspects to keep records of such things as temperatures and storage conditions, which would help the agency monitor fish safety. Nor does it inspect fishing vessels or retail fish stores, both significant problem areas in the handling of fish.

We also discovered big holes in the shellfish sanitation program, which the FDA supervises. Not only did we find clams with high levels of potentially harmful bacteria, but we also found that stores were not complying with rules for keeping identification tags, a cornerstone of shellfish regulation.

Furthermore, it's hard to have much confidence in the agency's surveillance of chemical contaminants in fish. In 1989, the FDA checked only 1604 fish samples for contaminants. In contrast, the same year the U.S. Department of Agriculture checked 185,000 samples of meat and poultry. The FDA has monitored swordfish for methylmercury since 1970 and recently started monitoring shark as well. But its testing for PCBs in salmon is particularly inadequate. Of 143 samples the agency tested in a recent three-year period, most of the domestic samples were from the Great Lakes—an incomplete picture of the salmon Americans eat.

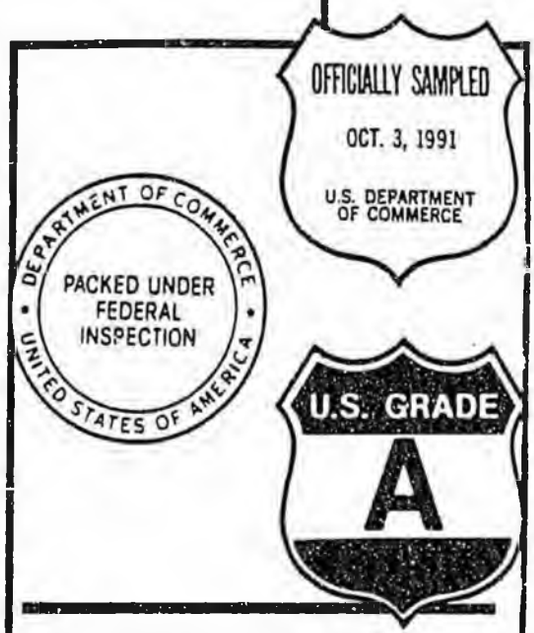
Skimpy fines

Local and state health departments also have a hand in monitoring the nation's fish. But a lack of money for frequent inspections and skimpy fines levied against retailers caught violating state health codes do little to deter unsanitary practices or to improve fish quality.

For their part, some supermarket chains are working with the Federal government to develop a voluntary program to check fish. The supermarkets that abide by the program's requirements can earn a seal of approval that will assure consumers that the fish has been handled properly. That seal is not yet in stores.

CU believes consumers deserve more than that. They need a strong program that addresses the microbial and chemical contamination of raw fish. Much of the inspection in place today focuses on visible plant or store deficiencies, such as dirty walls and floors and the lack of paper towels in employee restrooms. While important, these problems have little to do with whether a fish is laced with PCBs or methylmercury or whether disease-causing bacteria are present.

Any program must also focus on quality. Americans are eating and should eat more fish because it is a healthy alternative to beef and pork. One way to improve quality is to mandate better temperature control, especially in retail stores. Not only must inspectors be more vigorous in policing the temperatures in display cases, but states should consider changing their food laws to require fish be kept at temperatures lower than those now permitted.



Real seals These seals are issued to processors and retailers by the U.S. Department of Commerce. The top one indicates that a batch of fish was inspected as a group. The Packed Under Federal Inspection mark indicates the fish was processed in a Federally approved and supervised plant. The Grade A mark indicates the fish has met certain quality standards.

Alaska State Legislature

Sen. Lloyd Jones, *Chair*
Sen. Sam Cotten, *Vice-Chair*
Sen. Dick Ellason, *Member*
Sen. Steve Frank, *Member*
Sen. Rick Halford, *Member*
Sen. Curt Menard, *Member*
Sen. Fred Zharoff, *Member*

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Senate Resources Committee

MEMORANDUM

To: Senate Resources Committee Members

From: Senator Lloyd Jones, Chair
Senate Resources Committee

Date: February 10, 1992

Subject: Seafood Quality Hearing

If you haven't already read the Consumer Reports article, I would encourage you to review it. It is in your packet. While the article was misleading as far as contamination of Alaska salmon, it pointed out just how vulnerable our products are in the hands of the retailer.

Much of the problem with poor quality seafood seems to be in the hands of retailers. These are the people that ultimately make the decision on what product they sell. They are the people who receive the fish, they make the decision as to what to sell, under what name the product sells and what quality of fish to sell.

In a sense the Consumer Report article, except for the erroneous reports on salmon, is a positive reminder of the high stakes we have invested in the retailer. These businesses are the gatekeeper for quality of all seafood. They can refuse poor quality seafood, they can make high quality seafood inferior through poor handling techniques.

SEAFOOD INTRODUCTION

The purpose of this hearing is to develop an understanding of what can be done to ensure a high quality seafood product is delivered to the American consumer. The Alaska fishing industry has made great strides towards assuring that a high quality, healthy seafood product is being sent out of state.

The Alaska Seafood industry has been endeavoring to assure that the highest percentage of fish delivered to its markets is of the best quality. Even now, the State of Alaska is considering changes to its programs to assure an even better record.

Yet, despite its best efforts, the state and industry cannot assure that once the product has left the state it will be treated in a proper manner; ensuring that the consumer receives a product which is as good as when it was shipped from the state.

This is where the FDA, ASMI and organizations such as the National Fisheries Institute come in to play. Industry and federal regulators are the only quality assurance agents that Alaska has to assure our seafood product's integrity once it has left our borders.

Alaskans need to know what is being done to protect our vital export.

What is being done by the industry and by the FDA and state regulatory agencies to assure the quality of seafood in the retail outlets? Is a national program being put together to assure that the retail outlets maintain a high quality product and at the same time reject inferior quality fish that may be delivered to the retail store?

DIVISION OF ENVIRONMENTAL HEALTH
SEAFOOD INSPECTION SECTION

Goal

To guarantee the wholesomeness and safety of all Alaska seafood caught for commercial sale, in order to protect the reputation and thus marketability of the state's seafood for the benefit of the nearly 35,000 people who make their livings from the sea.

Program Background

While the state has had a seafood inspection program since the 1970's, it was expanded in spring 1982 after a Belgian man died of botulism from eating a single tainted can of salmon processed in Alaska in 1981. Since 1982 the program has been upgraded, standardized and expanded. It now employs 15 inspectors to monitor about 600 floating and shore-based seafood processing plants.

Issues

With Alaska fishermen and women now harvesting more than a billion pounds of seafood a year, the main issue is ensuring the proper care of the seafood after harvest, its transport, and especially its processing - often into value-added products. The goal is to guarantee the fish remain free of any chemical or biological contamination. The program concentrates on inspections of salmon canneries and firms that smoke salmon and vacuum-pack it into pouches - processes which if performed incorrectly are capable of producing unsafe product - and the processing of some types of shellfish: notably oysters, mussels and razor clams, which are subject to contamination by Paralytic Shellfish Poisoning (PSP).

Major Features

The major features of the Alaska Seafood Inspection Program include:

- Review of all construction and facility plans to check for design problems that could result in sanitation-processing lapses.
- Issuance of permits that require processors to follow state seafood regulations, and in the case of canneries and other value-added processors, to follow specific approved plans of operation.
- Inspections of fish tenders and processing plants to insure that proper procedures are followed and training received.
- Use of enforcement actions, from warnings to issuance of notices of violation in the case of more serious problems. The program also can detain contaminated or adulterated seafood. These are all steps to ensure that only healthy seafood reaches market.

Progress to Date

Since 1982 the program has become far more sophisticated. Improvements include:

- Expanded microbiological testing of seafood products.
- Focusing the program, concentrating inspection efforts on facilities with the higher health risks or those with lower previous inspection scores.
- Standardizing the inspection process, with written directives, policies, and guidelines for processors.
- More emphasis on upgrading handling procedure, ie., requiring that fish be iced before processing and kept free of petroleum-based contamination.
- Development of a scored inspection checklist based on relative health risks.
- New regulations that are easier to use, establishment of a special section for direct market fishing vessels, and consolidation of requirements.
- Creation of an advisory committee made up of the FDA, National Fish Processing Association and others to oversee creation of new regulations and procedures.
- Following the March 24, 1989, Prince William Sound oil spill, creation of a special inspection program that inspected processing plants several times daily to prevent the harvest of any oil-contaminated fish, and conducted inspections of potentially contaminated boats.
- During 1989 detained more than 490,000 pounds of decomposed salmon, another nearly 300,000 pounds of adulterated salmon potentially contaminated by the results of the oil spill, plus thousands of pounds of halibut, herring, oysters and crab. The efforts protected the consumer and ensured the reputation of Alaska's seafood.

Activities in FY 93

Upcoming activities include:

- Initiate domoic acid sampling program for shellfish and dungeness crab.
- Initiate PCB sampling program of all Alaska fin fish.
- Continue detailed inspection program, which may help open more areas for fishing.
- Training inspectors to standardize inspections statewide.

Program Costs

The cost for the seafood program in FY 92 is about $1.7 million.

Program Benefits

Since 1982 there have been no incidents where contaminated fish have reached market and no cases of botulism reported from Alaska seafood. The program has guaranteed the wholesomeness and safety of seafood stocks and helped increase the market for Alaska seafood, helped Alaska stocks compete against foreign, pen-reared salmon, and helped to promote satisfactory prices for the catch.

COMPARISON OF REQUIREMENTS OF THE U.S. "CONSUMER SEAFOOD SAFETY ACT OF 1991" AND STATE OF ALASKA INSPECTION PROGRAM

REQUIREMENTS OF PROPOSED ACT	PRESENT STATE PROGRAM	ACTION NEEDED TO UPGRADE
1. Administration of a comprehensive shellfish safety program in compliance with the National Shellfish Sanitation Program (NSSP) requirements.	Growers, harvesters, transporters or processors of bivalve shellfish must comply with the FDA administered National Shellfish Sanitation program. The State of Alaska shellfish program is currently certified by the FDA. Certified Alaskan operations are listed in the monthly Interstate Shellfish Shippers Listings.	No additional changes are needed in the certified program. Limited additional sampling is being done for the marine toxin, domoic acid. However, additional laboratory staffing/equipment is needed to conduct a comprehensive domoic acid sampling program, as well as, increase analysis of seafood products for contaminants such as PCBs, heavy metals, Listeria and Vibrio.
2. Develop health-based standards for safety and sanitation in handling and processing of fishery products (based on Hazards Analysis Critical Control Point (HACCP) at shore based facilities or on board processing vessels. Standards must be established for contaminants such as: bacteria, chemicals, parasites, and toxins. Processors must provide training for employees in sanitation and quality control. The state must have an inspector training program. Appropriate legal authorities must be available for the state inspection program. Plants must be registered with the regulatory agency.	The basic elements of the Alaska inspection plan are: a HACCP based plant inspection plan, plant plant registration, plan of operations (QA plan), enforcement and detention. Both shore based and and floating processors are routinely inspected based on public health risk. Contaminant levels exist for shellfish and marine toxins based on NSSP standards. Other existing federal standards are applied where appropriate (i.e. PCBs, pesticides, domoic acid, etc). Operations are inspected and training performed at the retail level to ensure that retail food store employees handle seafood products properly. Adequate legal authority is provided.	Processor's employee training program needs to be identified and evaluated for equivalency to a state training program. A formal state training program would need to be developed in coordination with processors and other appropriate agencies. Enhance the existing retail inspection and employee training program to ensure that fisheries products are properly handled at the retail level.
3. If it is determined that no practicable alternative exists for ensuring the safety of fishery products, develop standards for handling, storage and transportation of fishery products on board fishing vessels and tenders.	ASMI has developed basic guidelines for handling fishery products on board vessels but no vessel vessel inspection program currently exists.	A vessel inspection program, if adopted, could improve seafood quality by reducing product adulteration and encouraging better handling practices which will extend shelf-life. If a vessel inspection program were required for state certification, a program similar to the Canadian inspection program could be implemented.
4. Develop and administer a system to monitor fish growing areas and fishing grounds to identify areas where contaminated fish are likely to be caught and conduct research to determine relationship between polluted waters and seafood contamination.	Limited monitoring is presently being conducted for contaminants through product sampling. Intensive monitoring of shellfish growing/harvesting areas is conducted according to NSSP requirements.	Develop a formal product sampling program to evaluate possible product contamination. Work cooperatively with other agencies such as National Marine Fisheries (NMFS), Food and Drug (FDA), Alaska Sea Grant and other UAC program to identify locations where contaminations might occur and could pose a threat of contamination. Develop appropriate sampling.

(OVER)

REQUIREMENTS OF PROPOSED ACT	PRESENT STATE PROGRAM	ACTION NEEDED TO UPGRADE
5. Implementation of procedures and requirements to assure safety of imported fisheries products.	Bivalve shellfish product imported into Alaska from domestic or foreign markets are monitored for bacterial contamination but no other state monitoring program is in place. DEC works closely with FDA to remove any potentially contaminated products from Alaskan markets.	Continue existing shellfish monitoring surveillance and coordination with FDA to identify contaminated products. Participate in product recalls and market audits.
6. Establishment of a surveillance system regarding health risks associated with human consumption of fishery products including commercial compared to noncommercial products, Alaskan vs. imported products, and contamination of products prior to vs. after sale to the consumer.	Foodborne illnesses which are specifically identified are investigated by the state epidemiologist. This office also maintains statistics on reportable human diseases botulism and PSP.	In cooperation with NMFS and other appropriate agencies develop a surveillance system to collect information regarding health risks associated with consumption of fishery products.
7. Develop public education and advisory program which provides information and improves public awareness of state standards and promotes public understanding and acceptance of such standards and requirements; advice to recreational and subsistence harvesters regarding health hazards associated with fish they may harvest and precautions to safeguard themselves from harm; information to health professionals regarding persons at risk; that they may advise at risk individuals; health advisories concerning seafood safety.	No specific public education program exists but several state agencies provide information to the public regarding seafood safety. DEC issues public health alerts when health concerns such as elevated PSP toxin levels are identified.	DEC will work with other state and federal agencies such as ASMI, Alaska Marine Advisory, NMFS, MMPA, etc to develop information regarding seafood safety. Explore establishment of a consumer 1-800 Hotline to provide information regarding seafood safety.
8. Design/implement seafood related research such as relationship of contaminated growing sites to human illness, improved sanitation and quality control, and development of methods for determining and detecting the presence of harmful contaminants in fishery products.	Various state and federal agencies are conducting research in these areas.	Inventory existing on going research and identify additional research needs. Work through Alaska Marine Advisory Program, NMFS, etc. to implement required research.

DEPT. OF ENVIRONMENTAL CONSERVATION

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January 16, 1992

STATEMENT FOR THE HOUSE RESOURCES COMMITTEE HEARING, JAN.16, 1992
CONSUMER REPORTS ARTICLE & RELATED MEDIA COVERAGE ON FISH SAFETY
BY JOHN A. SANDOR, COMMISSIONER, DEPT. OF ENVIRON. CONSERVATION

Mr. Chairman, Thank you for the opportunity to testify on this very important subject.

The Department of Environmental Conservation (DEC) is working closely with the Department of Commerce & Economic Development (DC&ED), Alaska Seafood Marketing Institute (ASMI), the Alaska Department of Fish and Game (ADF&G), the Department of Health and Social Services (H&SS) National Marine Fisheries Service (NMFS), the Food and Drug Administration (FDA), the Environmental Protection Agency (EPA) and others to minimize the adverse effects from this inaccurate and unfortunate story.

Specialists from the above agencies agree there are no (polychlorinated biphenyls) PCB problems with Alaska salmon.

The Alaska Seafood Inspection program is regarded as the best in the United States. To ensure Alaska seafood is wholesome and safe, Alaska has a year-round seafood inspection program. Alaska inspectors examine seafood for contamination and decomposition and monitors distribution operations within Alaska. State inspectors visit processing plants to make sure they are run according to an approved plan of operation, that equipment is running properly, and seafood is handled appropriately. In addition, our staff works very closely with the FDA, NMFS and other organizations on special situations which arise to be certain our actions are effectively coordinated. For example, in the special processing and shipment of surplus salmon from Prince William Sound to the Soviet Union last year, DEC seafood inspection personnel were on line in Prince William Sound assuring the processing was in accord with standards.

Kit Ballentine, who heads our Environmental Health Division and Manny Soares, Chief of our Seafood Section are in Seattle working with the National Marine Fisheries Service, the Food and Drug Administration and others on this and related issues.

Accompanying this statement is a brief summary of the Alaska Seafood Inspection Program.

We would be pleased to respond to any questions you may have.

SEAFOOD INSPECTION PROGRAM

The Seafood Program consists of a Program Manager and his staff of 5; a Seafood Permit Coordinator, Shellfish Coordinator, Cannery Specialist and a Field Supervisor who supervises 11 field inspectors throughout the State at 7 locations listed below:

Kodiak - 2 inspectors
King Salmon - 1 inspector
Anchorage - 2 inspectors
Cordova - 1 inspector
Ketchikan - 2 inspectors
Dutch Harbor - 2 inspectors
Soldotna - 1 inspector

Additionally, Environmental Health Staff are crossed utilized in an effort to increase statewide coverage where Seafood staff is not immediately available.

Inspections are conducted on minimum schedule which is in direct relation to PUBLIC HEALTH RISK! An example of this would be as follows:

Canned or Smoked Salmon are at a higher risk of contamination due to increased handling and processing. Cold or frozen fish are at a lesser risk.

The following numbers represent the total number of Seafood Inspections conducted annually.

1988 - 948 inspections
1989 - 782 inspections
1990 - 710 inspections
1991 - 1418 inspections

Through the efforts of the Seafood Program, Voluntary Destructions have been reduced in 1991 by more than half. Improved handling of fish products, quality inspections and improved training have helped increase the credibility of Alaska Seafood Products.

Facts you should know about Alaska salmon

- Experts from the FDA, EPA and the Alaska Department of Environmental Conservation have stated that there are no PCB problems with Alaska salmon.

- There is no indication that any of the estimated 20 salmon samples tested by *Consumer Reports* were wild Alaska salmon. All of the salmon was labeled "fresh" and purchased within the last six months, a time when very little salmon is commercially harvested in Alaska.

- Salmon is distinguished by species and point-of-origin. *Consumer Reports* completely ignored this fact, to the detriment of the Alaska seafood industry and the consumer, in their statement that 43% of salmon samples tested positive for PCBs. The consumer is hurt because the info is misleading and incomplete.

- These are serious allegations and the Alaska Seafood Marketing Institute (ASMI) is doing everything in its power to get *Consumer Reports* to clarify the data. At this time, *Consumer Reports* has not been forthcoming with any additional information regarding their testing.

- The Alaska Seafood Marketing Institute has submitted wild Alaska salmon for PCB testing to both a federal agency and an independent research firm.

- 20 salmon samples taken from two markets, with no species identification or point-of-origin information, does not approach an acceptable amount of data from which one can issue such a sweeping indictment.

- Since its inception more than 10 years ago, ASMI's Seafood Quality Assurance Program has helped ensure the proper handling of Alaska seafood products through the distribution of educational and technical information to fishermen, processors, cold storage operators, distributors, foodservice and retailers. By way of these materials, videos and learning aids, serious efforts are made to educate each of the critical links in the distribution chain about how to maintain the quality of Alaska seafood on its way to the consumer.

- To ensure Alaska seafood is wholesome and safe, the Alaska DEC has a year-round seafood inspection program. Alaska inspectors examine seafood for contamination and decomposition and monitor distribution operations within Alaska. State inspectors visit processing plants to make sure they are run according to an approved plan of operation, that equipment is running properly, and seafood is handled appropriately.

- Alaska has the most pristine waters in the world, according to research by the National Oceanic and Atmospheric Association (NOAA). Analysis of strategic sample sites conducted by NOAA, such as the "National Benthic Surveillance Project: West Coast," shows Alaska's fishing grounds are located in waters free of pollutants.

For more information write the Alaska Seafood Marketing Institute at
1111 West 8th Street, Suite 100, Juneau, Alaska 99801-1895,
call (907) 586-2902, or FAX (907) 463-3273.

Alaska Seafood
Marketing Institute

MEMORANDUM

ALASKA SEAFOOD MARKETING INSTITUTE

TO: Alaska State Legislature

FROM: Kim Elton, Executive Director ASMI

DATE: January 16, 1992

SUBJ: Update on ASMI Activities

I am sending you a copy of the *Consumer Reports* article and press release. Also, to keep you informed, below I have listed the latest developments in this crisis.

As expected, the national news media has picked the story up and is running with it. Some of the media is in support of the study; however, there are many others that present both sides of the issue.

Our counsel at McDermott, Will and Emery is currently drafting communications to be sent to *Consumer Reports* policy makers.

The National Fisheries Institute has issued a press release to the national press stating that the article is inaccurate.

The embassies have been notified and are working on damage control outside the United States. Their information includes approved statements from the FDA stating that Alaska salmon is safe. Other options also are being explored.

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Juneau, Alaska 99801
Phone: (907) 586-2902
FAX: (907) 463-3273

MEMORANDUM

TO: Members of the Alaska State Legislature

FROM: Kim Elton, ASMI Executive Director

DATE: January 15, 1992

RE: *Consumer Reports* Press Release and Article

The last 36 hours have been hectic but it is important to pause and outline what has happened and what we are doing about it.

In a press release, *Consumer Reports* hypes an article scheduled for the February edition. That edition will hit the streets January 28. The press release was issued earlier this week and it is "embargoed" until Thursday morning (tomorrow) at 6 a.m. The press release has generated significant interest, including but not necessarily limited to, CNN, Wall Street Journal, New York Times, Good Morning America. NFI is talking with them. The pertinent parts of the press release include:

*". . .PCBs--potential carcinogenic and reproductive hazards--were found in 43 percent of the salmon tested. . ."
*"30 percent of the fish (not just salmon) tested. . .was spoiled."
*"Pregnant women or women who expect to become pregnant should avoid eating salmon. . ."
*Most healthy adults should not "eat salmon, swordfish, or lake whitefish more than once a week."

We have also received a bootleg copy of the article scheduled to appear. The article is the featured article on the magazine cover. The cover includes a picture of fishermen unloading a net of fish on deck with the headline teaser "IS OUR FISH FIT TO EAT?"

The article focuses on fish handling practices--especially at the retail level. We have a poor quality fax of the article that cannot retransmit but do expect to get a better copy by Fed Ex--hopefully today. When we receive a copy, I will fax to all. While the entire article is extremely negative, the most pertinent part may be the discussion of PCBs.

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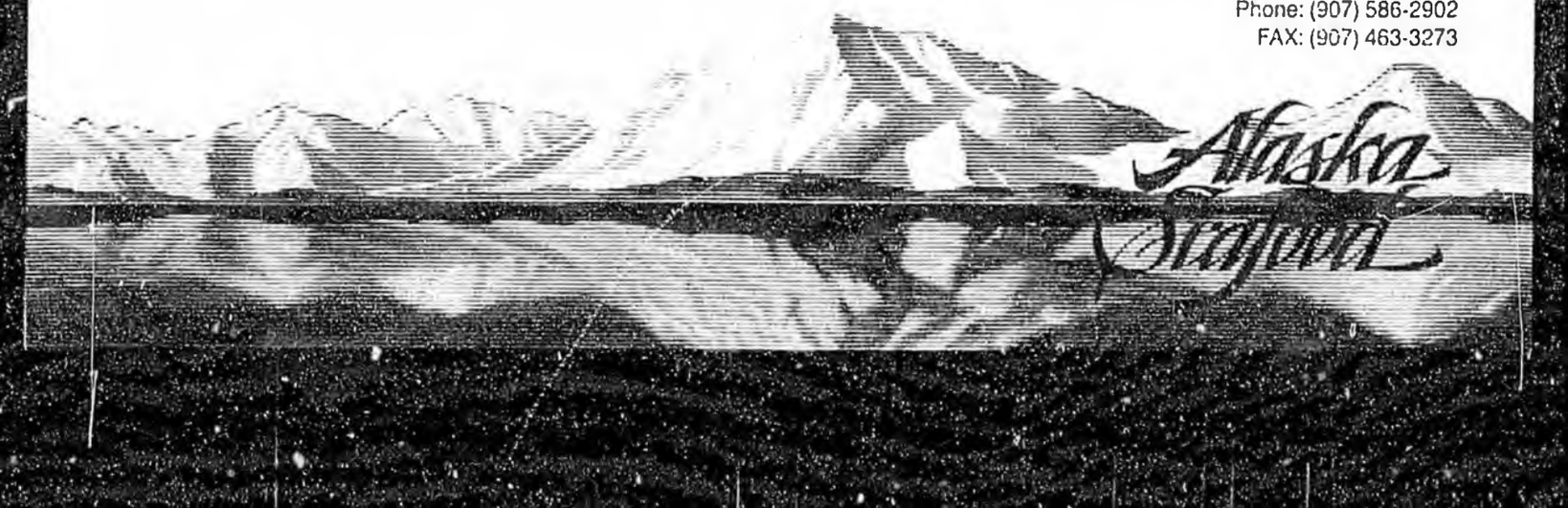

I've retyped the following paragraphs directly from the article. The quotes follow a discussion of the FDA setting the level for PCBs in fish at 2 parts per million.

"Given these facts, we think even 1 part per million of PCBs in fish is too high. Our laboratory detected levels ranging from 0.2 to 2.1 parts per million in our whitefish, swordfish, and salmon. Three out of ten samples of whitefish contained PCBs exceeding 1 part per million: three out of 20 samples of swordfish did.

"Seven of ten salmon samples we purchased in New York contained PCBs ranging from 0.7 to 1.3 parts per million. Thirty percent of the samples from Chicago had detectable levels, ranging from 0.2 to 0.8 parts per million.

"Some of our Chicago salmon samples were probably species from the west coast, at least that's what the store clerks told us. Those salmon may have come from less-contaminated waters than fish from the Atlantic or the Great Lakes, the possible sources of fish we purchased in New York. However, because the package labels, store clerks, and signs were not always believable, we could not tell for sure where our fish was from.

"Nor could we tell whether it was farm-raised as some salmon is. Just because salmon is farm-raised doesn't mean it is contaminant free. Farm-raised fish spend part of their time in pens in the ocean. Their diet also consists of manufactured feed, which is based largely on fish that may have contained PCBs."

Other than the last paragraph, there is no discussion of origin or species of salmon in the article and no discussion at all in the press release. In our discussions with the magazine (only at the functionary, not policy, level--they won't let anybody talk to anyone other than people in their PR department), they indicated that no distinction was made in the tests between species or point of origin. Magazine buyers apparently bought 20 salmon samples (10 in New York City and 10 in Chicago) in steak and fillet form. Based on this extremely small sample size and lack of data about species or origin, the sweeping indictment of salmon is totally irresponsible. FDA agrees and is preparing, according to their director of policy, attack quotes--especially on the outrageous statements about salmon.

On Tuesday, ASMI:

--initiated data collection from EPA and FDA on all tests of Pacific salmon;
--arranged to have Alaska salmon sampled for PCBs at a NMFS lab and independent lab;
--began working with Burson-Marstellar, the crisis public relations agency we used following the oil spill;
--contacted our Washington, D.C., counsel who arranged to have one of the partners with extensive experience with the apple\Alar and Chilean grape food contamination cases, and who has contacts at Consumer Reports, work with FDA and the surgeon general for supportive statements re: Alaska salmon and the lack of PCB point sources in the North Pacific;
--that counsel will also talk directly to *Consumer Reports* about the irresponsible reporting and determine how strong letter to follow should be written;

--met with state cabinet level officials from Fish and Game, Environmental Conservation, Commerce and Economic Development, and Health and Social Services about the dangers ahead, briefed the governor's office by memo and phone (face-to-face meeting in gov's office at 1:30 today);
--initiated a "talking point" paper to distribute to board, industry, congressional delegation, state agencies (we are revising now that we've got the article and will distribute when completed)--this will be developed into an "action" page for distribution to trade based on monitoring of the news stories by Burson-Marstellar and their advice; and
--worked with NFI on coordinated approach.

We will continue to keep you updated on the situation. If you have any additional questions or need more information, please feel free to contact Mary Gore on my staff.

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HANDLE WITH CARE
A Retail Seafood Quality Primer

CHAPTER ONE
Introduction

Seafood is the food of the 1990s. Light and healthy, seafood is becoming the choice of the growing number of Americans who are counting calories, cholesterol and vitamins.

The popularity of seafood is apparent in increasing retail sales figures and the growth of full-service retail seafood counters. The Alaska Seafood Marketing Institute (ASMI) is working hard to support the seafood efforts of retail stores with advertising and promotional programs.

But, ASMI believes that long-term retail success with seafood involves more than just advertising. The key to repeat sales is consistent delivery of a variety of high quality products. That's why ASMI developed this quality primer for Alaska seafood's most important sales representative—the person behind the counter.

These quality tips are designed to help you lure potential customers to your counter and keep them coming back after their initial purchase. Our suggestions cover receiving, storage, handling, thawing, display and sanitation.

Why Quality Is Important

Seafood must be treated differently than beef, pork, lamb, poultry and other meat products. Fish and shellfish lack the tough muscular fiber of land animals, the natural temperatures of Alaska seafood generally hover something just above freezing, and seafood is accustomed to a very moist environment.

Consequently, seafood must be handled with care while being kept cool and moist. Rough handling or improper storage can severely damage the taste, aroma, appearance and texture of seafood products.

Few foods can match the delicate texture, rich taste and pleasant aroma of seafood when it's first brought aboard a fishing vessel. Freshly caught seafood smells like a clean ocean breeze and its flesh is firm, moist and flavorful. The transportation systems and technology of the 1990s allow most Americans to enjoy fresh seafood from around the world.

That fresh-caught flavor now is successfully captured for months in frozen and canned seafood products. Indeed, today's frozen seafood often is superior in quality to fresh products; modern processing vessels can freeze a fish only hours after harvest, while it might take many days for the same fish to reach the market as "fresh."

The attitudes of all-too-many Americans toward seafood were shaped by an era preceding jet transportation, refrigeration and instant communications. Despite the growing interest in seafood, many consumers hesitate to make their first retail purchase, believing that seafood is difficult to buy and prepare.

Once you've convinced consumers to make a purchase, you want to make certain that their senses are delighted rather than assaulted. Promotion may convince someone to give seafood a try, but it's product quality that will keep customers coming back for more.

How Seafood Quality Is Lost

The spoilers of seafood quality—bacteria, enzymes, dehydration, oxidation, contamination and physical damage—will strike whenever they are given an opportunity.

Bacteria and enzymes (proteins that aid in digestion) are present in all fish and shellfish, but their activity increases at higher temperatures and in areas where nutrients such as blood, slime and scales accumulate. These spoilers break down the flesh of seafood, turning firm, resilient tissue soft and mushy. This process affects taste, odor, appearance and texture.

Strong "fishy" smells are clues that bacteria and enzymes are at work in your store.

Mishandling of whole, fresh seafood ruptures blood vessels and causes bruising. Blood also can seep into the flesh of fresh, whole fish when they are picked up by the tail. The weight of the fish can separate the backbone and break major arteries which still contain blood even though the fish may be eviscerated.

While a juicy red steak may appeal to the eye of a passing customer, a blood spotted fish fillet will not. Bruised seafood flesh has a strong "fishy" taste and odor. The presence of blood in bruised seafood also speeds up the oxidative process which occurs when oxygen mixes with the fish's fats and oils. Oxidation leads to rancidity.

Seafood flesh exposed to the air will dehydrate. This loss of fluids decreases the net product weight and damages texture and color. Dehydration is most commonly recognized as "freezer burn," but the process strikes fresh and frozen products alike.

Beating the Spoilers

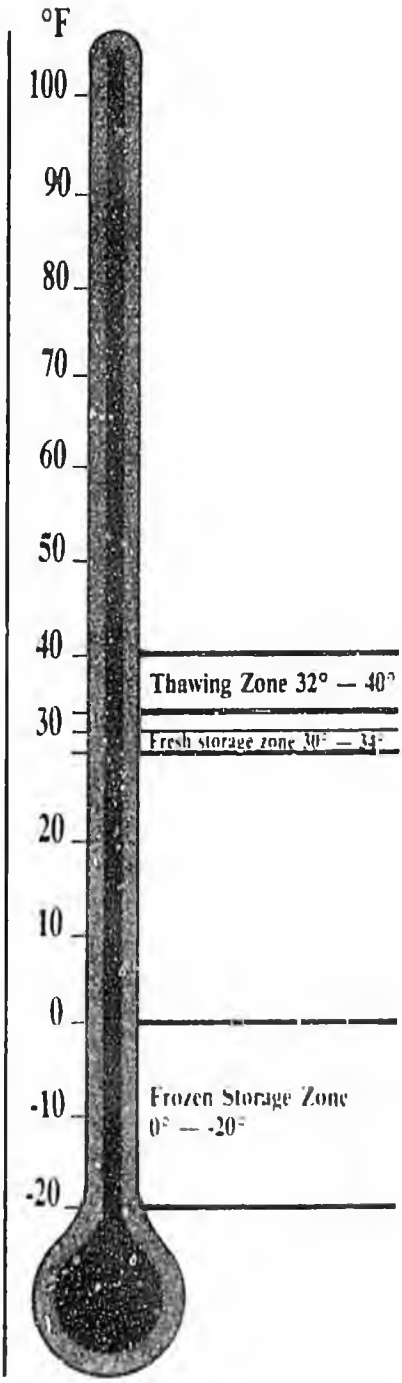
The formula for beating the quality spoilers is very simple: Keep seafood clean, cool, moist and moving. Handle seafood with care and pay close attention to temperatures and sanitation.

Temperatures are particularly important. A fish held at 50° F. will spoil five times faster than one held at 32° F. Even the difference of a few degrees can be critical. A good rule of thumb is that product shelf life is cut in half by every 10° F. increase in temperature.

Remember, temperature can be your friend or foe. Maximum product life can be obtained by holding fresh seafood at 30-34° F. and frozen products at −10° F. or colder. While a particular fresh seafood product may store well at 32° F. for a week, the same fish held at 37° F. may last only 3-4 days.

Sanitation also is critical in seafood operations. Cooling fresh seafood to 32° F. only slows down the destructive activities of bacteria and enzymes. The activity of enzymes speeds up as temperatures increase, and bacteria multiply in proportion to the temperature and available food supply.

Temperature can be your friend or enemy. The optimum holding temperatures for maintaining product quality are 30° to 34° F. for fresh seafood and -10° to -20° F. for frozen seafood. Thaw frozen seafood at 32 — 35° F.



If a work table isn't thoroughly cleaned, bacteria will multiply rapidly in the accumulated blood, slime or bits of seafood flesh. The bacteria strike quickly when they come in contact with another piece of seafood. If your shop has unpleasant "fishy" odors, it usually means there's a gap in your sanitation efforts.

Follow rotational policies closely. Seafood always should be handled on a 'first in, first out' basis. This is particularly critical for fresh seafood because of shorter shelf life, but it also should be applied to frozen product display cases.

Protect fresh seafood from dehydration and airborne contamination by keeping it covered. Perforation of plastic bags and other airtight containers used for storing fresh seafood is recommended, as some fresh seafood should not be held for extended periods of time in airtight containers.

Frozen seafood should not be exposed to oxygen. Frozen products should be held in airtight containers or be shielded from oxygen by protective coverings such as water glaze or vacuum packaging.

Always view your seafood displays and merchandising efforts from the customer's perspective. Move around to the other side of the counter to evaluate your results.

Get to know as much as you can about the products you handle. The knowledge will help you give your customers the best possible seafood, while allowing you to answer with authority questions about handling and preparation.

You're the "expert" consumers will turn to when hesitating to purchase an unfamiliar product. Your degree of confidence in the products you handle is likely to make a tremendous impression on shoppers.

CHAPTER TWO
Fresh Seafood

KEEP FRESH SEAFOOD

COOL

Hold fresh seafood at 30-34° F.

CLEAN

Use detergents and sanitizers to clean display cases 2-3 times a week.

MOIST

Hold on ice, cover or mist seafood periodically with an atomizer of cold water.

MOVING

Rotate fresh seafood in display cases on a first-in, first-out basis.