

ALASKA LEGISLATURE COMMITTEE FILES 1993-1994 8672

8078 HOUSE RESOURCES

343

PACFISH TEST
NATIONAL FOREST LANDS
AD PAXC1

- AHMU-CLASS 1 STREAMS 300 FT
- AHMU-CLASS 2 STREAMS 300 FT
- AHMU-CLASS 3 STREAMS 300 FT
- LAKES 300 FT
- HARVESTED AREAS
- △ ROADS
- WETLAND SOILS 150 FT
- RIPARIAN SOILS 150 FT
- MMHAZ SOILS 100 FT
- NEPA CLEARED



Map 2. Kuiu Island quadrangle PAXC1 showing PACFISH designated buffers. Gray areas are previously harvested units.

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less timber. Present planning guidelines for the Tongass provide for approximately 2 million board feet of timber per mile of road. Under PACFISH this would drop to 0.5-1.5 million available board feet per mile of road estimated to access the timber. This impact would make it extremely difficult to avoid below cost timber sales on the Tongass.

TABLE 1: Effects of PACFISH on harvestable timberlands on the Tongass National Forest

| Timberlands | NET Tentatively Suitable Timberlands | | | Suitable and Available | | |
|------------------------|---|---------|----------|------------------------|---------|----------|
| | Land Unit | *Pre-PF | *Post-PF | % Change | *Pre-PF | *Post-PF |
| PAXC1 | 44,795 | 25,683 | 43 | 24,827 | 13,419 | 46 |
| Tongass 4 Quad Ave. | 40,150 | 22,211 | 45 | 30,070 | 16,804 | 44 |

* Acres PF=PACFISH

An additional feature of the PACFISH program is that road design standards are upgraded to 100 year flood events for culverts and bridges. This is retroactive to existing roads. Present design criteria for the Tongass are 50 year events for bridges and 25 years for culverts, with an 18 inch minimum culvert size. The cost to retrofit existing roads is estimated to be \$100,000 per mile, while the additional cost for new construction to the 100 year flood standard is \$50,000 per mile.

An associated effect of implementing PACFISH is that the total [suitable/available] Tongass timber base would drop approximately 45% from 1.9 million acres currently in the available timber base to 0.95-1.14 million acres. This would only support an annual harvest of less than 200 million board feet per year on a sustained yield basis. Such annual harvest rates would immediately impact both pulp mills and the existing sawlog industry in the State. At present 52% of the logs off the Tongass are suitable only for the pulp mills. of the remaining timber, 11% is exported, and 37% is milled. Waste from milling operations provides an additional 21% of the timber supply to the pulp mills.

TONGASS SALMONID FISHERIES

The Alaskan situation with regard to anadromous Pacific salmonids is entirely different than is the case in California, Idaho, Oregon, and Washington. The status of Alaskan stocks of anadromous Pacific salmonids is most generally strong and healthy. None of the thousands of stocks of anadromous Pacific salmonids in Alaska are listed as threatened or endangered, none of the stocks are considered extinct, and none of the stocks

are yet classified as of "special concern." Rather, all of these stocks are at this time considered "secure." In recent years there has been an apparent decline in steelhead stocks throughout their range. This decline has been attributed primarily to high seas fishery impacts. There are also two salmon stocks listed as sensitive by the U.S. Forest Service, the Hyder chums and the Island chinooks. The Hyder chum fishery is under international treaty regulation and is not impacted by logging in Southeast Alaska. The Island chinook run is a unique king salmon run of special interest to the State, and is located within a watershed that is totally protected from logging activities.

Major timber harvests in Southeast Alaska have taken place, predominantly using clearcutting as a harvest method, since the early 1950's. Large scale conversion to second growth, now on the decline due to a variety of reasons including withdrawal of land from multiple use by TTRA. Alaska commercial salmon harvests for Southeast are shown in figures 7 and 8, while timber harvest for the last 10 years are shown in figure 9 and exhibit no direct relationship. Fish returns are dynamic, with record runs for one fishery or another common, with no recorded or perceived correlation between runs and timber harvest. That is true for tests against any annual timber harvest and for any aggregation of timber harvests. This is in contrast to the relationship shown in figure 10 for the Alaska fishery enhancement program, which correlates with increased commercial catches since its inception.

In many areas, roads, required and constructed by timber harvests, have enabled dispersion of sport and subsistence fishing effort. Fishing communities scattered throughout the region enjoy and depend on federal timber dollars.

The situation with regard to the four H's is also entirely different in Alaska. Very few hydroelectric facilities have been developed in Alaska; those that have been developed have not been situated on streams with major anadromous salmonid runs- as a result, impacts of hydroelectric facilities and operations on stock status of anadromous Pacific salmonids in Alaska has been and continues to be nil.

Hatcheries have been developed in Alaska to enhance fisheries rather than as mitigation efforts. The state has used an estimated \$300,000,000 of predominantly petroleum royalty and tax dollars to enhance fisheries, chiefly through hatcheries. Additionally, the state spends \$97.97 per capita managing its fisheries. Strong policies were and continue to be implemented by the State of Alaska to prevent potential transfer of diseases and to prevent detrimental genetic impacts from resulting from Alaska hatcheries.

Harvests of anadromous Pacific salmonids in Alaska is almost entirely

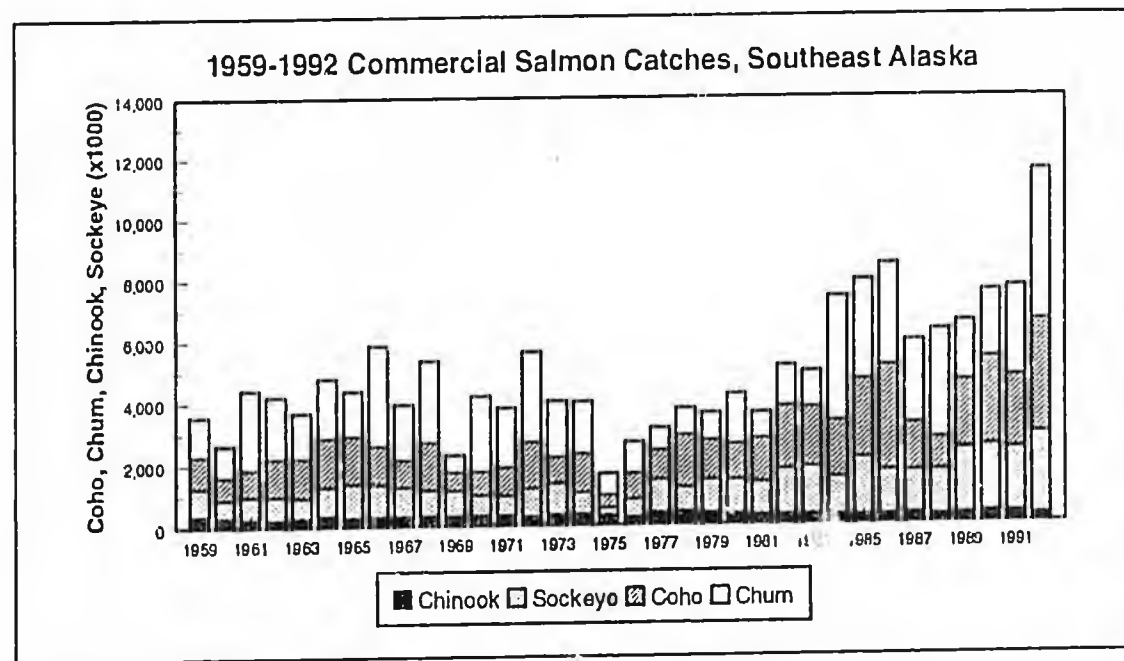


FIGURE 7

1959salm.cgm
1959salm.pcx

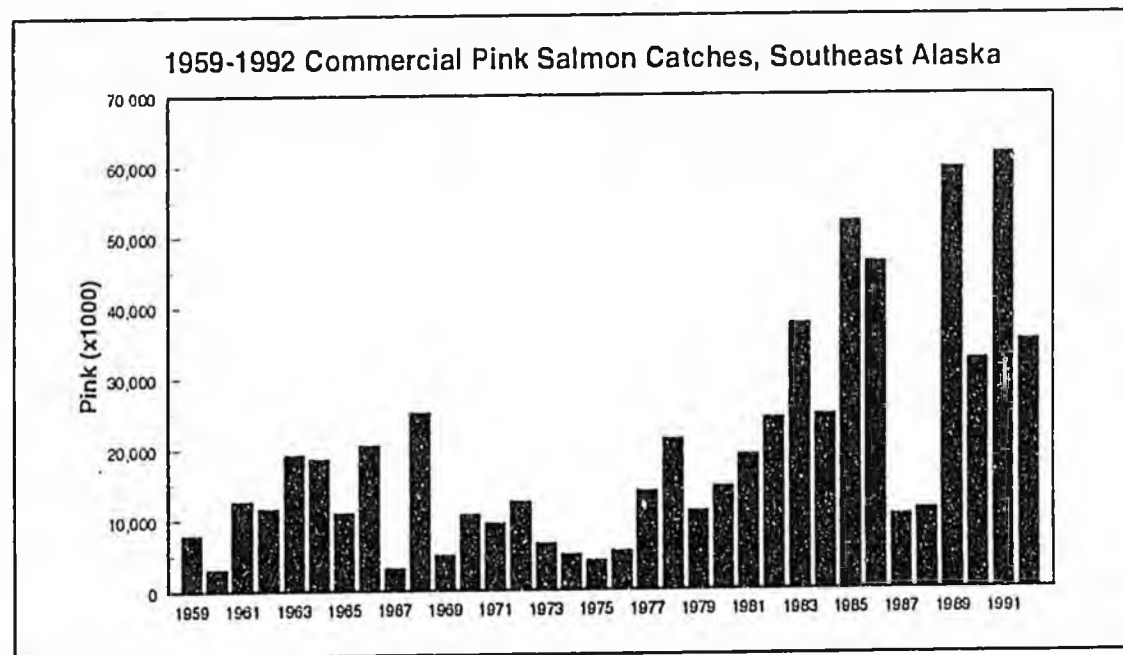
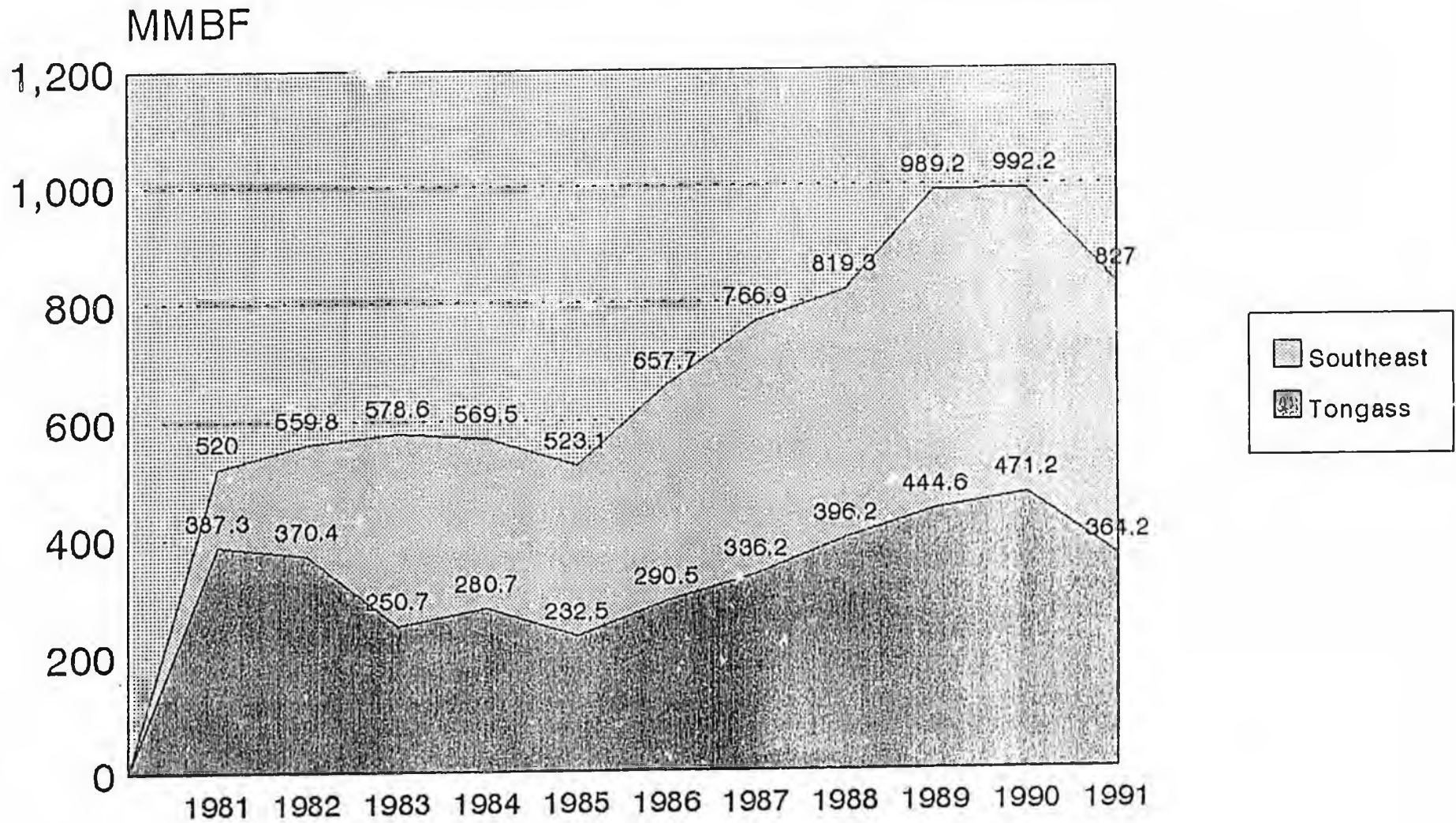


FIGURE 8

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Comparison of Timber Harvest Southeast Alaska and Tongass National Forest Figure 9



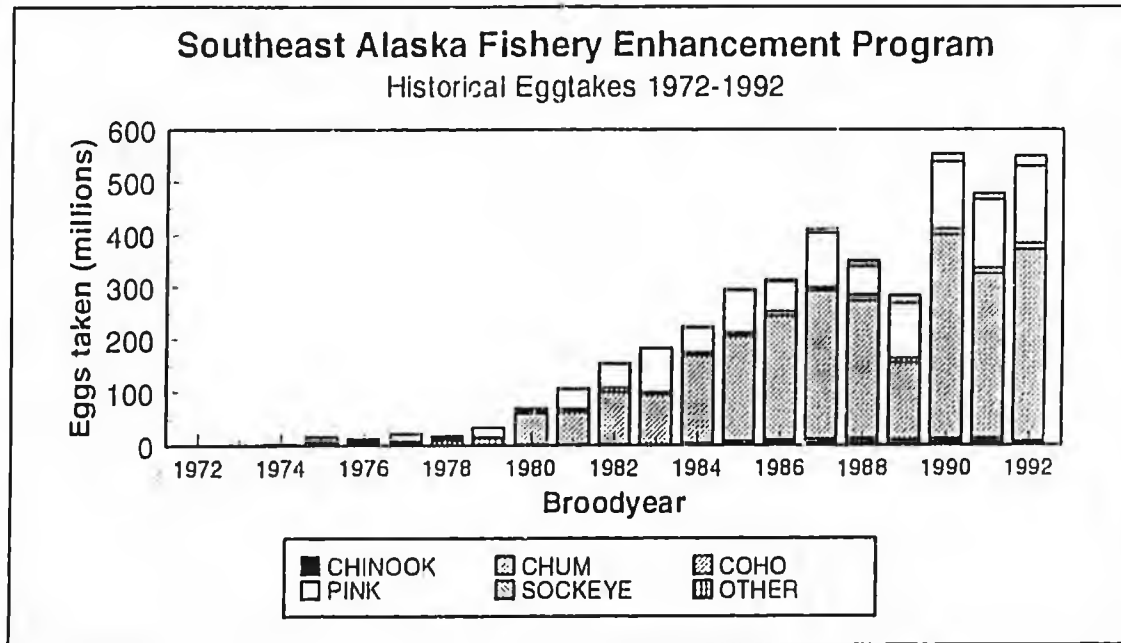


FIGURE 10

regulated by the Alaska Department of Fish and Game, (ADFG) and the Alaska Board of Fisheries (BOF) although some coordination occurs with various Federal entities. Management includes commercial, sport and subsistence fisheries, as well as habitat. The Alaska Constitution requires that fisheries be managed for sustained yield and that mandate has been interpreted by both ADFG and the BOF to apply on a priority basis to wild stocks even when that results in under-harvests of surplus hatchery stocks. Since Statehood, emergency order authority of local ADFG fishery managers to alter fishing areas and seasons has ensured healthy stocks of anadromous Pacific salmonids. Such management authority and action was shown most recently in Southeast Alaska when both catch and gear restrictions were imposed on an emergency basis to ensure that chinook sport harvest levels remained within quota limits established by the BOF. Monitoring of the sport harvest, and projections of catch to the end of season, prompted this proactive management decision. As a result of the Constitutional mandate and the direct jurisdictional authority in Alaska, harvests of anadromous Pacific salmonids have been at record levels and yet spawning requirements have been met resulting in strong and healthy runs of almost all stocks.

RIPARIAN AND INSTREAM HABITAT PROTECTION ON THE TONGASS

The instream and riparian habitat of the majority of streams in Alaska that lie outside of communities is in pristine condition. However, areas logged on state and private land prior to May 1990, when the Alaska Forest Resources and Practices Act (FPA) was revised, and areas logged on the Tongass National Forest prior to the Tongass Timber Reform Act (TTRA) of 1990, did not receive the level of fish habitat protection that experts now know is needed. For example, some freshwater systems in southeast Alaska have been impaired due to past logging practices that included clearcutting to the stream bank and retaining inadequate buffers along streams. Effects of these practices included blowdown of forested stream buffers, increased temperature in temperature-sensitive watersheds that were heavily clearcut, and sedimentation of streams due to extensive networks of unpaved roads in a watershed.

In response to the growing awareness of the adverse impacts timber harvest can have on sustained yields of anadromous and resident freshwater fish important for commercial, sport and subsistence fisheries, as well as to many species of wildlife, the State of Alaska took the initiative in 1989 to strengthen the State FPA. The Alaska Legislature revised the FPA in 1990 based on recommendations resulting from lengthy negotiations between state and federal resource agencies, environmentalists, fisheries groups, tourism groups, and the timber industry. The FPA requires that logging on federal land in Alaska protect fish and wildlife resources by implementing the following standards, among others, under the Alaska Coastal Management Program

(ACMP). The FPA is one of the standards of the federally approved ACMP and thus requires that federal actions be consistent with State law and regulations.

Since 1990, with regulation of riparian areas under the TTRA, ACMP, and the FPA, fish habitat on the Tongass National Forest has been protected both through forest-wide requirements and through the ability to require additional protection due to site-specific conditions, as follows:

1) Harvest of timber may not occur within 100 feet from the shore or bank of an anadromous or high value resident fish waterbody [except where variations to this standard are approved by the Alaska Department of Natural Resources (DNR), with due deference given to the Alaska Department of Fish and Game (ADF&G)]; (ACMP/FPA)

"High value resident fish" means resident fish populations that are used for recreational, personal use, commercial, or subsistence purposes.

2) Forest land shall be administered for the multiple use and sustained yield of the renewable resources of the land in the manner that best provides for the present needs and preserves the future options of the people of the state;(ACMP/FPA)

3) There may not be significant impairment of the productivity of the land and water with respect to renewable resources;(ACMP/FPA)

4) Allowance must be made for important fish and wildlife habitat.(ACMP/FPA)

5) Commercial timber harvest is prohibited within 100 feet of Class I streams or resident fish streams that flow directly into Class I streams (TTRA). (Class I is defined as anadromous fish streams or streams that could become anadromous fish habitat through enhancement.)

6) Timber harvest between 100 and 300 feet from an anadromous or high value resident fish waterbody may occur but must be consistent with the maintenance of important fish and wildlife habitat. This provision of the FPA may be applied to federal lands where data indicates this provision is needed if logging on federal land is to be consistent with the ACMP (ACMP/FPA).

7) Best management practices must be followed to control non-point source pollution of any waters, including those without fish (ACMP/FPA).

8) Additional protection for fish habitat may be required on federal land through the adoption of a forest plan or a coastal district management plan (ACMP). For example, the 1991 draft revision of the Tongass Forest Plan would not allow programmed commercial timber harvest within 100 to 200 feet from certain types of low-gradient floodplain rivers and estuarine channels, or within 100 to 500 feet of certain types of estuarine channels. It would also recommend 269 miles of Wild and Scenic River designation by Congress along which timber harvest would be prohibited within 1/4 mile of the river.

The state resource agencies are also able to condition the design of timber harvest support activities, including log transfer and sort yards, under the ACMP review process. For example, the ACMP standards generally do not allow dredge-and-fill operations to disrupt the movement of fish in a waterbody; offshore marine areas must be managed as a fisheries conservation zone; and wetlands and tideflats must be managed so as to assure adequate water flow, nutrients and oxygen levels and to avoid adverse effects on natural drainage patterns, the destruction of important habitat and the discharge of toxic substances.

The ADF&G has diligently pursued the protection of fish habitat on the Tongass National Forest through the revision of the Tongass Forest Plan. The department rejected the validity of the models initially proposed by the Forest Service (FS) to predict the effects of future logging and roading on fish production. The department also objected to the FS stating in public documents that increased harvests of salmon correlated with increased timber harvests on the Tongass in the absence of research to establish causal linkage of these two parameters. ADF&G has worked closely with the FS to develop forest-wide standards and guidelines that would provide fish habitat protection.

ADF&G has conducted a limited number of post-harvest field inspections and notified the FS of riparian buffers that had not been retained as required under the TTRA. The FS has responded positively to these inspections and is working to reduce or avoid mistakes in buffer layout. Finally, ADF&G continues to assert its authority to implement the State's Anadromous Fish and Fishways Acts on both the Tongass and the Chugach National Forests to ensure that instream and nearshore riparian fish habitat is protected during roading and logging.

Collectively, the intent of the TTRA, FPA, ACMP, and state fish habitat statutes are virtually identical to that of PACFISH: To ensure the adequate preservation of fish habitat by maintaining a short- and long-term source of large woody debris, stream bank stability, channel morphology, water temperatures, stream flows, water quality, adequate nutrient cycling, food sources, clean spawning gravels, and sunlight. Aside from achieving greater enforcement of Alaska's Anadromous Fish and Fishways Acts on national forests, these management instruments are already in place. In fact, the Commissioner of DNR began the final phase of undertaking a revised FPA program in Alaska when he adopted implementing regulations for the FPA in June of 1993.

WATER QUALITY MANAGEMENT ON THE TONGASS

Maintaining water quality in Alaska's National Forests through Best Management Practices (BMPs) implementation and effectiveness monitoring is a critical component of the FPA strategy. As the state's lead water quality protection and management agency, the Alaska Department of Environmental Conservation (ADEC) has the responsibility and the authority to control nonpoint source pollution on National Forest lands in Alaska.

Responsibilities for forestry related sources of nonpoint source pollution and water quality protection and monitoring between the ADEC and the Forest Service was formalized through a Memorandum of Agreement (MOA), signed on April 6, 1992. The purposes of the MOA are:

- 1) for ADEC and the Forest Service to commit to the responsibilities and activities to be performed by each agency pursuant to National Forest water quality protection tasks described in the Alaska Nonpoint Source Pollution Control Strategy (NPS Strategy), approved by the U.S. Environmental Protection Agency (EPA) in August 1990;
- 2) to ensure Forest Service activities meet Federal consistency requirements of
 - a. § 319(b)(2)(f) and 319 (k) of the Clean Water Act as amended (PL 100-4) as specified in pages 88 through 92 of the NPS Strategy,
 - b. § 313 of the Clean Water Act,
 - c. Executive Order 12088; and,
- 3) to establish the Forest Service as the agency responsible for monitoring and protecting water quality on National Forest System lands in Alaska for purposes of the Clean Water Act (CWA), as amended.

The MOA references three attachments that together constitute the "Forest Service Alaska Region Water Quality Management Plan." The ultimate purpose of this plan is to maximize water quality protection on National Forest Lands in Alaska by specifying ADEC and Forest Service water quality management and protection responsibilities.

The three MOA attachments are the:

- 1) Forest Service Soil and Water Conservation Handbook, Chapter 10 (FSH 2509.22); also known as the Forest Service BMP Handbook;
- 2) NPS Strategy; and
- 3) Alaska Water Quality Standards - 18 AAC 70.

Forest Service Soil & Water Conservation Handbook (BMP Handbook)

The Forest Service Soil and Water Conservation Handbook consolidates the Forest Service BMPs (including riparian buffer and management requirements) that are to be implemented for all ground disturbing activities on the Tongass and Chugach National Forests, including timber harvest related activities.

The Environmental Protection Agency (EPA) has recognized that BMPs are the primary mechanism to enable the achievement of State Water Quality Standards (WQS), and if designed and implemented in accordance with a State approved process, will normally constitute compliance with the CWA.

The Forest Service BMPs have been designed, when properly implemented, to achieve the WQS. The WQS are used in part as parameters of BMP effectiveness monitoring projects, information that is then used to determine the effectiveness of the BMPs. BMP implementation and effectiveness monitoring objectives are detailed in the BMP Handbook.

Periodic reviews of the BMP Handbook, as per MOA requirement and ADEC input, are done to help achieve the goal of BMP implementation meeting the WQS and protecting water uses such as growth and propagation of fish, shellfish, and other aquatic life. The latest revision of the Forest Service BMP Handbook was recently completed and effective June 25, 1993.

Alaska Water Quality Standards

The goal of the ADEC/Forest Service BMP implementation and effectiveness program is to meet the WQS found in 18 AAC 70. The WQS were developed in part to protect water uses such as growth and propagation of fish, shellfish, and other aquatic life. WQS are revised every three years based on new information, changing policies, and public concerns.

Other components of the Water Quality Program
on National Forest Lands.

- 1) Water quality is assured through the Alaska Coastal Zone Management Program using standards found in the FPA and the Forest Resources and Practices Regulations.
- 2) The state is currently preparing an assessment of the § 6217(g) of the Coastal Zone Act Reauthorization Amendments of 1990. A draft document analyzes the federal management measures, including forestry management measures, as part of Alaska's response to § 6217 (g). Final participation in this new federal program will be based on a final analysis of the program to Alaska and pending federal guidance.
- 3) Procurement of Clean Water Act 319 monies fund, in part, BMP effectiveness monitoring projects. An example is the Lake Florence BMP effectiveness monitoring project.
- 4) As required by § 305(b) of the Clean Water Act, the ADEC assesses and documents the quality of the state's waters. This document is developed every two years. In the 1992 report only three impaired waterbodies are listed associated with timber harvest activities.
- 5) ADEC participates with the Alaska Working Group on Cooperative Fisheries and Forestry Research. This working group is composed of agency, industry, and environmental interest groups with the goal to develop research priorities and procure funding for research projects.

The NPS Strategy

The NPS Strategy, approved by the EPA in 1990, integrates existing water quality programs to address nonpoint source pollution. For forest practices, the NPS Strategy details seven tasks to address forest source nonpoint source pollution specific to National Forest lands in Alaska. The MOA was revised in part to ensure that ADEC/Forest Service NPS Strategy tasks are adequately addressed.

The seven tasks that relate to National Forest lands in Alaska are:

- 1) revise and reauthorize the ADEC/Forest Service Memorandum of Understanding (now referred to as the MOA);
- 2) revise and reauthorize the Division of Governmental Coordination/Forest Service Memorandum of Understanding;

- 3) evaluate and certify the Forest Service BMP Handbook;
- 4) evaluate the effectiveness of Forest Service BMPs in meeting WQS and make appropriate revisions to the BMP handbook;
- 5) evaluate Forest Service planning framework, watershed and water quality protection guidelines, and inspection and enforcement processes;
- 6) conduct ongoing review and evaluation of selected Forest Service planning products: forest land management plans, EISs, EAs, contracts, annual operating plans, and harvest unit layouts; and
- 7) conduct ongoing, periodic field inspections of timber harvest operations on National Forest lands in cooperation with the Forest Service.

With the exception of task 2, all of the tasks have been or are currently being addressed by ADEC and Forest Service staff. A majority of the tasks are ongoing and require a priority commitment by the agencies. This priority commitment was made a part of the MOA. Additionally, to help ensure MOA implementation, the ADEC and Forest Service annually meet at a public noticed meeting to discuss Forest Service water quality monitoring reports and other MOA issues.

Impacts of the Proposed PACFISH Management Strategy
to the Southeast Alaska Economy
August 1993

INTRODUCTION

The forest products industry has been a major component of the Southeast Alaska economy since the 1950s. However in the 1990s, there is uncertainty regarding the future of the industry. This is due in large part to the restricted access to stable timber supplies. The proposed PacFish management strategy has the potential to have significant adverse impacts to the economy of Southeast Alaska by essentially shutting down this basic sector industry.

In 1992, the forest products industry, including timber harvest-related US Forest Service (USFS) employment, directly generated an annual average of 2950 jobs and \$124 million in payroll from Tongass Forest timber resources, excluding private (native) timber.¹ The forest products industry accounts for over one-third (34%) of all private basic industry employment, or 24% of all basic industry including government basic industry, in the region. This industry accounts for an even greater percentage of the key winter months private employment options for the region.

Forest Service estimates indicate 42% of the land base will be impacted by the proposed PacFish management strategy. Assuming this will ultimately correspond to volume of timber offered for harvest, which in turn corresponds to employment generated by the forest products industry, Southeast Alaska can expect a loss of 1711 jobs and a \$72 million reduction in payroll from direct employment alone.

For the purpose of this analysis, a conservative range, a 42 to 70% reduction in land base is carried through. It is important to note that additional impacts to the land base may be experienced depending on the PacFish alternative implemented. Furthermore, the economic viability of the remaining timber in current markets may effectively decrease supply by more than 70%.

¹Direct employment includes all labor involved in accessing timber, falling the timber and transporting the logs to sawmills or pulpmills, and finally processing the logs into lumber or pulp. Direct employment does not include labor involved with the supplying of remote camps, other transportation support of logging communities, or labor employed in the sales or contracted service of logging equipment, McDowell Group, 1993

IMPACTS OF PACFISH

Reduction in Land Base

The Forest Service prepared an analysis of the effects of the proposed PacFish management strategy on the Tongass by examining four pilot quads on Northeast Chichagof, Kuiu, and North Prince of Wales Islands. These four quads showed less than 15% variation. Thus it is reasonable to assume that they represent forest-wide effects. In the analysis it is estimated that 42-43% of the suitable forest lands would fall within riparian habitat conservation areas (RHCAs). If intermittent streams are assumed to be "Class IV" streams then the effect in terms of forest lands that fall within RHCAs would be increased to 52-53%.

The Forest Service also did a rough logging-transportation plan for the remaining timber resources. The plan assumes that, during watershed analysis, roads will be permitted through RHCAs. In the four transportation sheds analyzed, the amount of timber accessed per mile of road was reduced by 45%. Furthermore, new road construction would increase \$50,000 per mile and reconstruction to new design standards could be increased by \$100,000 per mile. These costs would be approximately double what is currently the case and will greatly impact the marketability of remaining timber resources. Added road construction costs could be expected to preclude additional timber stands from development.

An additional 13% would change in operability due to isolation brought about as a result of conflicts with RHCAs mandated by PacFish. The Forest Service assumes that individual tracts of forested lands isolated due to PacFish setbacks could only be harvested by helicopter. If these isolated stands are added to those directly impacted by the RHCAs the total land base is reduced by 65-66%.

What the Forest Service does not consider is the fact that the higher grade timber is, by and large, located on the better developed soils of the stream corridors. Thus, the economic viability of the remaining woodpile is further diminished. An actual percentage is not estimated in this analysis, but it is clear that the cumulative impacts of PacFish (both reduction in land base and economic viability) could effectively decrease supply upwards of 70%.

Regional Economic Impacts - Background

The modern forest products industry was born in the 1950s, when the pulp industry was drawn to the region. It was the assurance of supply via long term timber harvesting contracts that induced pulp manufacturers to make the huge investment required in Southeast Alaska. In 1954, the Ketchikan Pulp Company completed construction of a facility near Ketchikan and five years later, Alaska Lumber and Pulp Company completed construction of pulpmill near Sitka, marking a turning point in the economic development of these communities, in particular, and Southeast Alaska in general. Almost overnight, the forest products industry became Southeast Alaska's leading industry.

In the 1980s and 1990s, legislative and resource management issues have been as important as market conditions among the forces shaping the region's forest products industry. The net effect of the Alaska National Interest Lands Conservation Act and the Tongass Timber Reform Act was to significantly reduce the available Tongass timber resource. By placing high value timber off-limits, these acts have further reduced the overall quality of the Tongass timber resource. Finally, the Timber Reform Act mandated changes in Tongass management practices that could negatively impact timber availability of the remaining commercial forest land base.

PacFish Impacts on Employment

In 1992, estimates indicate that Tongass National Forest timber harvests generated an annual average of 2,500 jobs with a payroll of \$103 million. Included in Tongass forest products industry employment are approximately 900 pulpmill jobs accounting for \$40 million in payroll. These figures do not include pulpmill employed loggers or sawmill workers. The pulpmills are the largest single employers in Sitka and Ketchikan and the State of Alaska's largest manufacturing employers.

Sawmills generated the annual equivalent of 537 jobs during 1992. Sawmill workers earned approximately \$21 million in wages and salaries. Logging on the Tongass National Forest generated an estimated annual average of 840 jobs during 1992. Tongass loggers earned \$34 million in wages and salaries. Timber harvest-related road construction accounts for approximately 120 jobs (annual equivalent) to the Tongass forest products industry. These construction jobs accounted for about \$5 million in payroll earned during 1992.

Other basic components of the Tongass forest products industry added an additional 110 jobs and nearly \$4 million in payroll. This includes log scalers, towing and stevedoring workers.

The table below shows the potential range of impacts to the forest products industry employment and payroll as a result of implementing PacFish.

PacFish Impacts on 1992 Employment and Payroll

| Component | 1992 Average Employment | After PacFish | Total Payroll | After PacFish |
|-------------------------------|-------------------------|-------------------|------------------------|-------------------------------|
| Pulpmills | 906 | 272 - 525 | \$39.7 million | 11.9 - 23.0 million |
| Sawmills | 537 | 161 - 311 | \$20.8 million | 6.2 - 12.1 million |
| Logging | 840 | 252 - 487 | \$33.9 million | 10.2 - 19.7 million |
| Road construction | 120 | 36 - 70 | \$ 5.0 million | 1.5 - 2.9 million |
| Towing, Stevedoring and Other | 110 | 33 - 64 | \$ 4.0 million | 1/2 - 2.3 million |
| Tongass Industry Total | 2,513 | 754 - 1457 | \$103.4 million | \$ 31.0 - 60.0 million |

The Forest Service itself generated 935 full-time equivalent positions in Southeast Alaska in 1992. The Forest Service estimates that 448 are directly involved in timber sale preparation, implementation and management. These Forest Service workers earned an estimated \$20.8 million in annual payroll in 1992.

A very significant portion of Forest Service employment in Southeast Alaska, resulting from management of the Tongass as a commercial timber resource, is expected to decline. It is not possible to determine exactly how Forest Service employment would be affected by a reduction in the Tongass commercial timber resource base as a result of PacFish. Reallocation of federal funding to other types of Tongass management activities, such as watershed analyses, could mitigate Forest Service employment reductions.

In the past, when timber harvest and forest products industry employment declined overall, timber related USFS employment increased in response to Congressional direction to accelerate the timber sale preparations. In the long-term, however, it is anticipated that timber related USFS employment would reflect the amount of commercial timber resource available under PacFish management. The table below shows potential range of reductions in employment and payroll as a result of PacFish.

**Total Tongass Forest Products Industry
Estimated Employment and Payroll In 1992**

| | 1992 Average Employment | After PacFish | Total Payroll | After PacFish |
|------------------------|-------------------------|-------------------|------------------------|----------------------------|
| Tongass Industry Total | 2,513 | 754 - 1457 | \$103.4 million | 31.0 - 60.0 million |
| US Forest Service | 448 | 134 - 260 | \$20.8 million | 6.2 - 12.0 million |
| Grand Total | 2,961 | 888 - 1717 | \$124.2 million | 37.2 - 72.0 million |

Outlook Under PacFish

There is little certainty regarding the outlook for the Tongass forest products industry. However, the implementation of any interim Forest Service policy that has the potential effect of reducing the land base by 42 to 70+% will most certainly have a negative impact. In the near term, the industry is faced with weak markets for pulp, strong markets for lumber, and continuing concern over timber availability. Considerable hope has been expressed recently that Alaska could develop an increased value-added component to its Southeast facilities due to the increased cost of alternative supplies. The impact of the PacFish management strategy on timber availability will eliminate Southeast Alaska's ability to respond to increased demand for forest products.

Southeast Alaska's seafood industry generates the annual equivalent of 4,100 jobs. Tourism adds an estimated 2,200 jobs to the basic economy. As a result of the recent closure of Green's Creek, mining accounts for less than 200 jobs. State and federal government continue to be important components in Southeast Alaska's basic economy adding upwards of 5,000 and 2,000 basic sector jobs respectively.

The forest products industry accounts for more than one in three private basic industry jobs in Southeast Alaska. Timber harvest and manufacturing from the Tongass National Forest accounts for about 62% of the forest products industry in the region. In spite of recent declines, the role of the forest products industry among all basic industry, including government, is still substantial. The forest products industry including related Forest Service employment accounts for nearly one quarter (24%) of all basic industry employment. Thus a 42 to 70+% reduction to the Tongass component will have an unacceptable impact on the region's economy.

This analysis does not consider the indirect impacts of the forest products industry on the Southeast economy. It is, however, important to note that the industry does have important secondary impacts and that indirect impacts vary from one segment of the industry to another. The pulpmills have by far the greatest impact. They provide hundreds of high-paying, year-round, almost entirely resident jobs which account for a high level of local spending.

Sawmills have comparatively high indirect and induced impacts. They too have generally well paid, resident workforce and represent an important industrial property tax bases. Among the various components of the forest products industry, remote logging camps have the lowest level of indirect and induced impacts. Still, remote logging operations do provide a significant market for many Southeast Alaska service and supply businesses.

There are many indirect service oriented activities and jobs that can only exist in the presence of a viable, functioning private sector. Substantial indirect economic losses are expected to occur as a result of the loss of land base available for the forest products industry.

Community Economic Impacts - Sitka and Ketchikan

The pulpmills are the largest employers in Sitka and Ketchikan. There is grave concern regarding the ability of these mills to maintain operations with the timber supply diminished by the proposed PacFish policies. While both mills have survived in past years without extended shut downs, PacFish is being proposed at a time when the Sitka mill has already announced an indefinite shutdown. Cumulatively, weakening markets, already artificially constrained timber supply, and additional PacFish constraints will force the permanent shut-down of the pulpmills. PacFish gives rise to 42 to 70+ % reductions in the scale of pulp mill operations. Reductions of this magnitude are not economically feasible. Major plants have volume-related economies of scale only when the plant is operating at, or near, full capacity. These important advantages are lost at reduced volumes. A reduction of 42 to 70+% in log supply is more likely to result in full closure than in reduced operations.

It is not possible to say that implementation of the proposed PacFish management strategy will unequivocally cause the closure of both pulp mills, as the permanent closure of one could result in increased supply for the other. Given current market conditions, however, it is a reasonable scenario. The result could be the loss of over 900 jobs in Sitka and Ketchikan, plus hundreds of support jobs.

Further, pulpmills represent an important property tax base in Sitka and Ketchikan. The pulpmills add millions of dollars to local government coffers either through property tax payments or through purchases of public utilities; These property tax payments and high volume purchases of public utilities help keep local government and public utility costs lower for residents of the communities.

All told, without the pulp mills, the economies of Sitka and Ketchikan would shrink by about one-quarter and some costs of living for remaining residents would increase significantly. Property values in Sitka and Ketchikan would be expected to decline sharply.

Alaska Pulp Corporation (APC) will suspend its Sitka pulp mill operations indefinitely beginning September 30, a move that company officials say is primarily related to the USFS administration of its long-term timber purchase contract. Implementation of the proposed PacFish management strategy on the Tongass National Forest will likely affect the timber supply for APC to the point where permanent closure is the only reasonable economic alternative available to the company.

The actual timing of impacts due to closure will vary depending on the existing financial circumstances and the schedule for shutting down. Studies of other Alaska communities show almost all impacts are experienced within two years, the heaviest impacts being within the first six months. The initial period of outmigration and economic recession is followed by bankruptcies, collapse of the real estate market, business closures, reductions in government services and additional job loss and outmigration as the effects are played out throughout the support sector of the remaining economy.

The following table from a recent study provides a summary of projected impacts due to the closure of just one mill on the economy of Sitka. Based on 1988 figures (The McDowell Group, 1989):

| Impact | Loss | % of Sitka Total |
|----------------------------|-----------------|------------------|
| Population | 2,050 | 24.1 |
| School Enrollment | 413 | 24.1 |
| Employment | 944 | 24.1 |
| Payroll | \$28.7 million | 28.5 |
| Gross Business Sales | \$37.4 million | 28.5 |
| Selected Municipal Impacts | \$6.4 million | 32.7 |
| Real Estate Values | \$170.8 million | 46.1 |

A detailed study has not been conducted for potential closure of Ketchikan Pulp Corporation. It is reasonable to assume similar impacts to the City of Ketchikan and Gateway Borough, as adjusted for the combined population of 22,588. Although the greater Ketchikan area is nearly three times the population of Sitka, community profiles² suggest that local economy and employment statistics are proportional.

Other Southeast Communities

Most of the other communities in the region are highly dependent on the forest products industry for their livelihood. They are extremely limited with respect to opportunities for economic diversification.

Although fishing is the mainstay in terms of number of jobs, forest products provides over half the cash economy for the Cities of Hoonah, with a population of 793 and Kake, with a population of 725. The forest products industry contributes approximately 35% to the economy of the City of Wrangell, or nearly 300 jobs. The APC sawmill is the largest employer in this community of 2,539. Thorne Bay (population 637), Klawock (population 758) and Craig (population 1,637), located on Price of Wales Island, all rely on the forest products industry for approximately 90% of their private sector employment. Unemployment Insurance data indicate an annual average of 557 jobs for this combined census area in 1992³.

Clearly, a reduction of 42 to 70+% in the land available for harvesting of forest products would be devastating to these small, undiversified economies. For the Price of Wales area alone, the number of jobs would be reduced by 234 - 390, a tremendous impact to an area of 3032 people.

²Alaska Department of Community and Regional Affairs' Community Database - Research and Analysis Section, Municipal and Regional Assistance Division, Juneau, Alaska, 1993.

³Alaska Department of Labor, Research and Analysis Section, Southeast Forest Product Wage and Salary Employment by Census Area, 1993.

Of key, and sometimes overlooked importance, is the disproportionate impact of the forest products industry to the wintertime economy of the region. The remaining private sector employment, fishing and tourism, is of a highly seasonal nature. The forest products industry, however, provides the economic glue that holds a major part of the economy and hence society together during the winter months.

The loss of the forest products industry associated with PacFish may drive companies away from Southeast which could ordinarily survive the winter doldrums. Given the migratory nature of businesses catering to the fishing and tourism industries, there would be little inducement for the service sector to remain in Ketchikan or Sitka absent the incremental sales associated with the Forest products industry. A disproportionate impact to year-round availability of services in these communities would be the result of the implementation of interim PacFish policies.

CONCLUSION

For the most part, this analysis has focused on the direct, and to a lesser extent the indirect, impacts to the economy of Southeast Alaska. There are many other indirect impacts that will likely be experienced that are beyond the scope of this study, but nevertheless, deserve mention. This report has not attempted to quantify the significant socio-cultural and psychological impacts that would undoubtedly be associated with an economic impact of this scale. Nor has an effort been made to assess impacts beyond the geographic scope of Southeast Alaska. It is not unreasonable to anticipate impacts to the balance of trade, particularly with the pacific rim and with our newest trading partners in Russia. Suffice it to say, implementation of interim/permanent PacFish strategies will hurt many people in Alaska.

This analysis clearly demonstrates that the proposed PacFish management strategy has serious, negative, economic ramifications for the people of Southeast Alaska, and the State of Alaska as a whole. If we consider only the least case impacts of the proposed PacFish management strategy, Southeast Alaska would be faced with the loss of 1711 jobs and \$72 million in payroll. PacFish would create an untenable situation for a region that relies on the forest products industry for 24% of its basic industry.

Unequivocally, the proposed PacFish management strategy, both interim and long term, have devastating and potentially far reaching impacts to the people of Alaska.

WALTER J. HICKEL
GOVERNOR



P. O. Box 110001
Juneau, Alaska 99811-0001
(907) 465-3600

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

September 28, 1993

The Honorable Tom Bevil
United States House of Representatives
2302 Rayburn House Office Building
Washington, DC 20515

| | | |
|--|---------------------|--------------|
| Post-It™ brand fax transmittal memo 7671 | | # of pages ▶ |
| To: <i>Lindy Roberts</i> | From: <i>Paul</i> | |
| Co. | Co. | |
| Dept. | Phone # | |
| Fax # <i>465-5442</i> | Fax # <i>5-3075</i> | |

Dear Representative Bevil:

Undoubtedly you have heard much about a joint U.S. Forest Service/Bureau of Land Management fisheries management strategy called PACFISH. It has emerged as a management strategy to redress the extreme habitat degradation and decline of anadromous fish stocks in Washington, Oregon, Idaho, and California. This strategy is not needed in Alaska, as we do not face the same habitat degradation. Therefore, I am writing to you to urge your support for Senator Stevens' PACFISH Amendment to the Senate version of the Interior and Related Agencies appropriations bill.

Extension of the PACFISH strategy to Alaska would be both a waste of environmental resources and an economic disaster to the residents of Southeast Alaska. Inclusion of Alaska within the strategy will reduce the timber land base by 40 - 50 percent, and result in a loss of more than 1,700 jobs, many in small, rural, native communities. Additionally, it would eliminate any possibility of a viable long-term industry in Southeast Alaska. The timber products industry currently accounts for more than 34 percent of the private economy of Southeast Alaska, and 24 percent of the overall basic industry of this region. Thus, implementation of the PACFISH proposal would jeopardize a forty-year federal policy of protecting jobs and maintaining community stability in the Tongass.

Thirty-four years of careful fisheries management by the State of Alaska provides the basis for Senator Stevens' amendment. Consider the following:

- * There are over 2,500 known anadromous fish streams in Southeast Alaska;
- * There are no threatened, endangered, or sensitive fish stocks in any of these streams;
- * The few fish stocks (less than two dozen) that have shown declines of concern are not related to timber, but rather to a variety of issues;

The Honorable Tom Bevil
September 28, 1993
Page 2

- * Declining fish stocks of concern exist within wilderness areas, non-timber management areas, and timber management areas;
- * Most of the streams in Southeast Alaska remain in a pristine condition, with unaltered riparian zones;
- * Commercial salmon catches are at historically high levels in Southeast Alaska.

With respect to fisheries/forest management, the Tongass National Forest is a leader in the Northwest. The Tongass Forest is managed through a network of overlapping federal and state laws and regulations unique amongst the national forests of the United States. Land uses, balancing of resource issues, and maximum timber harvest levels are established under the Tongass Land Management Plan. Any major policy modifications, such as the PACFISH proposal, should be considered in this planning process, rather than by means of unilateral forest service action. In addition, the Tongass National Forest is the only national forest with mandated minimum 100 foot buffers on all anadromous streams through the Tongass Timber Reform Act passed by Congress only three years ago. Further, the Tongass National Forest is unique in that it lies within the Alaska Coastal Zone and all timber harvesting and other activities must comply with the provisions of the State Coastal Zone Management Program as well as the newly implemented State Forest Practices Act. This overlapping federal/state regulatory network already achieves what PACFISH hopes to establish in the other Pacific Northwest states, and should be looked to as a model for achieving a balanced use of resources.

The cost to Alaskans will be very high to re-achieve environmental goals within PACFISH--goals that have already been attained through a combination of federal and state laws and regulations. Accordingly, I urge your support for Senator Stevens' amendment, so we can avert this environmental and economic disaster.

With best regards.

Sincerely,



Patrick P. Ryan
Chief of Staff

cc: *Senator Ted Stevens*
Senator Frank Murkowski
Representative Don Young
Commissioner Carl Rosier
Commissioner Harry Noah
Mr. John Katz
Dr. Paul Rusanowski

PACFISH STRATEGY Executive Summary

Revised May 1, 1993

OFFICE OF
MANAGEMENT & BUDG
JUL 12 1993
GOVERNMENTAL
COORDINATION

Introduction

The purpose of this executive summary is to provide an overview of the background, issues and current status of the Pacific salmon and steelhead management strategy of the USDA Forest Service (Forest Service) and USDI Bureau of Land Management (BLM). Updates to this briefing will be provided periodically.

Over the past several years, significant new research information about the status of Pacific salmon and steelhead stocks, current habitat conditions, and habitat requirements has become available. This new information makes it necessary for the Forest Service and BLM to take immediate and long-term actions to assure proper management of anadromous fish habitat in Alaska, California, Idaho, Oregon and Washington. Changes in management guidance will affect about 75% of the Ranger Districts on 34 National Forests in five Forest Service Regions and 29 Area Offices on 16 Districts in four BLM State Offices.

Background

Pacific anadromous salmonids (including salmon, steelhead and sea-run cutthroat trout, and dolly varden) occur naturally from southern California northward to the Arctic Ocean. These fish are comprised of a large number of stocks, or populations that originate from specific watersheds during specific times of year as juveniles, migrate to the ocean, and generally return to reproduce in their natal streams at the same time of year they were spawned. In many areas of the West Coast, naturally reproducing stocks of Pacific salmon, steelhead and sea-run cutthroat trout are at risk of extinction. Of the more than 400 stocks from California, Idaho, Oregon, and Washington recently evaluated by the American Fisheries Society (AFS), 214 were considered to be at "moderate" or "high" risk of extinction or of "special concern," 106 were extinct, and about 120 were considered secure.

About 134 "at risk" stocks identified by the AFS report are found on National Forests and 109 are found on Public Lands administered by the BLM. Recent information suggests that coho and chum salmon, and steelhead stocks in Alaska probably are declining also. To more accurately characterize the situation in Alaska, Forest Service researchers began an investigation in 1992 that is due to be completed in late spring 1993 to identify the unique stocks of anadromous fish on National Forests in Alaska. The Alaska Chapter of the AFS has undertaken a review of the status of anadromous fish throughout the state of Alaska and in 1994 expects to publish a report on stocks at risk in Alaska.

Reasons for the decline of the Pacific anadromous salmonids vary by species and geographic area. The depressed status of the 214 stocks reflects the interaction of inherently variable environmental conditions, such as oceanic productivity and weather patterns, and a variety of management activities. In general, stock survival is threatened by some combination of hydroelectric development and operation, fish harvest, fish hatchery influences on disease and genetic fitness, and fish habitat conditions. These management activities sometimes are referred to as the "four H's."

- o **Hydroelectric**, flood control, and irrigation dams have reduced fish production in many drainages throughout the range of the Pacific salmon, steelhead, and sea-run cutthroat trout. This is especially true in the San Joaquin and Sacramento River Valleys of central California, and the Columbia River Basin of Idaho, Oregon and Washington. Recovery of as many as 20% to 40% of the stocks identified by AFS as "at risk" is limited primarily by dam operations. The problem of hydroelectric development and operations is particularly acute in the Columbia River Basin, where: (a) more than 30% of the salmon, steelhead and sea-run cutthroat trout's historic range has been blocked by dams without fish passage facilities, (b) adult fish have difficulty in locating and negotiating past dams where ladders have been installed, (c) direct mortality of juvenile fish as a result of passing through power turbines is estimated at 12-20% per dam, and (d) mortality of juvenile fish has increased due to an approximately four-fold increase in downstream travel time (from 7-9 days to nearly 4 weeks) as a result of turning all but about 50 miles of the Columbia River into a series of placid lakes. The demise of a large majority of the extinct stocks is attributable to dam construction and operation.
- o **Harvest** of Pacific salmon, steelhead, and sea-run cutthroat trout occurs in a variety of sport, commercial, and subsistence fisheries. Because small naturally spawning fish stocks mix in the ocean with abundant hatchery stocks, management for a "maximum sustained yield" can result in overharvest of some stocks, appropriate harvest of some, and underharvest of others. Further confounding the issue is the fact that much of the commercial harvest occurs outside the national waters of the U.S. and of Canada, and much of the subsistence harvest is guaranteed under treaty or given special priority by law. As a result, complex jurisdictional authorities must grapple with allocating a "fair share" of an ever-dwindling resource among various nations, states, and tribes.
- o **Hatcheries** were built to be a part of the solution to declining populations of salmonids. However, many have become part of the problem and some have had a subtle, but adverse impact. Traditional hatchery practices have contributed to the decline, or may limit recovery, of 104 of the 214 stocks identified by AFS as "at risk." Hybridization of hatchery stock with wild salmonids can reduce the genetic fitness of the wild stock by affecting run timing and life history characteristics important to long-term viability. Competition between juvenile wild salmon, steelhead, and sea-run cutthroat trout and juvenile hatchery fish (that typically are larger because of hatchery feeding and/or time of hatching, and are released in large numbers) can be overwhelming. Further, crowded rearing conditions, warmer water, and greater concentrations of fish waste in many hatcheries can increase the incidence of disease among hatchery fish that can be transmitted to naturally-reproducing fish. Genetic contamination of the remaining lower Columbia River coho population by hatchery fish, and the resulting extinction of "wild" genes.

was one of the primary reasons cited by the National Marine Fisheries Service in their decision that listing the stock was not warranted.

- o **Habitat** is an very important component of salmonid production. In fact, declining habitat condition is the single factor affecting nearly all of the stocks at risk. Degradation of spawning and rearing habitat has occurred on all land ownerships throughout the range of Pacific anadromous fish stocks. Detrimental changes in habitat condition include reduction in water quality (as measured by increases in temperature, sedimentation, changes in nutrient levels and water chemistry, and the presence of toxic substances), changes in water quantity and/or timing of water flow, and reduction in habitat complexity (as indicated in loss of deep pools, reduction in amounts of large woody debris, and changes in width:depth ratios and bank angles).

The Forest Service and BLM have an important role to play in the management of watersheds and fish habitat in Alaska, California, Idaho, Oregon, and Washington. The watersheds on National Forests encompass approximately 50% of the remaining freshwater anadromous fish spawning and rearing habitat in the lower 48 states and about 25% of such habitat in Alaska. Public Lands managed by the BLM include 13,200 stream miles in the lower 48 states and 133,000 miles in Alaska that provide anadromous fish spawning and rearing habitat.

For those stocks affected primarily by habitat factors, the management of watersheds to ensure good fish habitat on National Forests and Public Lands is important. Management of these lands also can play an important role in moderating the rate of decline for those stocks affected primarily by hydroelectric development and operations, hatcheries, and fish harvest, and can provide a buffer against environmental extremes. Of the 134 "at risk" stocks identified by the 1991 AFS report that are found on National Forests in the lower 48 states and the 109 "at risk" stocks that are found on BLM administered Public Lands, approximately 23% are affected primarily by hydroelectric development and operation. For the remaining stocks that are limited primarily by other factors (habitat, harvest, hatcheries), poor habitat condition most often is the primary cause of decline or impediment to recovery.

PACFISH Strategy Framework

The 1991 AFS report, coupled with the November 1991 listing of the Snake River sockeye salmon as endangered and the April 1992 listing of the Snake River spring/summer and fall chinook salmon as threatened, served as a wake-up call for the Forest Service, BLM, and others to provide more sensitive management of Pacific anadromous fish and their habitat. In an effort to address the issue of declining fish stocks in the Alaska, California, Idaho, Oregon and Washington, the Forest Service initiated a team effort in early spring 1992 to undertake an assessment and develop a management strategy that addresses the habitat needs of all Pacific anadromous "at risk" stocks on National Forests (see December 1992 Informational Report). During this same time, the BLM began revising its 1988 "Anadromous Fish Habitat on Public Lands" strategic plan. In March 1993, the Forest Service and the BLM announced their commitment to develop a common strategy for management of Pacific salmon and steelhead habitats and

associated watersheds on Forest Service and BLM administered lands in the West. This comprehensive strategy has become known as "PACFISH."

To facilitate a strong linkage between management and research, the PACFISH effort is staffed with technical specialists and managers from the Forest Service National Forest System and the BLM, and research scientists from the Forest Service research organization. The organizational framework for the PACFISH effort includes three components:

- o **Washington Office Policy Group** - Provides overall direction for development of the strategy. This group is led by USDA-FS Associate Deputy Chiefs Dave Unger, National Forest System, and Eldon Ross, Research, and USDI-BLM Deputy Assistant Director Kemp Conn, Land and Renewable Resources. Members of the group include Washington Office Staff Directors from the Forest Service and Washington Office Division Chiefs from the BLM. Ad hoc members include representatives from the Department of Agriculture Office of General Counsel and the Department of Interior Office of the Solicitor.
- o **Washington Office Work Group** - Established to work with the Field Team to develop the strategy for managing salmon and steelhead habitats on Forest Service and BLM administered lands. This group is led by Forest Service Assistant Director for Wildlife and Fisheries Phil Janik, Pacific Northwest Research Station Aquatic/Land Interactions Program Team Leader Jim Sedell, BLM Science Advisor Jack Williams, and BLM Rangeland Resources Branch Chief Glen Secret. Core members include representatives with expertise in fisheries, economics, public affairs, watershed management, land management planning, and range management. Additional representatives with other expertise serve ad hoc as needed.
- o **Inter-regional Field Team** - Established to provide coordination and work with the Washington Office Work Group in the development of the strategy. This team is led by Forest Service Deputy Regional Forester Bob Joslin and Pacific Northwest Research Station Aquatic/Land Interactions Program Project Leader Fred Everest, and BLM Deputy State Directors for Resources Elaine Zielinski (OR/WA) and Dick Bastin (ID). Members include representatives from each of the three Forest Service Research Stations (PSW, PNW, INT) and five Regions (1, 4, 5, 6, 10), and each of the four BLM State Offices (CA, ID, OR/WA, AK) responsible for management of Pacific anadromous fish habitat. Forest Service and BLM Anadromous Fisheries Coordinators, Gordon Haugen and Bob House, assist with Field Team activities.

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Current Habitat Conditions Were Assessed

As part of the PACFISH assessment, Forest Service research scientists, working with fisheries biologists and watershed specialists on National Forests with Pacific anadromous fish habitat, have characterized current habitat conditions in many watersheds on National Forests and other lands in Alaska, California, Idaho, Oregon and Washington. Generally, these habitats have 30% to 70% fewer large, deep pools, more fine sediments in spawning gravels, and greater disturbance of riparian vegetation than is acceptable and have experienced a reduction in fish habitat capability. These downward trends in

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habitat conditions represent the cumulative effects, across all ownerships, of past and present land management activities. For example:

- o **Coastal Oregon** streams on west-side forested lands have been degraded. The amount of bedrock bottom exposed has gone from 30% to 80-90%. Pool-riffle ratios have gone from about 50:50 to 20:80 or 10:90 based on Oregon Game Commission surveys in 1960 and Forest Service surveys in the 1970's. The loss of 50% of deep pools and complex edges since late 1960's translates directly into a 50% loss of summer rearing habitat for juvenile salmonids. Stream channel condition in 77% of the 211 miles of anadromous fish habitat in BLM's Salem District of western Oregon fail to meet desired BLM standards.
- o **East-side Oregon** habitat in the Upper Grande Ronde River Basin has been degraded. 80% of fish habitat fails to meet current Forest Plan standards and guidelines for temperature, sediment, and riparian condition. 20% exceeds current Forest Plan standards and guidelines. BLM habitat in the basin has undergone similar degradation.
- o **Upper Snake River Basin** habitat in the developed portions of the Middle Fork Clearwater and Lochsa Rivers watersheds on the Clearwater National Forest in Idaho have been degraded. 70% fail to meet Forest Plan standards and guidelines. Between 1935 and 1992, the number of large pools in the Salmon River Basin has decreased by 52% in managed watersheds and increased by 29% in Wilderness area watersheds.

"Good" Habitat Conditions Were Defined

With the help of historic inventory and survey data, as well as current research, "good" anadromous fish habitat conditions have been defined. This was determined by comparing quantitative habitat surveys, completed between 1989 and 1992, with surveys done by the Bureau of Fisheries, now the National Marine Fisheries Service, between 1934 and 1941 on 116 watersheds in Alaska, Idaho, Oregon and Washington. "Good" habitat has been defined using physical features as surrogates for the processes that form salmonid habitat. One key feature (pool frequency) and four supporting features (water temperature, amount of large woody debris interacting with stream channels, streambank stability and bank angle, and width to depth ratio of stream channels) are used to describe habitat quality. In "good" habitat, all five features are above the following threshold levels:

- o **Pool Frequency** (pools per mile). Varies by wetted width of stream.
Wetted Width: 5 10 15 20 25 50 75 100 125 150 175 200
Pools/Mile: 184 96 70 56 47 26 23 18 14 12 10 9
- o **Water Temperature.** Compliance with State Water Quality standards generally provide adequate protection for salmonid assemblages, except that summer temperatures should be less than 68 degrees F.

- o **Large Woody Debris.** The amount of large wood debris needed varies by geographic location.
Southeast Alaska, Northern California, and western Oregon and Washington: greater than 80 pieces per mile; greater than 24 inch diameter; greater than 50 foot length.

East of Cascade Crest in Oregon, Washington, and Idaho: greater than 20 pieces per mile; greater than 12 inch diameter; greater than 35 foot length.
- o **Bank Stability and Lower Bank Angle** (non-forested setting): Bank stability exceeds 80%. 75% of banks should be undercut (i.e. less than 90 degree angle). Less than 25% of bank angles should be greater than 90 degrees.
- o **Width to Depth Ratio:** less than 10 in all systems (measured as mean wetted width divided by mean depth).

Elements Of The PACFISH Strategy

The PACFISH effort is a proactive, ecosystem approach to management of watersheds and Pacific anadromous fish habitats across five Forest Service Regions and four BLM state administrative units, including the states of Alaska, California, Idaho, Oregon and Washington. Eight alternatives are being evaluated, including six developed by the PACFISH Field Team, alternative 8A from the Gang of Four Report, and a draft riparian management strategy from Region 5 of the Forest Service. The eight alternatives include some combination and application of key watershed identification, watershed analysis, Riparian Habitat Conservation Areas and standards and guidelines, and watershed restoration. The PACFISH strategy is building upon a scientifically sound assessment that characterizes current habitat conditions, provides an understanding of the elements of "good" habitat condition, provides the knowledge of how to manage watersheds to maintain "good" habitat where it now occurs and achieve "good" habitat conditions in areas that currently are degraded.

- o **Riparian Management Objectives** are being refined that call for the maintenance or restoration of: (a) water quality to a degree that provides for stable and productive ecosystems (i.e. timing and character of temperature, sediments and nutrients), (b) stream channel integrity, channel processes and sediment regime under which the ecosystems developed (e.g. timing, volume, and character of sediment input and transport), (c) instream flows to support desired riparian and aquatic habitats, stream channel stability and effective function, and ability to route flood discharges, (d) natural timing and variability of the water table elevation in meadows and wetlands, (e) diversity and productivity of native and desired non-native plant communities, (f) riparian vegetation so amount and distribution of large woody debris is characteristic of natural riparian and aquatic ecosystems, (g) habitat for populations contributing to viability of riparian-dependent communities (i.e. native and desired non-native plants, vertebrates, and invertebrates), (h) riparian vegetation for adequate summer and winter thermal regulation, (i) riparian vegetation so the rates of surface and bank erosion and channel migration are similar to the rates under which the communities developed, and (j) riparian and

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- o **Watershed Restoration** efforts in key watersheds will receive priority. All restoration work will be designed at a watershed/landscape scale and will involve coordination between changes in land management activities and active restoration projects.

Implementation Process

Direction provided by the PACFISH strategy will be science based, practical, and economically feasible. It also will provide assurance to the public that we are responding seriously to the situation. Because of critical status of many of the "at risk" anadromous fish stocks and the Forest Service and BLM's need to demonstrate commitment to improved habitat conditions on lands they administer, consideration is being given to the issuance of interim direction that will apply to Forest Service and BLM stewardship of all anadromous fish habitat on National Forests and Public Lands in the West. Appendix 5K of the Report of the Scientific Analysis Team is one of the six PACFISH developed alternatives, and provides some indication of the type of interim direction being considered. Selection of final management direction will proceed with a full NEPA review of all alternatives that meet technical and legal requirements.



HOUSE RESOURCES COMMITTEE

DATE: 2/23/94

PLACE: Capitol, Room 124

SUBJECT OF MEETING:
 HB 398 - Rights to certain tide + submerged land
 HJR 55 - Economic Importance of S.E. Timber Harvests
 HJR 56 - Exempt Alaska From "ACFISH" Regs.
 HB 199 - Oil + Gas Exploration Issues

| NAME | REPRESENTING | BUSINESS/PERSONAL MAILING ADDRESS | ZIP | (H) PHONE | (W) PHONE | DO YOU WANT TO TESTIFY? | WHAT SUBJECT/ WHICH BILL? |
|-------------------|----------------------------|---|-------|-----------|-----------|-------------------------|-------------------------------|
| Chip Thomas ✓ | self | Juneau 2 Marine Way, 99801 | | | | (Y) N | HJR 55 + 56 |
| Rollo Paul ✓ | AK Pulp Corp | SITKA 4600 Saw Mill Chukchi Rd 99835 | | | 747-2283 | (Y) N | HJR 55 + 56 |
| John Sisk ✓ | self | Juneau | | 586-2544 | | (Y) N | HJR 55 + 56 |
| Crystal Smith | AML | 217 2nd St, Suite 200 | | | 67325 | (Y) (N) | HJR 55 + 56 HB 348 |
| Chuck Ashberger ✓ | Juneau Chamber of Commerce | 124 W Fifth St Juneau | | | 66420 | (Y) N | HJR 55 - 56 |
| Dave Katz ✓ | SEACC | 419 Sixth St. #328 Juneau | 99801 | | 586-6942 | (Y) N | HJR 55 + 56 |
| | | | | | | Y N | |
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LTN1100-R01
02/23/94

LEGISLATIVE TELECONFERENCE NETWORK

PAGE 01
11:00:52

TCN: 40363 DATE & TIME: 02/23/94 08:15 TO 10:00 STATUS:6 ADJOURNED

**** ORDER SUMMARY ****

SPONSOR: HRES HOUSE RESOURCES CHAIRS: WILLIAMS
PURPOSE: PUB PUBLIC HEARING LEGISLATIVE
CONTACT: MARY MCDOWELL TEL#: (907)465-3715
CHAIRING SITE: JUNEAU CAPITOL CAP124

SPONSOR REMARKS(PUB): TESTIMONY:Y ALLOWED 99 MINUTE LIMIT
OTHER SITES MAY ADD IF THERE IS INTEREST
TCN REQUESTED ON 02/23/94 AND HAS 4 UPDATES

**** AGENDA ****

- 1 HB 199 OIL & GAS EXPLORATION LICENSES/LEASES
- 2 HB 398 LAND CONVEYED TO & FROM MUNICIPALITIES
- 3 HJR 55 TONGASS NATIONAL FOREST TIMBER HARVESTS
- 4 HJR 56 EXEMPT ALASKA FROM "PACFISH" REGS

**** PARTICIPATING SITES ****

| | | |
|---------------|------------------|----------------|
| ANC ANCHORAGE | 716 W 4TH. #200 | LOCATION STAFF |
| FBX FAIRBANKS | 119 N CUSHMAN ST | LOCATION STAFF |
| HOM HOMER LTC | 126 W PIONEER #4 | LOCATION STAFF |
| * JNU JUNEAU | CAPITOL CAP124 | LOCATION STAFF |
| KOD KODIAK | 112 MILL BAY RD. | LOCATION STAFF |
| KYN KETCHIKAN | 352 FRONT STREET | LOCATION STAFF |
| SIT SITKA | 210 LAKE STREET | LOCATION STAFF |

**** VOLUNTEER & OFFNET SITES ****

ZZZ OF1 OFFNET 1 ANCHORAGE RON SWANSON (999)999-9999

PARTICIPANTS IN: ANCHORAGE ANC

| | | | |
|---|-------------------|----------------|------------------------|
| 1 | GARY WILLIAMS | WHITTIER | TSFY. HB 398 |
| | PO BOX 608 | WHITTIER | AK 99693 (907)472-2337 |
| 2 | BOB JUETTNER | ALEUTIANS EAST | TSFY. HB 398 |
| | 1600 A ST. NO 103 | ANCHORAGE | AK 99501 (907)274-7559 |
| 3 | KEN BOYD | DNR O&G | UNABL. HB 199 |
| | 3601 C ST | ANCHORAGE | AK 99501 (907)762-2548 |
| 4 | LEE SHARP | ALEUTIAN E | TSFY. HB 199 |
| | 420 L STREET | ANCHORAGE | AK 99501 (907)276-1969 |
| 5 | STEVE BORELI | AK MINERS | TSFY. HJR 56 |

| | | | |
|---|------------------------|---------------|------------------------|
| 5 | 501 W NORTHERN LTS | ANCHORAGE | AK 99516 (907)276-0347 |
| | ARDIE GRAY | | UNABL HB 199 |
| 7 | 121 W FIREWEED STE 207 | ANCHORAGE | AK 99503 (907)272-1481 |
| | JOHN STURGEON | KOMCOF FOREST | TSFY. HJR 56 |
| 8 | 3501 DENALI STE 202 | ANCHORAGE | AK 99516 (907)562-3335 |
| | JIM BARNETT | ATTY WHITTIER | OBSV. HB 398 |
| | 10050 PROSPECT DR | ANCHORAGE | AK 99516 (907)346-2755 |

PARTICIPANTS IN: FAIRBANKS FBX

| | | | |
|-------|--------------------|-----------|------------------------|
| 1 MR. | GREGORY GARRELS | | UNABL HB 199 |
| | 1176 BROADVIEW DR. | FAIRBANKS | AK 99712 (907)457-3543 |
| 2 MR. | CLIFF BURGLIN | | UNABL HB 199 |
| | 17 ADAK AVE. | FAIRBANKS | AK 99701 (907)452-5140 |

PARTICIPANTS IN: HOMER LTC HOM

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LTN1100-R01 LEGISLATIVE TELECONFERENCE NETWORK PAGE 02
 02/23/94 11:00:52
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| 2 MR. | PO BOX 2397 | HOMER | AK 99603 (907)235-3978 |
| | LARRY SMITH | | TSFY. HJR 55 |
| 3 MR. | PO BOX 15337 | FRITZ CREEK | AK 99603 (907)235-3855 |
| | STEVE GIBSON | | OBSV. HJR 55 |
| | 1622 HIGHLAND DR. | HOMER | AK 99603 (907)235-6487 |

PARTICIPANTS IN: JUNEAU JNU

| | | | |
|---------|-------------------|--|------------------|
| 1 REP. | BILL WILLIAMS | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 2 REP. | CON BUNDE | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 3 REP. | ELDON MULDER | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 4 REP. | JOHN DAVIES | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 5 REP. | DAVID FINKELSTIEN | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 6 REP. | JEANATTE JAMES | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 7 REP. | PAT CARNEY | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 8 REP. | JOE GREENE | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 9 REP. | BILL HUDSON | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 10 REP. | HARLEY OLBERG | | TSFY. HB 199 |
| | | | AK (907)000-0000 |
| 11 | TO TESTIFY | | TSFY. ALL ITEMS |
| 12 | TO TESTIFY | | TSFY. ALL ITEMS |
| 13 | TO TESTIFY | | TSFY. ALL ITEMS |
| 14 | TO TESTIFY | | TSFY. ALL ITEMS |

PARTICIPANTS IN: KODIAK KOD

| | | | |
|-------|------------------|-----------------|------------------------|
| 1 MR. | RUD CASSIDY | KOD. IS BOROUGH | OBSV. HB 398 |
| | 710 MILL BAY RD. | KODIAK | AK 99615 (907)486-9302 |

PARTICIPANTS IN: KETCHIKAN KTN

| | | | | | |
|----|------|----------|-------------|----|-----------------|
| 1 | REP. | BILL | WILLIAMS | AK | (907)000-0000 |
| 2 | REP. | CON | BUNDE | AK | TSFY. HB 199 |
| 3 | REP. | ELDON | MULDER | AK | (907)000-0000 |
| 4 | REP. | JOHN | DAVIES | AK | TSFY. HB 199 |
| 5 | REP. | DAVID | FINKELSTIEN | AK | (907)000-0000 |
| 6 | REP. | JEANATTE | JAMES | AK | TSFY. HB 199 |
| 7 | REP. | PAT | CARNEY | AK | (907)000-0000 |
| 8 | REP. | JOE | GREENE | AK | TSFY. HB 199 |
| 9 | REP. | GILL | HUDSON | AK | (907)000-0000 |
| 10 | REP. | HARLEY | OLBERG | AK | TSFY. HB 199 |
| 11 | TO | | TESTIFY | | TSFY. ALL ITEMS |
| 12 | TO | | TESTIFY | | TSFY. ALL ITEMS |
| 13 | TO | | TESTIFY | | TSFY. ALL ITEMS |
| 14 | TO | | TESTIFY | | TSFY. ALL ITEMS |

PARTICIPANTS IN:KODIAK

KOD

1 MR. RUD CASIDY
710 MILL BAY RD.

KOD. IS BOROUGH OBSV. HB 398
KODIAK AK 99615 (907)486-9302

PARTICIPANTS IN:KETCHIKAN

KTN

1 MR. TROY REINHART
111 STEDMAN # 200

AK FOREST ASSOC TSFY. HJR 55
KETCHIKAN AK 99901 (907)225-6114

PARTICIPANTS IN:SITKA

SIT

1 MR. JOEL KAWAHARA
507 KATLIAN ST.
2 MR. ERIC JORDAN
103 GIBSON PL.

SITKA

SITKA

TSFY. HJR 55
AK 99835 (907)747-5811
TSFY. HJR 56
AK 99835 (907)747-6743

PARTICIPANTS IN:OFFNET 1

ZZZ OF 1

1 RON SWANSON

DNR

TSFY. HB 199
AK (907)000-0000

HJR

59

HOUSE COMMITTEE REPORT

(9) [REDACTED]
 Date Referred: March 2, 1994

FURTHER REFERRALS:

Date of Committee Action: 3/14/94

The RESOURCES Committee considered:

HJR 59

HOUSE JOINT RESOLUTION NO. 59

WANTON WASTE OF FISH N.PACIFIC/BERING SEA

Relating to reduction of wanton waste in North Pacific Ocean and Bering Sea fisheries.

RECOMMENDATIONS:

be replaced with CS HJR 59 (FSH) the same title
 a new title

have attached amendments(s)

do pass

do not pass

no recommendations

individual recommendations

additional referral to the _____ Committee

ADOPTS: _____ letter of Intent

ATTACHES NEW FISCAL NOTE(S): _____ (Dept)

APPROVES PREVIOUS: _____ (Dept/Date)

fiscal impact _____

fiscal note(s) _____

zero fiscal note _____

zero fiscal note(s) Fish Committee/3-2-94

| SIGNING <u>DO PASS</u> | DP | OTHER RECOMMENDATIONS | DNP | NR | AM |
|--------------------------------------|----|-----------------------|-----|----|----|
| <i>Bill Hudson</i> Hudson | ✓ | | | | |
| <i>Robert Carney</i> Carney | ✓ | | | | |
| <i>Robert Green</i> Green | ✓ | | | | |
| <i>James James</i> James | ✓ | | | | |
| <i>David Hinkelstein</i> Hinkelstein | ✓ | | | | |
| <i>Al N. Davies</i> Davies | ✓ | | | | |
| <i>Glen Mulder</i> Mulder | ✓ | | | | |
| <i>Carl Bunde</i> Bunde | ✓ | | | | |
| <i>W.K. Williams</i> Williams | ✓ | | | | |
| | | | | | |
| | | | | | |

W.K. Williams
 CHAIRMAN'S SIGNATURE

Alaska State Legislature

Representative Carl E. Moses

CHAIRMAN
HOUSE RULES COMMITTEE

CHAIRMAN
HOUSE SPECIAL COMMITTEE FISHERIES

MEMBER FINANCE SUBCOMMITTEES ON:
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SESSION:
CAPITAL BUILDING, ROOM 204
JUNEAU, ALASKA 99801-1182
PHONE: (907) 465-4451
FAX: (907) 455-3445

INTERIM
716 W. 4TH AVE. #630
ANCHORAGE, AK 99501-2133
PHONE: (907) 258-8167
FAX: (907) 258-6468

SPONSOR STATEMENT

House Joint Resolution 59

Reduction of wanton waste in North Pacific Ocean and Bering Sea fisheries.

House Joint Resolution 59 addresses an issue of immediate concern to Alaska and its commercial fishing industry. In a May 1993, report prepared for the Alaska Department of Fish & Game by Pacific Associates, the wanton waste of fishery resources in the North Pacific Ocean and Bering Sea fisheries was documented.

Discards of either dead or live fishery resources occur in these commercial fisheries for three basic reasons: economics, management policies and fishing practices. Discards sometimes occur because of the economic loss associated with processing the entire harvest. When species of little or no value are harvested along with the target species, there is no real economic incentive to discourage discarding.

Management induced discards occur for several reasons. There are federal regulations which prohibit fishermen utilizing certain gear types from retaining certain species. The fact that the fish may be dead or alive does not matter. This is called prohibited species catch. Groundfish fisheries in the North Pacific are managed by an open-access method with species quotas. Fishermen are interested in targeting their particular species as rigorously as possible before the allotted quota is reached. This method also lends itself to waste through discards of non-target species.

Fishing practices discards may be the result of direct action by fishermen or through a combination of management requirements and fishing practices. Some fishermen "prospect" for a closed-fishery species while targeting another species. Because they will harvest prohibited species while doing this, there is mortality associated with the non-targeted species. Technical modifications to gear to make it "legal" (e.g. modifying on-bottom trawl gear to mid-water trawl) can cause increased bycatch mortality.

HJR 59 urges Congress to either amend the Magnuson Fishery Management and Conservation Act or to enact other legislation to address the waste of fishery resources in the North Pacific Ocean and Bering Sea fisheries. Congress can utilize a variety of means to disallow fishery resource waste.

ADAK • AKUTAN • AMCHITKA • ATKA • ATTU • BELKOFSKI • CHERNOFSKI • CHIGNIK • CHIGNIK LAGOON • CHIGNIK LAKE
COLD BAY • DUTCH HARBOR • EGEGIK • EKWOK • FALSE PASS • IVANOF BAY • KING COVE • KING SALMON • KOLIGANEK • LEVELOCK • NAKNEK
NELSON LAGOON • NEW STUYAHOK • NIKOLSKI • PEDRO BAY • PERRYVILLE • PILOT POINT • PORT HEIDEN • PORT MOLLER • SAND POINT
SHEMYA • SQUAW HARBOR • SOUTH NAKNEK • ST. GEORGE ISLAND • ST. PAUL ISLAND • UGASHIK • UNALASKA • UNGA

FISCAL NOTE

STATE OF ALASKA
1994 LEGISLATIVE SESSION

BILL NO. HJR 59

Revision Date: _____ Dept. Affected: _____
 Title: Relating to the reduction of wanton waste CRU: _____
in North Pacific Ocean and Bering Sea fisheries Component: _____
 Sponsor: House Rules Committee
 Requestor: House Rules Committee COMPONENT SERIAL NO. _____

Expenditures/Revenues (Thousands of Dollars)

| OPERATING EXPENDITURES | FY 95 | FY 96 | FY 97 | FY 98 | FY 99 | FY 00 |
|------------------------|-------|-------|-------|-------|-------|-------|
| PERSONAL SERVICES | | | | | | |
| TRAVEL | | | | | | |
| CONTRACTUAL | | | | | | |
| SUPPLIES | | | | | | |
| EQUIPMENT | | | | | | |
| LAND & STRUCTURES | | | | | | |
| GRANTS, CLAIMS | | | | | | |
| MISCELLANEOUS | | | | | | |
| TOTAL OPERATING | 0 | | | | | |

| | | | | | | |
|----------------------|---|--|--|--|--|--|
| CAPITAL EXPENDITURES | 0 | | | | | |
|----------------------|---|--|--|--|--|--|

| | | | | | | |
|------------------------|---|--|--|--|--|--|
| CHANGE IN REVENUES () | 0 | | | | | |
|------------------------|---|--|--|--|--|--|

FUND SOURCE (Thousands of Dollars)

| | | | | | | |
|--------------------------|---|--|--|--|--|--|
| 1002 Federal Receipts | | | | | | |
| 1003 GF Match | | | | | | |
| 1004 GF | | | | | | |
| 1005 GF/Program Receipts | | | | | | |
| 1006 GF/MHTIA | | | | | | |
| Other | | | | | | |
| TOTAL | 0 | | | | | |

Estimate of any current year (FY94) cost: \$ 0

POSITIONS

| | | | | | | |
|-----------|--|--|--|--|--|--|
| FULL-TIME | | | | | | |
| PART-TIME | | | | | | |
| TEMPORARY | | | | | | |

ANALYSIS: (Attach a separate page if necessary)

Prepared by: Cheryl Sutton, Aide, House Special Committee on Fisheries Phone: 465-6848
 Division: _____ Date: March 2, 1994
 Approved by Commissioner: *Carl E. Moses* Date: March 2, 1994
 Agency: House of Representatives/Legislature

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**DISCARDS IN THE GROUND FISH FISHERIES
OF THE
BERING SEA/ALEUTIAN ISLANDS
& THE GULF OF ALASKA
DURING 1992**

prepared for

The Alaska Department of Fish & Game

by

Pacific Associates

May, 1993

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EXECUTIVE SUMMARY

This paper identifies the amount and source of discards of groundfish, crab, halibut, herring and salmon resulting from the commercial groundfish fisheries in the Bering Sea/Aleutian Islands and the Gulf of Alaska during calendar year 1992. Discards related to the directed commercial fisheries for crab and halibut are not identified.

The data base used to detail the groundfish discards was generated by the National Marine Fisheries Service (NMFS), and reflects only the reports submitted to the NMFS by fishing vessel operators and/or processors, who are required by federal regulation to report their discards to the NMFS. Discard data for species other than groundfish, such as prohibited species catch (PSC), are from observer data generated by independent contract observers.

A significant variance in the amount of groundfish discards reported is found when comparing discard reports by the vessel operator and/or processor to discard reports by the independent contract observers. For example, in the 1992 Bering Sea/Aleutian Islands pollock fishery, vessel operators and/or processors reported total pollock discards of 47,772 mt while federal observers reported extrapolated pollock discards of 113,000 mt — or 237% greater than those reported by the vessel operators.

It is also noteworthy that the largely unobserved hook and line vessels in the Gulf of Alaska reported no discards of groundfish in the sablefish and Pacific cod directed fisheries in 1992.

As a result, the groundfish discard information depicted in this paper should be viewed as a conservative estimate of the actual discards which occurred in the 1992 groundfish fisheries.

The table below depicts the total groundfish harvest, the reported groundfish discards, and the prohibited species discards for the Bering Sea/Aleutian Islands and the Gulf of Alaska during 1992:

| | <u>mt</u> | <u>pounds</u> |
|---------------------------|------------|---------------|
| Total Groundfish Catch | 1,893,074 | 4,173,470,940 |
| Total Groundfish Discards | 229,999 | 507,055,795 |
| Percent Discarded | 12% | 12% |
| | | |
| Halibut Mortality | 20,035,767 | pounds |
| Chinook Salmon | 49,571 | fish |
| Other Salmon | 50,420 | fish |
| King Crab | 148,401 | crab |
| Bairdi Tanner Crab | 3,967,622 | crab |
| Other Crab | 16,360,418 | crab |
| Herring | 1,080,200 | pounds |

With the exception of halibut, the mortality rate for fish returned to the ocean in the Alaskan groundfish fisheries is assumed to be 100% by the NMFS. Halibut mortality rates are displayed in Table 1 (page 4) for the various fisheries.

Bering Sea/Aleutian Islands

The following findings apply to the groundfish fisheries in the Bering Sea and Aleutian Islands (BS/AI) management area.

- A total of 462 million pounds of groundfish (12% of the total harvest) were discarded during 1992 in the BS/AI, according to vessel operator and/or processor reports.
- Trawl fisheries were responsible for 93% of the groundfish discards, while fixed gear accounted for 7% of the discards.
- In trawl fisheries, 47% of the discards consisted of the species being targeted.
- In fixed gear, 2% of the discards consisted of the species being targeted.
- The mortality of halibut taken as incidental bycatch totaled nearly 14 million pounds.
- The average size of halibut taken as bycatch in the trawl fisheries was 0.94 pounds per halibut; in the pot fisheries the average size was 2.16 pounds per halibut; and, in the hook and line fishery the average size was 11.94 pounds per halibut.
- 20.3 million crab were discarded (60% of this total came from the yellowfin sole trawl fishery).
- 73,000 salmon of all species were discarded (81% of this total came from the mid-water trawl pollock fishery).
- 1 million pounds of herring were discarded.

The following findings apply to specific fisheries in the BS/AI:

Mid-Water Trawl Pollock Fishery: From a percentage perspective, this was a relatively

clean fishery as 4% of the total groundfish harvest of 2.27 billion pounds was discarded. This "mid-water" fishery, however, had a higher incidental bycatch of bottom-dwelling animals than the bottom trawl pollock fishery: 2.2 million pounds of halibut mortality and 3.2 million crab.

Bottom Trawl Pollock Fishery: The total groundfish harvest was 360 million pounds. Of this amount, 18% (64 million pounds) was discarded. The FSC discard consisted of 1.7 million pounds of halibut mortality and 2.2 million crabs.

Yellowfin Sole Trawl Fishery: The total groundfish harvest was 354 million pounds; 38% (133 million pounds) was discarded, including 58.7 million pounds of yellowfin sole. Halibut bycatch mortality associated with the fishery was 1.55 million pounds, and 12.2 million crab were taken as bycatch.

Rocksole Trawl Fishery: The total groundfish harvest was 115.5 million pounds.; 61% (70 million pounds) of the total catch was discarded, including twenty-two million pounds of rock sole and nineteen million pounds of pollock . The PSC discard consisted of 2 million crab and 1.6 million pounds of halibut mortality.

Pacific Cod Trawl Fishery: The total groundfish harvest was 146 million pounds; 36% (53 million pounds) was discarded. Halibut bycatch mortality was 3.5 million pounds.

Pacific Cod Hook & Line Fishery: The total groundfish harvest was 229 million pounds; 12% (29 million pounds) was discarded. Discards of Pacific cod accounted for less than one-tenth of one percent (618,000 pounds). Halibut bycatch mortality was 2.4 million pounds.

Pacific Cod Pot Fishery: The total groundfish harvest was 30.5 million pounds; 3% (1 million pounds) was discarded. Ninety-seven percent of the catch was the target species. 274,000 crab were taken as bycatch.

Gulf of Alaska

Discard information available for the Gulf of Alaska (GOA) management area varies significantly from that in the BS/AI. The following findings apply to the Gulf of Alaska management area.

- A total of 45 million pounds (9% of the total catch) of groundfish were discarded during 1992 in the GOA, according to vessel operator and/or processor reports.
- While the total catch in the GOA is approximately 16% of the total

catch in the BS/AI; the reported groundfish discards in the GOA are 9% of the reported groundfish discards in the BS/AI. This is likely due to greater observer coverage in the BS/AI.

- The total groundfish discard rate reported by the vessel operators in the GOA hook and line fishery is significantly less than 1%. This seems unexpectedly low.
- Trawl groundfish discard rates in the GOA are more reflective of the Bering Sea: 9% of the total groundfish harvest.
- Halibut bycatch mortality was 6.2 million pounds..
- The average size of halibut taken as bycatch was greater in the Gulf than the Bering Sea: 7.25 pounds per fish for trawl gear, 10.14 pounds per fish for pot gear, and 14.38 pounds per fish for hook and line.
- 26,500 salmon of all species were reported as discards.

The following findings apply to specific fisheries in the GOA:

Bottom Trawl Pollock Fishery: The total groundfish harvest was 53 million pounds; 6% (3 million pounds mt) of the harvest was discarded. 118,051 pounds of halibut mortality were associated with the fishery.

Mid-Water Trawl Pollock Fishery: The total groundfish harvest was 121 million pounds; 7% (8 million pounds) were discarded. Approximately 4,000 chinook salmon were taken as bycatch. Unlike the Bering Sea, there was little halibut bycatch mortality associated with this fishery.

Pacific Cod Trawl Fishery: The total reported groundfish harvest was 113 million pounds; 6% (6.6 million pounds) of the harvest was discarded. Halibut mortality associated with the fishery was 1.2 million pounds. 5,300 chinook salmon were also taken as bycatch.

Rockfish Trawl Fishery: The total reported groundfish harvest was 48 million pounds; 18% (8.7 million pounds) of the harvest was discarded. There were no discards of rockfish reported. Halibut mortality associated with the fishery was 1.1 million pounds. Over 5,000 salmon of all species were also taken.

Deepwater Flatfish Trawl Fishery: The total reported groundfish harvest was 34 million

pounds; 50% of the harvest was discarded. Halibut mortality was 1.3 million pounds.

Pacific Cod Hook and Line fishery: The total reported groundfish harvest was 32 million pounds. There were zero discards of groundfish reported; 98% of the reported harvest was Pacific cod. Halibut bycatch mortality associated with the fishery was 843,000 pounds.

Sablefish Hook and Line Fishery: The total reported groundfish harvest was 47.4 million pound; 93% of the total reported harvest was sablefish. Less than 2% of the total groundfish catch was reported as discard. Halibut bycatch mortality associated with the fishery was 1 million pounds.

.....

The data used in this paper, drawn exclusively from the NMFS 1992 records, is attached in appendices at the end of this paper.

1.0 Introduction

The purpose of this paper is to identify the amount of discards by species and fishery which occur annually in the commercial groundfish fisheries of the North Pacific and to examine the contributory cause of discards. The data used in this paper is drawn exclusively from National Marine Fisheries Service (NMFS) files for 1992. All data used is attached in its original form as Appendix 1 (NMFS Catch & Discard Data), Appendix 2 (NMFS Bering Sea Prohibited Species Catch), Appendix 3 (NMFS GOA Prohibited Species Catch), and Appendix 4 (Numbers and Size of Halibut PSC).

Although discards also occur in the crab fisheries in the North Pacific, primarily consisting of undersize crab, crab of species other than the target species, and varying amounts of halibut, this paper does not review those discards.

Discards are generally defined as those fish or animals which are returned to the sea after being harvested. For the purpose of this paper, the term "discard" is synonymous with waste since a discarded fish is thrown away, or wasted, instead of being used for the purpose it was initially harvested for — food. Not all of the fish or animals discarded die; therefore, total discards do not equate to total waste. NMFS has developed assumed mortality rates to estimate the survival rate of various species discarded in the different fisheries. Those rates were used in this paper to estimate actual discard waste. They take into account those fish or animals returned to the sea which survive. Therefore, discard waste figures used in this paper exclude those discards which are presumed to have survived the harvest and discard trauma. (See Section 1.2 for further discussion on mortality rates.)

Not all of the species discarded have a food production value; markets either do not exist or processing technology is not available to render the fish into viable consumptive products. As a result, it is questionable whether the discard of those species constitutes waste.

1.1 Discard Data

1.1.1 Groundfish

The National Marine Fisheries Service collects data on discards from two sources: the vessel operator and/or processor, and the contract employed, federal observer — if any — on board the vessel. The discard data for groundfish used in this paper was generated by NMFS for the 1992 fishing year, and reflects only the reports submitted by vessel operators/processors to document the discards in the fishery. Vessel/processor reports were used rather than observer reports because they were available for 1992 (observer reports were not) at the time this paper was being prepared. Because the data used is that reported by the industry itself, there should be little dispute from the harvesting sector of the industry regarding the data's veracity.

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It is worth noting that observer reports on discards are generally higher than the reports submitted by vessel operators/processors. This is exemplified by the data shown below which compares observer/best blend discard data with vessel/processor reported discard data for the target 1992 pollock fishery.¹ In the 1992 pollock fishery, the observer/best blend data shows pollock discards 65,249 mt (or 144 million pounds) greater than that reported by the vessel /processors. This represents a difference of 137% between the two reports.

| | <u>Total Catch (mt)</u> | <u>Retained Catch (mt)</u> | <u>Discard (mt)</u> |
|----------------------------|-----------------------------|--------------------------------|---------------------|
| Observer/Best Blend Report | 1,333,754 | 1,220,733 | 113,021 |
| Vessel/Processor Reports | 1,158,853 | 1,111,081 | 47,772 |
| Difference (mt) | 174,901 | 109,652 | 65,249 |
| Difference (lbs) | 385,586,745 | 241,738,799 | 143,847,945 |
| Difference (%) | 15% | 10% | 237% |

Again, note that the summary discard data used in this report for groundfish is not observer/best blend data, but data reported by the vessel operators and/or processors themselves.

For further comparisons between observed and reported discards, see Comparison Between Observed and Reported Catches of Retained and Discarded Groundfish in the Bering Sea and the Gulf of Alaska, 199-91 (Berger, 1993).

1.1.2 Prohibited Species

The discard data for prohibited species catch (PSC) contained in this report is NMFS observer data. This is available for 1992 because NMFS manages fisheries, in part, upon the level of PSC harvested. NMFS observers collect PSC data as a priority, so this data is continuously monitored and updated.

It is important to note that observers estimate only the number of PSC harvested, and only on those hauls or gear that the observers witness. NMFS assumes that the bycatch rate observed and reported by observers is standard throughout the fleet, and extrapolates that rate to all unobserved harvests. Through this process, NMFS develops an estimate of total PSC catches and discards.

¹Observer/best blend data from NMFS Bulletin Board (Preliminary Catch figures); vessel report data also from NMFS as shown in Tables 4 and 5.

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This report does not separate discard data between various harvesting entities, such as catcher vessels delivering to shoreside processors, catcher vessels delivering to floating processors, or harvests by catcher/processors. That information is, however, generally available.

1.2 Mortality Rates

The National Marine Fisheries Service establishes mortality rates for the various species that are harvested and then returned to the sea. These rates are then applied to the amount of the harvest of the species in question to determine the total discard mortality for that species.

The assumed mortality rate for all species is 100%, except in the case of halibut. For halibut, different mortality rates are used for different gear types and different fisheries. Additionally, halibut mortality rates may change from one year to the next dependent upon a variety of factors. Table 1 shows halibut mortality rates for 1992 and 1993.

The mortality rates used to identify halibut mortality in the 1992 fisheries (as shown in Section 3) are the 1992 rates.

Although the assumed mortality rate for crab is 100%, studies have shown that the actual rate is less than 100%. A mortality rate less than 100% may, however, be offset (or partially offset) by the unobserved mortality of crab that may be mortally injured on the bottom as a result of contact with trawl gear. Insufficient studies have occurred to determine an accurate crab mortality rate, and NMFS continues to use 100%.

1.3 Managing Entities

The managing entities for the groundfish fisheries in the North Pacific include NMFS, the North Pacific Fishery Management Council (NPFMC), the Alaska Department of Fish & Game (ADF&G), and the International Pacific Halibut Commission.

The North Pacific Fishery Management Council is a federal body charged with developing management policies affecting the commercial fisheries in the 200 mile Exclusive Economic Zone (EEZ). Those policies include the establishment of recommended harvest guidelines by species, fishery management plans, and policies and management techniques which address a wide array of issues, including bycatch management, limited access, and allocation issues.

The National Marine Fisheries Service is responsible for the overall day-to-day management of the fisheries. This includes the review, approval, and/or modification and implementation of the NPFMC's recommendations, as approved by the U.S. Secretary of Commerce.

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Table 1

**1992 and 1993 Halibut Bycatch Mortality Rates
for the
Bering Sea/Aleutian Islands & the Gulf of Alaska**

| <u>Area</u> | <u>Gear</u> | <u>Fishery</u> | <u>1992 Rate</u> | <u>1993 Rate</u> |
|-------------|-------------|---|----------------------|----------------------|
| BS/AI | Trawl | Mid-Water Pollock | 100% | 80% |
| | | Atka Mackerel | 100% | 70% |
| | | Rock Sole | | |
| | | Yellowfin Scle Other Flatfish | | |
| | | Pacific Cod | 100% | 60% |
| | | Bottom Trawl Pollock Rockfish | | |
| | | Arrowtooth Flounder Greenland Turbot Sablefish Other | 100% | 40% |
| | Longline | All | 16% | 18% |
| | Pot | All | 5% | 5% |
| GOA | Trawl | Mid-Water Pollock | 65% | 75% |
| | | Rockfish | 65% | 60% |
| | | Shallow Water Flatfish Other | | |
| | | Pacific Cod | 65% | 55% |
| | | Bottom Trawl Pollock Deep Water Flatfish | | |
| | Longline | Sablefish | 16% | 20.5% |
| | | All Other Fisheries | 16% | 16.0% |
| | Pot | All | 5% | 5% |

Source: National Marine Fisheries Service

Discards in the Groundfish Fisheries of the North Pacific

The Alaska Department of Fish & Game has management authority in the EEZ over those species and fisheries for which the federal government has declined to adopt a fishery management plan, or which have been formally delegated to the state of Alaska. With the exception of demersal shelf rockfish in the Eastern Gulf of Alaska, ADF&G does not exert management control over groundfish species in the EEZ.

The International Pacific Halibut Commission has the responsibility to establish overall harvest limits for the directed halibut fishery, define legal gear for harvesting of halibut, and other conservation oriented measures. The IPHC's authority is limited to conservation actions; allocation decisions are the responsibility of the NPFMC and the NMFS.

2.0 General Causes of Discards

There are a variety of reasons why discards occur, including economics, management policies, and fishing practices.

2.1 Economic Discards

Discards sometimes occur because of the economic loss associated with processing the entire harvest. This normally happens in the case of mixed stock fisheries or when species of little or no value are incidentally harvested along with the target species.

Mixed stock fisheries are those in which many different species are harvested at the same time. This occurs when the species being targeted inhabits the same area as other species, and/or when the harvesting gear being used cannot discriminate between species.

Common examples of mixed stock fisheries include the rocksole and yellowfin sole trawl fisheries. In these fisheries, large amounts of other species are also harvested, and since they were not the target species, are frequently discarded. In most instances, the fish being discarded have a lesser value than the target species. Since cargo hold or processing space aboard commercial fishing vessels (including catcher/processors) is at a premium, the retention of these lesser value species may reduce the overall economic income associated with a fishing trip because they occupy space which would otherwise be used for the higher value, target species, or the species for which a market has been secured. Consequently, the incidentally caught species are discarded.

Many species taken incidental to the target catch are discarded because they have little or no commercial value. Arrowtooth flounder in the Gulf of Alaska is a good example. Arrowtooth flounder is the most abundant groundfish in the Gulf, and is harvested incidentally in almost every target fishery. Since arrowtooth turns to mush when cooked, it has no value as a food product at present.

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One of the arguments surrounding discards is the question of whether or not they represent a cost to the nation. Some in the industry suggest that a certain minimal level of discards may be necessary or realistic, but that discards above that level occur as a result of poor fishing practices or bad judgment. Discards of that nature are not necessary (they argue), and may constitute a cost since they would otherwise have been utilized.

During 1991, the discard rate for the inshore sector of the industry for pollock was 4.3%, the offshore discard rate was 9.01%, the total offshore harvest was 1,052,625 mt, and the amount of pollock discarded by the offshore component was 94,822.² It may be reasonable to assume that the lower of the two discard rates accurately reflects the high end of minimal necessary discards; therefore, the amount of discards greater than 4.3% of the total harvest could be considered to be an economic cost. That amount was 49,308 mt (1,052,625 mt of total harvest times 4.3%, subtracted from total discards of 94,822 mt), or 109 million pounds. If one relies upon the argument that these discards were unnecessary, the 109 million pounds constitutes economic waste since other participants in the fishery would, presumably, have been able to utilize the harvest in an economically positive manner.

Clearly, the "economics" of discards work in both directions: they can be used to justify waste in the name of efficiency, or they can be used to illustrate what appears to be needless waste.

2.2 Management Induced Discards

Regulations, or the lack thereof, by managing entities are often a direct cause for discards. The following sections review the most common of management-induced discards.

2.2.1 Prohibited Species Catch

Federal regulations prohibit fishermen using certain gear types from retaining certain species, regardless of whether the fish are alive or dead. These species are referred to as prohibited species catch (PSC). PSC is divided into two categories.

The first category consists of halibut, salmon, crab, and herring. These species are PSC for all but a few gear types — it is unlawful for a gear type other than that specified to purposefully harvest, or to retain in any circumstances, these species. In no case, for example, are trawlers allowed to retain any of those species: any that are harvested must be returned as quickly as possible to the ocean. For each species other than

²North Pacific Fishery Management Council, Amendment 18/23, Supplemental SEIS, Table 1.5, NMFS Scenario.

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halibut, this rule was established by the NPFMC; for halibut, IPHC rules prohibit retention at any time by any gear other than longline. Also, IPHC rules prohibit the retention of halibut by longline vessels at any time other than when directed fishing for halibut is allowed.

The second category of PSC consists of those species whose allocated catch level has nearly been met and the amount of the quota remaining is insufficient to allow targeting without the risk of exceeding the harvest quota. In these cases, a minimal amount (or none) of the species may be retained. The purpose of this regulation is to eliminate or reduce the incentive for vessels to target the particular species which is nearing its total allowable catch level.

This paper does not provide a breakdown of management induced discard as compared to other types of discard. That information is, however, available and could be compiled.

Management induced discards of PSC are becoming increasingly controversial because they require discard waste.

2.2.2 The Race for Fish

The groundfish fisheries in the North Pacific have become seriously over-capitalized; the existing harvesting capacity far exceeds the amount that is reasonably necessary to harvest the quota. Since the fishing quotas are managed on an open access principle (anyone with a license and the proper gear can fish), and open seasons last only as long as the quota is available, a race for fish occurs as vessels compete with each other to take as much of the quota as possible during the time the season is open. With ever more efficient harvesting techniques available, fishing seasons are becoming shorter and shorter.

This management system, commonly known as the Olympic system, has an impact upon discard rates for both PSC and non-PSC species. Since vessels have an extremely limited amount of time to harvest the target quota, they are unable to fish slower and more selectively; on the contrary, they fish for maximum production and discard those species or those fish they are incapable of efficiently holding for transport back to port (for catcher vessels), or processing through their volume-oriented production line (for catcher-processors). Time is money in an Olympic system fishery, and vessels simply do not have the time to process anything other than the most profitable species they can harvest. Consequently, they throw everything else away.

The Olympic system also results in increased handling mortality of bycatch species and the loss of gear. This is particularly a problem in the longline halibut fisheries (see Section 4.1).

2.3 Fishing Practice Discards

Discards resulting from fishing practices may be the result of action by the fishermen directly, by management requirements (as described in Section 2.2 above), or a combination of the two. For the purpose of this paper, fishing practice discards are those discards which result from cavalier fishing practices by the vessel without regard to the impact of that practice. The following are examples:

- During the past two years in the Bering Sea, when the use of on-bottom trawl gear for pollock and/or Pacific cod was prohibited (due to halibut bycatch), some vessel operators made slight technical modifications to their gear so that the trawl was no longer classified as a bottom trawl, but as a mid-water trawl. In this manner, the operators could legally continue to fish their gear on the bottom. These modifications not only violated the intent of the law, but resulted in higher levels of halibut bycatch than had occurred with the defined "bottom trawl".³
- In the period prior to the opening of a halibut fishery, some longline vessels "prospect" for halibut while allegedly targeting another species such as Pacific cod. Since the purpose of the prospecting fishing trip is really to locate large quantities of halibut, the vessels fish in areas of known halibut concentration under the guise of fishing for Pacific cod; the halibut are discarded (they are PSC until the directed halibut fishery begins) and the cod retained, but the halibut bycatch rate and associated mortality are substantially greater than what would otherwise occur.
- Some vessels fish in areas where PSC and groundfish bycatch rates are known to be substantially higher than in other — albeit more distant and operationally costly — locations.

3.0 Amount of Discards

The following sections describe discard amounts by fishery in the Bering Sea/Aleutian Islands and the Gulf of Alaska.

³In fact, the bycatch of bottom-dwelling species in the mid-water pollock fishery during 1992 was substantially greater than the bycatch of bottom-dwelling species in the bottom trawl pollock fishery (see Sections 3.1.1 and 3.1.2).

3.1 Bering Sea/Aleutian Islands Fisheries

The reported 1992 harvest of groundfish in the Bering Sea/Aleutian Islands was 1.66 million mt. or 3.7 billion pounds. Of this amount, 462 million pounds (12%) of the total groundfish harvested was reported by the vessels as being discarded. Discards of PSC directly associated with the groundfish catch during 1992 included 14 million pounds of halibut (mortality), 3.85 million bairdi Tanner crab, 16.2 million opilio Tanner crab, 148,000 red king crab, 104,000 other king crab, 33,000 Chinook salmon, 40,000 salmon of other species, and 1 million pounds of herring.⁴ (See Table 2.)

Trawl fisheries accounted for 93% of total groundfish discards; fixed gear fisheries accounted for the remainder.

In the trawl fisheries, 47% of the total groundfish discards consisted of the same species the trawl fishery was targeting. For example, 22 million pounds of the 50 million pounds of rocksole harvested in the target trawl rocksole fishery was discarded by the vessels fishing rocksole. In total, 202 million pounds of the groundfish discarded by the trawl fisheries were the same species the trawl fisheries were targeting.

This problem did not exist in the longline fisheries, where just 2% of the total longline groundfish discards consisted of the targeted species.

Table 3 documents target catch discards.

The following provides a review of each major trawl and fixed gear fishery.

3.1.1 Mid-Water Trawl Pollock

Table 4 documents total catch and discard figures for the mid-water trawl pollock fishery. Figure 1 also depicts the relationship between groundfish retained and groundfish discarded in this fishery.

The total harvest of groundfish in the mid-water trawl pollock fishery during 1992 was 2.27 billion pounds. Of this amount, 85 million pounds, or 4% of the entire harvest, was discarded. This includes 73 million pounds (of pollock, or 3% of the pollock harvested. Pollock amounted to 86% of total groundfish discards. Of the remaining 12 million pounds of groundfish discard, 4.8 million pounds was Pacific cod and 3 million pounds was other flatfish.

⁴These numbers do not include discards that may have occurred during the December, 1992 Community Development Quota fishery. The total pollock harvest in that fishery was approximately 100,000 mt. The incidental harvest of bottom-dwelling PSC species was very low, however some 7,000 Chinook salmon were taken according to observer reports.

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Despite the fact that the mid-water pollock fishery is an off-bottom fishery, the incidental harvest of bottom-dwelling crab and halibut consisted of 2.2 million pounds of halibut mortality, 700,000 Bairdi Tanner crab, and 2.5 million Opilio Tanner crab. Additionally, 22,000 Chinook salmon and 39,000 salmon of other species were taken incidentally.

The PSC bycatch of bottom-dwelling animals resulted from the use of bottom trawl gear that was modified to meet the mid-water trawl gear definition; the modified gear was used to fish pollock on the bottom after the bottom trawl fishery had been closed. Future PSC catches of bottom-dwelling animals should be nearly eliminated if the fishery truly occurs mid-water.

3.1.2 Bottom Trawl Pollock Fishery

Table 5 documents total catch and discard figures for the bottom trawl pollock fishery. Figure 2 also depicts the relationship between groundfish retained and groundfish discarded in this fishery.

The total harvest of groundfish in the bottom trawl pollock fishery during 1992 was 359 million pounds. Of this amount, 64 million pounds, or 18% of the entire harvest, was discarded. This includes 32.3 million pounds of pollock, or 10% of the pollock harvested. Of the remaining 32 million pounds of groundfish discard, 9.5 million pounds was other flatfish, 6.8 million pounds was rocksole, and 6.8 million pounds was Pacific cod.

Prohibited species discard included 1.7 million pounds of halibut mortality, 600,000 Bairdi Tanner crab, 1.6 million Opilio Tanner crab, 43,000 king crab of all species, and 6,000 Chinook salmon.

The incidental harvest of bottom dwelling species was lower than that of the mid-water trawl pollock fishery.

3.1.3 Flatfish Trawl Fisheries

The flatfish trawl fisheries consist of two components: the yellowfin sole target fishery and the rocksole target fishery. Both are mixed stock fisheries in which sizable quantities of other groundfish species are harvested due to co-habitation of grounds.

The flatfish fisheries are also bottom trawl fisheries which often occur in areas that have a high abundance of crab and halibut; as a result, high incidental bycatch rates of those species are not unusual.

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3.1.3.1 Yellowfin Sole Trawl Fishery

Table 6 documents total catch and discard figures for the trawl yellowfin sole fishery. Figure 3 also depicts the relationship between groundfish retained and groundfish discarded in this fishery.

The total harvest of groundfish in the yellowfin sole fishery during 1992 was 354 million pounds. Of this amount, 133 million pounds, or 38% of the entire harvest, was discarded. This includes 58.7 million pounds of yellowfin sole, or 23% of the yellowfin sole harvested. Of the remaining 74.2 million pounds of groundfish discard, 14 million pounds was rocksole, 25.5 million pounds was other flatfish, 16.5 million pounds was pollock, and 4.5 million pounds was Pacific cod.

Additionally, large quantities of PSC were harvested and discarded. This includes 1.55 million pounds of halibut mortality, 1.6 million Bairdi Tanner crab, 10.5 million Opilio Tanner crab, and 96,000 king crab of all species.

The following illustrates the discard rate of groundfish and PSC for every one metric ton of yellowfin sole retained (also see Table 6):

| <u>Species</u> | <u>Amount Discarded</u> |
|--------------------|-------------------------|
| Yellowfin Sole | 0.30 mt |
| Rocksole | 0.07 mt |
| Other Flatfish | 0.13 mt |
| Pollock | 0.09 mt |
| Pacific Cod | 0.02 mt |
| Halibut | 0.01 mt |
| Bairdi Tanner Crab | 18.03 animals |
| Opilio Tanner Crab | 119.75 animals |
| King Crab | 1.09 animals |

3.1.3.2 Rocksole Trawl Fishery

Table 7 documents total catch and discard figures for the trawl rocksole fishery. Figure 4 also depicts the relationship between groundfish retained and groundfish discarded in this fishery.

The total harvest of groundfish in the rocksole fishery during 1992 was 114.4 million pounds. Of this amount, 70 million pounds, or 61% of the entire harvest, was discarded. This includes 22.3 million pounds of rocksole, or 45% of the rocksole harvested. Of the remaining 47.7 million pounds of groundfish discard, 19 million

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pounds was pollock, 9.4 million pounds was other flatfish, 7.5 million pounds was yellowfin sole, and 2.9 million pounds was Pacific cod.

Additionally, large quantities of PSC were harvested and discarded. This includes 1.6 million pounds of halibut mortality, 588,000 bairdi Tanner crab, 1.4 million opilio Tanner crab, and 72,000 king crab of all species.

The following illustrates the discard rate of groundfish and PSC for every one metric ton of rocksole retained (also see Table 7):

| <u>Species</u> | <u>Amount Discarded</u> |
|--------------------|-------------------------|
| Rocksole | 0.81 mt |
| Yellowfin Sole | 0.27 mt |
| Other Flatfish | 0.34 mt |
| Pollock | 0.69 mt |
| Pacific Cod | 0.11 mt |
| Halibut | 0.06 mt |
| Bairdi Tanner Crab | 47.18 animals |
| Opilio Tanner Crab | 110.77 animals |
| King Crab | 5.82 animals |

3.1.4 Pacific Cod Trawl Fishery

Table 8 documents total catch and discard figures for the trawl Pacific cod fishery. Figure 5 also depicts the relationship between groundfish retained and groundfish discarded in this fishery.

The total harvest of groundfish in the Pacific cod trawl fishery during 1992 was 146 million pounds. Of this amount, 53 million pounds, or 36% of the entire harvest, was discarded. This includes 4.8 million pounds of Pacific cod, or 5% of the Pacific cod harvested. Of the remaining 48 million pounds of groundfish discard, 23.6 million pounds was pollock, 5 million pounds was other flatfish, 4.2 million pounds was rocksole, and 3.6 million pounds was Atka mackerel.

The incidental bycatch of prohibited species, notably halibut and crab, were relatively high on a catch per mt basis when compared to other fisheries. Halibut bycatch was 3.5 million pounds of mortality, and bairdi and opilio Tanner crab catches were 163,648 and 77,048 respectively. Additionally, 4,000 chinook salmon were taken.

3.1.5 All Trawl Fisheries

With the exception of the fisheries identified above, the remainder of the trawl fisheries take extremely limited quantities of target and non-target species. Table 9 documents total catch and discard figures for the combined trawl fisheries.

3.1.6 Hook & Line Pacific Cod Fishery

The hook and line fisheries in the Bering Sea/Aleutian Islands are essentially limited to Pacific cod, although nominal fisheries for sablefish and some other species also occur.

Table 10 documents total catch and discard figures for the longline Pacific cod fishery. Figure 6 also depicts the relationship between groundfish retained and groundfish discarded in this fishery.

The total harvest of groundfish in the Pacific cod longline fishery during 1992 was 229 million pounds. Of this amount, 28 million pounds, or 12% of the entire harvest, was discarded. This includes 600,000 pounds of Pacific cod, less than one-tenth of one percent of the Pacific cod harvested. Of the remaining 27 million pounds of groundfish discard, 17 million pounds was "other" species, 5.6 million pounds was pollock, and 2.6 million pounds was arrowtooth flounder.

The incidental catch of prohibited species was primarily halibut; approximately 2.4 million pounds of halibut mortality were associated with this fishery. Surprisingly, 113,000 crab were taken as bycatch; this consisted of 17,000 Bairdi Tanner crab, 93,600 Opilio Tanner crab, and 3,600 king crab. These are observer numbers extrapolated across the entire fishery.

With the exception of the Pacific cod fishery identified above, the remainder of the hook and line fisheries take extremely limited quantities of target and non-target species. Table 11 documents total catch and discard figures for the combined hook and line fisheries.

3.1.7 Pot Fisheries

The only groundfish pot fishery in the Bering Sea/Aleutian Islands is the Pacific cod pot fishery. The total harvest of groundfish in this fishery during 1992 was 30.5 million pounds. Of this amount, 29.5 million pounds (97%) was Pacific cod. Discards of Pacific cod amounted to 154,300 pounds — less than 1% of the Pacific cod harvest. Discards of other groundfish species were inconsequential. Table 12 documents total catch and discard figures for the Pacific cod pot fishery.

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The incidental catch of prohibited species consisted primarily of Tanner crab; approximately 213,000 bairdi and 52,000 opilio were taken.

3.2 Gulf of Alaska Fisheries

Tables 13, 14, 15, 16, and 17 show groundfish retained and discard amounts of species and target fishery. Table 18 shows PSC discards in the same fisheries.

The discard figures in the Gulf of Alaska are unreliable. The reports generated by the vessel operators and/or processors, particularly in the longline fisheries, are especially suspect. Total reported discards in the Gulf of Alaska longline fisheries amounted to just 366 mt, or 807,000 pounds; this compares to a retained harvest of 37,000 mt, resulting in a discard rate significantly less than 1%.

Trawl discard rates appear to be more realistic; 20,115 mt (44 million pounds) were reported as discard out of a total trawl catch of 188,000 mt, resulting in an overall trawl discard rate of 11%.

Although federal regulations require vessel operators to report discards, enforcement of this regulation is difficult in the absence of on-board observers. Since the requirements for observer coverage are based upon length of a vessel⁵, and smaller vessels predominate in the Gulf, either vessel operators are failing to account for their discards or they are extremely effective and clean operators.

The 1992 harvest of groundfish in the Gulf of Alaska was 234,746 mt, or 518 million pounds. Of this amount, 9% (20,559 mt or 45.3 million pounds) of the groundfish harvested was reported as discard. Discards of PSC directly associated with the groundfish catch during 1992 included 6.2 million pounds of halibut mortality, 117,000 bairdi Tanner crab, 14,000 other Tanner crab, 1,400 king crab of all species, 16,200 Chinook salmon, 10,300 salmon of other species, and 36,400 pounds of herring.

The following is a brief review of major Gulf of Alaska fisheries.

3.2.1 Hook & Line Pacific Cod Fishery

The total harvest of groundfish in the Pacific cod longline fishery during 1992 was 32 million pounds (14,475 mt). Of this amount, 99% (or 14,326 mt) was Pacific cod; the remaining 149 mt of catch was split between demersal shelf rockfish, sablefish, and shortraker/Rougheye. There was no groundfish discard reported. (See Table 13.)

⁵Vessels greater than 125 feet are required to carry an observer at all times, vessels between 60 and 125 feet must carry an observer at least 30% of the time, and vessels less than 60 feet are not required to carry an observer.

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The incidental catch of prohibited species in this fishery consisted nearly exclusively of halibut; approximately 843,000 pounds of halibut mortality was attributed to the longline Pacific cod fishery. (See Table 18.)

3.2.2 Hook & Line Sablefish Fishery

The total harvest of groundfish in the sablefish longline fishery during 1992 was 47.4 million pounds (21,489 mt). Of this amount, 93% (or 19,988 mt) was sablefish. The remaining 1,500 mt of catch was primarily split between demersal shelf rockfish, Pacific cod, slope rockfish, and shortraker/rougheye, all of which were retained. The only groundfish discard reported consisted of arrowtooth flounder, deep water flounder, and skates. The reported groundfish discard rate in the longline sablefish fishery was less than 1%. (See Table 13.)

The incidental catch of prohibited species in this fishery consisted nearly exclusively of halibut; approximately 1 million pounds of halibut mortality was attributed to the longline Pacific cod fishery. (See Table 18.)

3.2.3 Pot Pacific Cod Fishery

The Pacific cod pot fishery is the only pot fishery of consequence in the Gulf of Alaska. During 1992, the fishery accounted for a total groundfish harvest of 21 million pounds (9,533 mt); virtually the entire reported groundfish harvest consisted of Pacific cod — little or no groundfish discards were reported. (See Table 15.)

The prohibited species catch consisted of 21,800 pounds of Tanner crab and 9,068 pounds of halibut mortality. (See Table 18.)

3.2.5 Bottom Trawl Pollock Fishery

The total groundfish harvest in the target bottom trawl pollock fishery during 1992 was 53 million pounds (24,200 mt). Pollock comprised 94% of the harvest. A total of 3.2 million pounds, or 6% of the total groundfish catch, was discarded. Groundfish discards consisted mostly of pollock. (See Table 16.)

The prohibited species catch consisted of 118,000 pounds of halibut mortality, 3,100 Tanner crab, and 3,200 salmon. (See Table 18.)

3.2.6 Mid-Water Trawl Pollock Fishery

In the mid-water trawl pollock fishery, the total groundfish harvest during 1992 was 123 million pounds (55,000 mt). Pollock comprised 99% of the groundfish catch. A

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total of 8.3 million pounds, or 7% of the total groundfish catch, was discarded. Groundfish discards consisted almost entirely of pollock. (See Table 16.)

The prohibited species catch consisted of 12,250 pounds of halibut mortality, 1,600 Tanner crab, and 9,600 salmon (3,900 of which were Chinook). (See Table 18.)

3.2.7 Trawl Pacific Cod Fishery

The total groundfish harvest in the target Pacific cod trawl fishery during 1992 was 113 million pounds (51,306 mt). Pacific cod comprised 89% of the catch. A total of 6.6 million pounds, or 6% of the total catch, was discarded. Discards consisted primarily of arrowtooth flounder (3 million pounds), flatfish (2 million pounds), and Pacific cod (1.3 million pounds). (See Table 16.)

The prohibited species catch consisted of 1.2 million pounds of halibut mortality, 59,000 Tanner crab, and 5,300 Chinook salmon. (See Table 18.)

3.2.8 Trawl Rockfish Fishery

During 1992, the total groundfish harvest in the fishery was 48 million pounds (22,000 mt). Rockfish comprised 70% of the catch (34 million pounds). A total of 8.7 million pounds, or 18% of the total catch, was discarded. Ninety-one percent of the discards consisted of arrowtooth flounder; the remainder were flounder and Pacific cod (see Table 16).

The prohibited species catch consisted of 1.1 million pounds of halibut mortality, 7,600 Tanner crab, and 5,000 salmon (see Table 18.)

3.2.9 Trawl Deepwater Flatfish Fishery

During 1992, the total groundfish harvest in the trawl deepwater flatfish fishery was 34 million pounds (15,500 mt). Deepwater flatfish comprised 38% of the harvest (13 million pounds). A total of 17 million pounds, or 50% of the total catch, was discarded. Eighty-eight percent of the discards consisted of arrowtooth flounder; the remainder were deepwater flatfish and Pacific cod (see Table 16).

The prohibited species catch consisted of 1.3 million pounds of halibut mortality, 33,500 Tanner crab, and 3,000 salmon (mostly chinook). (see Table 18.)

3.2.10 Trawl Shallow Water Flatfish Fishery

The shallow water trawl flatfish fishery reported a total groundfish harvest of 12 million pounds (5,375 mt) during 1992. There were no groundfish discards reported. Sixty-four percent of the harvest consisted of shallow water flatfish. (See Table 16.)

The incidental bycatch of prohibited species in the shallow water flatfish fishery consisted of 323,000 pounds of halibut mortality and 16,000 Tanner crab. (See Table 18.)

3.3 Bering Sea/Aleutian Island & Gulf of Alaska Longline Halibut Fishery

Participation in the directed halibut fisheries is limited to longline vessels only. Fishing openings typically are limited to one day due to the huge amount of harvesting effort. The halibut grounds are extremely crowded, and gear is often lost or abandoned. The pace of the fishery is very fast (given the short openings), and halibut of sub-legal size suffer from improper handling which reduces their chance of surviving when they are returned to the water.

The International Pacific Halibut Commission (IPHC) estimates the amount of halibut mortality associated with lost and abandoned gear and with sub-legal handling. For 1992, in the Bering Sea/Aleutian Islands and the Gulf of Alaska combined, the IPHC estimated 1.64 million pounds of halibut died as a result of lost and abandoned gear and 1.33 million pounds of sub-legal halibut died as a result of handling mortality. The total loss of halibut was 3 million pounds. (See Table 19.)

3.4 Average Size of Halibut Taken as Bycatch in the Bering Sea/Aleutian Islands and the Gulf of Alaska

Tables 20 and 21 shows the number and size of halibut taken as bycatch in each of the target fisheries in the Bering Sea/Aleutian Islands and the Gulf of Alaska respectively during 1992. This information is from observer reports.

In the Bering Sea/Aleutian Islands, the average size of halibut taken as bycatch varies greatly between the different gear types and fisheries. The trawl fisheries accounted for the lowest average size (0.94 pounds per halibut), followed by the pot fisheries (2.16 pounds per halibut) and the hook and line fisheries (11.94 pounds per halibut).

Halibut taken as bycatch in the Gulf of Alaska were substantially greater in size on average than the Bering Sea/Aleutian Islands: trawl fisheries averaged 7.25 pounds per halibut, pot fisheries averaged 10.14 pounds per halibut, and hook and line fisheries averaged 14.38 pounds per halibut.

Table 2

Catch & Discard of All Species and Fisheries in the Bering Sea/Aleutian Islands During 1992

| Total Catch | Retained Catch (mt) | Discard Catch (mt) | Discard Rate (%) | Ratio of Discard Per mt of Retained Catch | Assumed Mortality Rate | Discard Loss (mt) | Discard Loss (lbs) |
|---|------------------------|-----------------------|---------------------|---|------------------------------|----------------------|-----------------------|
| Groundfish | | | | | | | |
| Atka Mackerel | 30,608 | 6,484 | 14% | 0.00 | 100% | 6,484 | 14,294,626 |
| Arrowtooth | 593 | 8,082 | 93% | 0.01 | 100% | 8,082 | 17,817,798 |
| Flounder | 5,050 | 24,276 | 83% | 0.02 | 100% | 24,276 | 53,519,311 |
| Turbot | 611 | 1,008 | 62% | 0.00 | 100% | 1,008 | 2,222,016 |
| Pacific Cod | 160,881 | 11,618 | 7% | 0.01 | 100% | 11,618 | 25,612,381 |
| Pollock | 1,115,850 | 78,346 | 7% | 0.05 | 100% | 78,346 | 172,722,473 |
| Pacific Ocean Porch | 10,560 | 2,299 | 18% | 0.00 | 100% | 2,299 | 5,087,714 |
| Rockfish | 1,200 | 993 | 45% | 0.00 | 100% | 993 | 2,189,829 |
| Rocksole | 18,599 | 21,862 | 54% | 0.02 | 100% | 21,862 | 48,197,627 |
| Sablefish | 1,965 | 27 | 1% | 0.00 | 100% | 27 | 59,083 |
| Yellowfin Sole | 90,885 | 31,319 | 26% | 0.02 | 100% | 31,319 | 69,045,867 |
| Other | 2,984 | 23,125 | 89% | 0.02 | 100% | 23,125 | 50,981,595 |
| Total | 1,448,888 | 209,440 | 13% | 0.14 | 100% | 209,440 | 461,730,322 |
| Prohibited Species | | | | | | | |
| Halibut (mt or pounds) | 0 | 12,196 | 100% | 0.01 | varies | 6,255 | 13,789,303 |
| Herring (in pounds) | 0 | 1,043,871 | 100% | 0.72 | 100% | 473 | 1,043,871 |
| Bairdi (in numbers) | 0 | 3,850,692 | 100% | 2.66 | 100% | | 3,850,692 |
| Other Tanner (in numbers) | 0 | 16,241,162 | 100% | 11.21 | 100% | | 16,241,162 |
| Red King Crab (in numbers) | 0 | 148,332 | 100% | 0.10 | 100% | | 148,332 |
| Other King (in numbers) | 0 | 104,204 | 100% | 0.07 | 100% | | 104,204 |
| Chinook Salmon (in numbers) | 0 | 33,401 | 100% | 0.02 | 100% | | 33,401 |
| Other Salmon (in numbers) | 0 | 40,213 | 100% | 0.03 | 100% | | 40,213 |
| Total Grd'fish, Halibut & Herring Discards in All Fisheries (in mt and pounds) | | | | | | 216,168 | 476,563,496 |
| Total Crab and Salmon Discards in All Fisheries (in numbers) | | | | | | | 20,418,004 |

Source: NMFS Special Data Run (see Appendix 1)

Discards in the Groundfish Fisheries of the North Pacific

Discards in the Groundfish Fisheries of the North Pacific

Table 3

Target Catch Discards in the Bering Sea/Aleutian Islands During 1992 by Target Fishery and Gear

| Trawl | Target Fishery | Target Catch Retained (mt) | Target Catch Discard (mt) | Target Catch Discard (lbs) |
|-------|---|-------------------------------|------------------------------|-------------------------------|
| | Atka Mackerel | 37,400 | 4,268 | 9,404,824 |
| | Bottom Pollock | 125,765 | 14,634 | 32,262,118 |
| | Pacific Cod | 37,817 | 2,185 | 4,772,959 |
| | Pacific Ocean Perch | 5,482 | 568 | 1,247,804 |
| | Mid-Water Pollock | 985,318 | 33,138 | 73,056,035 |
| | Rocksole | 12,470 | 10,129 | 22,330,393 |
| | Yellowfin Sole | 87,952 | 26,625 | 58,697,475 |
| | Total Target Catch | 1,298,182 | 91,523 | 201,771,608 |
| | Total Groundfish Discards of All Species in Trawl Fisheries | | 195,020 | 429,941,092 |
| | Percent of Discard Composed of Target Catch Species | | 47% | 47% |

| Longline | Target Fishery | Target Catch Retained (mt) | Target Catch Discard (mt) | Target Catch Discard (lbs) |
|----------|--|-------------------------------|------------------------------|-------------------------------|
| | Pacific Cod | 89,548 | 280 | 617,288 |
| | Sablefish | 1,720 | 1 | 2,205 |
| | Total Discards of Target Catch | | 281 | 619,493 |
| | Total Groundfish Discards of All Species in Longline Fisheries | | 13,614 | 30,013,424 |
| | Percent of Discard Composed of Target Catch Species | | 2% | 2% |

| Pot/Jig | Target Fishery | Target Catch Retained (mt) | Target Catch Discard (mt) | Target Catch Discard (lbs) |
|---------|---|-------------------------------|------------------------------|-------------------------------|
| | Pacific Cod | 13,298 | 70 | 154,322 |
| | Rockfish | 828 | 300 | 661,380 |
| | Total Discards of Target Catch | | 370 | 815,702 |
| | Total Groundfish Discards of All Species in Pot/Jig Fisheries | | 806 | 1,776,908 |
| | Percent of Discard Composed of Target Catch Species | | 46% | 46% |

| All Gear Types | Target Fishery | Target Catch Retained (mt) | Target Catch Discard (mt) | Target Catch Discard (lbs) |
|----------------|---|-------------------------------|------------------------------|-------------------------------|
| | Trawl | | 91,523 | 201,771,608 |
| | Longline | | 281 | 619,493 |
| | Pot/Jig | | 370 | 815,702 |
| | Total Discards of Target Catch | | 92,174 | 203,206,800 |
| | Total Groundfish Discards of All Species | | 209,440 | 461,731,424 |
| | Percent of Discard Composed of Target Catch Species | | 44% | 44% |

Source: NMFS Special Data Run (see Appendix 1)

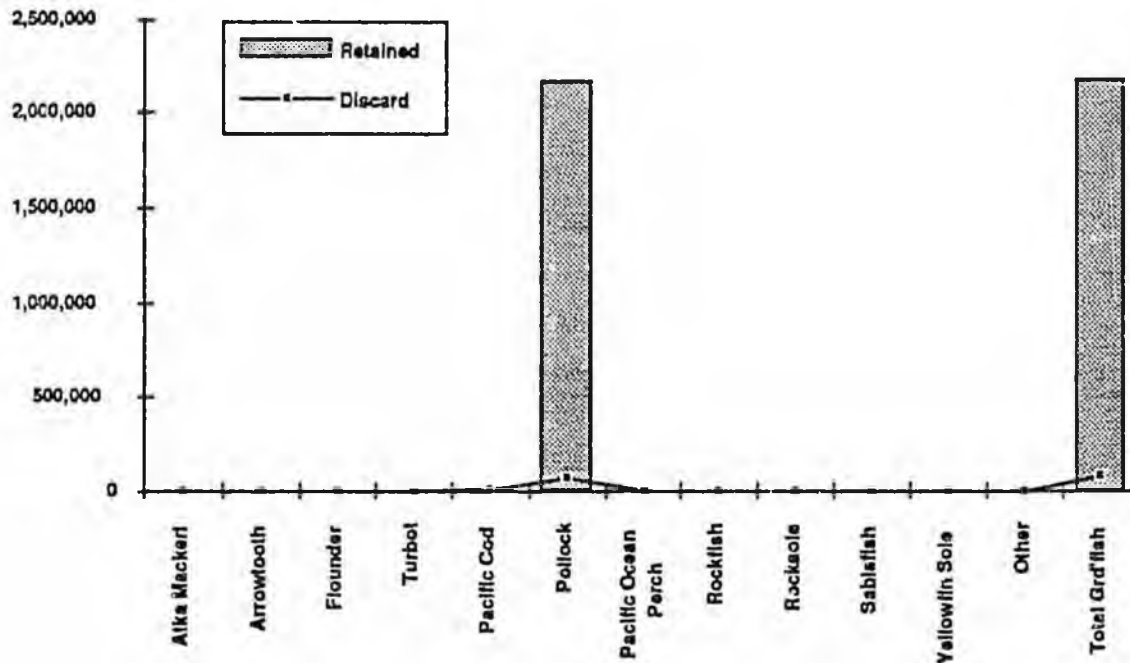
Table 4

**Catch & Discards of All Species In the Bering Sea/Aleutian Islands
Mid-Water Trawl Pollock Fishery During 1992**

| Species | Retained Catch (mt) | Discard Catch (mt) | Discard Rate (%) | Rate of Discard Per mt of Retained Target Catch (mt) | Assumed Mortality Rate | Discard Loss (mt) | Discard Loss (lbs) |
|---|------------------------|-----------------------|---------------------|---|------------------------------|----------------------|-----------------------|
| Atka Mackerel | 3 | 56 | 95% | 0.00 | 100% | 56 | 123,899 |
| Arrowtooth | 144 | 503 | 78% | 0.00 | 100% | 503 | 1,108,473 |
| Flounder | 539 | 1,340 | 71% | 0.00 | 100% | 1,340 | 2,954,825 |
| Turbot | 63 | 82 | 57% | 0.00 | 100% | 82 | 180,116 |
| Pacific Cod | 3,078 | 2,157 | 41% | 0.00 | 100% | 2,157 | 4,758,204 |
| Pollock | 985,310 | 33,138 | 3% | 0.03 | 100% | 33,138 | 73,056,035 |
| Pacific Ocean Perch | 18 | 33 | 64% | 0.00 | 100% | 33 | 73,193 |
| Rockfish | 3 | 16 | 83% | 0.00 | 100% | 16 | 34,171 |
| Rocksole | 637 | 195 | 23% | 0.00 | 100% | 195 | 430,117 |
| Sablefish | 3 | 1 | 20% | 0.00 | 100% | 1 | 1,764 |
| Yellowfin Sole | 12 | 50 | 80% | 0.00 | 100% | 50 | 110,010 |
| Other | 434 | 940 | 68% | 0.00 | 100% | 940 | 2,071,222 |
| TOTAL GROUND FISH | 990,240 | 38,510 | 4% | 0.04 | 100% | 38,510 | 84,900,028 |
| Halibut | 0 | 991 | 100% | 0.00 | 100% | 991 | 2,184,507 |
| Herring (in pounds) | 0 | 654,768 | 100% | 0.66 | 100% | 297 | 654,768 |
| Bairdi (in numbers) | 0 | 694,471 | 100% | 0.70 | 100% | | 694,471 |
| Other Tanner (in numbers) | 0 | 2,500,128 | 100% | 2.54 | 100% | | 2,500,128 |
| Red King Crab (in numbers) | 0 | 5,212 | 100% | 0.01 | 100% | | 5,212 |
| Other King (in numbers) | 0 | 7,780 | 100% | 0.01 | 100% | | 7,780 |
| Chinook Salmon (in numbers) | 0 | 21,821 | 100% | 0.02 | 100% | | 21,821 |
| Other Salmon (in numbers) | 0 | 38,981 | 100% | 0.04 | 100% | | 38,981 |
| Total Grd'fish, Halibut & Herring Discards in the Mid-Water Trawl Pollock Fishery (in mt and pounds) | | | | | | 39,798 | 87,739,303 |
| Total Crab and Salmon Discards in the Mid-Water Trawl Pollock Fishery (in numbers) | | | | | | | 3,268,393 |

Source: NMFS Special Data Run (see Appendix 1)

FIGURE 1
Retained and Discarded Groundfish Catch
in the
Bering Sea/Aleutian Islands Mid-Water Trawl Pollock Fishery
(by species, in 1,000 pounds)



Source: NMFS (also see Table 4).

Table 5

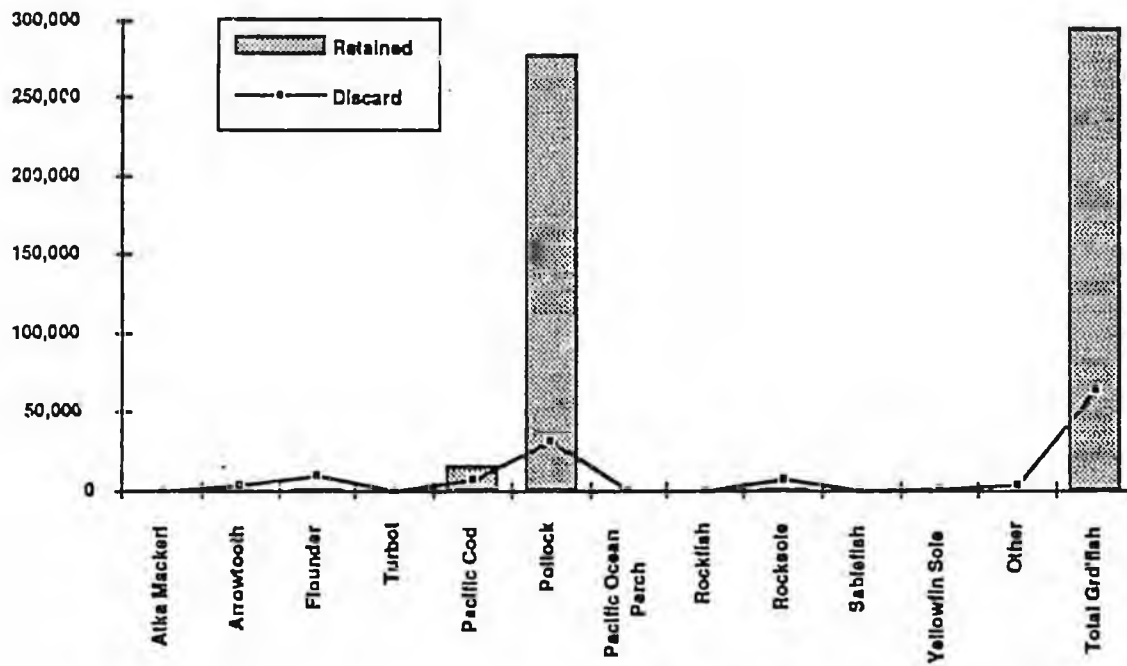
**Catch & Discards of All Species in the Bering Sea/Aleutian Islands
Bottom Trawl Pollock Fishery During 1992**

| Species | Retained Catch (mt) | Discard Catch (mt) | Discard Rate (%) | Rate of Discard Por mt of Retained Target Catch (mt) | Assumed Mortality Rate | Discard Loss (mt) | Discard Loss (lbs) |
|--|------------------------|-----------------------|---------------------|---|------------------------------|----------------------|-----------------------|
| Atka Mackerel | 35 | 4 | 10% | 0.00 | 100% | 4 | 8,598 |
| Arrowtooth | 43 | 1,568 | 97% | 0.01 | 100% | 1,568 | 3,451,522 |
| Flounder | 146 | 4,319 | 97% | 0.03 | 100% | 4,319 | 9,521,667 |
| Turbot | 4 | 80 | 95% | 0.00 | 100% | 80 | 175,707 |
| Pacific Cod | 6,949 | 3,084 | 31% | 0.02 | 100% | 3,084 | 6,799,868 |
| Pollock | 125,765 | 14,634 | 10% | 0.12 | 100% | 14,634 | 32,262,116 |
| Pacific Ocean Perch | 34 | 30 | 47% | 0.00 | 100% | 30 | 66,138 |
| Rockfish | 1 | 5 | 83% | 0.00 | 100% | 5 | 11,684 |
| Rocksole | 760 | 3,092 | 80% | 0.02 | 100% | 3,092 | 6,815,962 |
| Sablefish | 1 | 4 | 82% | 0.00 | 100% | 4 | 8,157 |
| Yellowfin Sole | 41 | 673 | 94% | 0.01 | 100% | 673 | 1,483,696 |
| Other | 64 | 1,612 | 96% | 0.01 | 100% | 1,612 | 3,554,256 |
| TOTAL GROUND FISH | 133,844 | 29,103 | 18% | 0.23 | 100% | 29,103 | 64,159,372 |
| Halibut | 0 | 774 | 100% | 0.01 | 100% | 774 | 1,706,111 |
| Herring (in pounds) | 0 | 11,986 | 100% | 0.10 | 100% | 5 | 11,986 |
| Bairdi (in numbers) | 0 | 586,221 | 100% | 4.68 | 100% | | 586,221 |
| Other Tanner (in numbers) | 0 | 1,603,259 | 100% | 12.75 | 100% | | 1,603,259 |
| Red King Crab (in numbers) | 0 | 33,862 | 100% | 0.27 | 100% | | 33,862 |
| Other King (in numbers) | 0 | 9,098 | 100% | 0.07 | 100% | | 9,098 |
| Chinook Salmon (in numbers) | 0 | 6,082 | 100% | 0.05 | 100% | | 6,082 |
| Other Salmon (in numbers) | 0 | 261 | 100% | 0.00 | 100% | | 261 |
| Total Grd'fish, Halibut & Herring Discards in the Bottom Trawl Pollock Fishery (In mt and pounds) | | | | | | 29,892 | 65,877,469 |
| Total Crab and Salmon Discards in the Bottom Trawl Pollock Fishery (In numbers) | | | | | | | 2,238,783 |

Source: NMFS Special Data Run (see Appendix 1)

Discards in the Groundfish Fisheries of the North Pacific

FIGURE 2
Retained and Discarded Groundfish Catch
in the
Bering Sea/Aleutian Islands Bottom Trawl Pollock Fishery
(by species, in 1,000 pounds)



Source: NMFS (also see Table 5).

Table 6

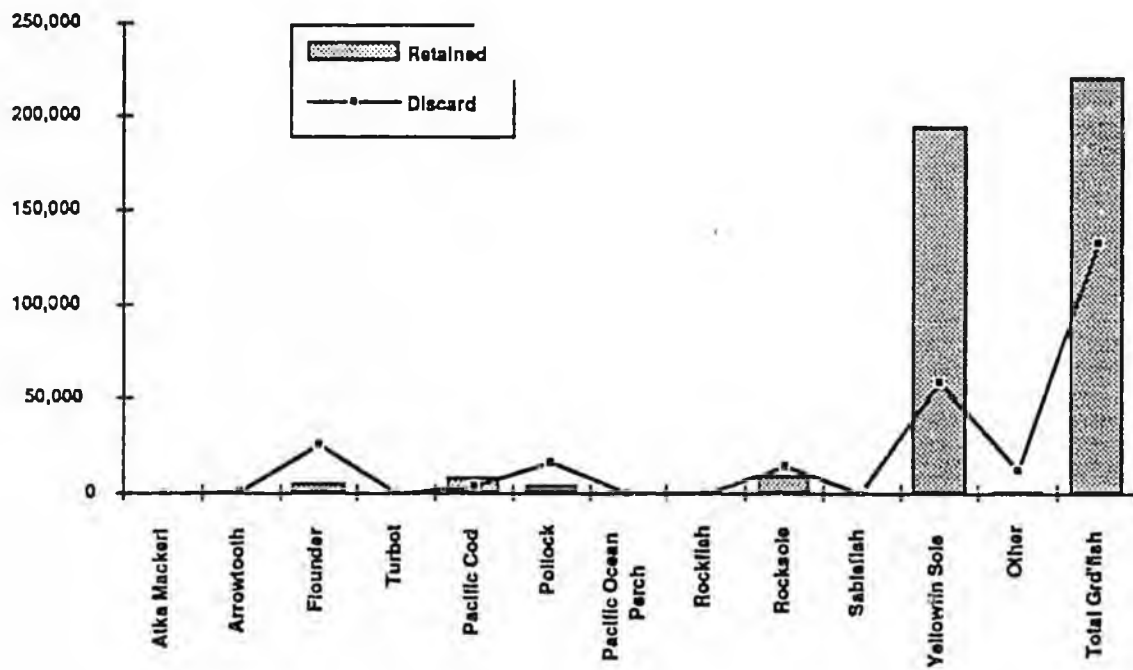
**Catch & Discards of All Species in the Bering Sea/Aleutian Islands
Yellowfin Sole Trawl Fishery During 1992**

| Species | Retained Catch (mt) | Discard Catch (mt) | Discard Rate (%) | Ratio of Discard Per mt of Retained Target Catch (mt) | Assumed Mortality Rate | Discard Loss (mt) | Discard Loss (lbs) |
|--|------------------------|-----------------------|---------------------|--|------------------------------|----------------------|-----------------------|
| Atka Mackerel | 0 | 0 | 0% | 0.00 | 100% | 0 | 0 |
| Arrowtooth | 18 | 369 | 95% | 0.00 | 100% | 369 | 812,616 |
| Flounder | 2,441 | 11,580 | 83% | 0.13 | 100% | 11,580 | 25,528,166 |
| Turbot | 2 | 1 | 37% | 0.00 | 100% | 1 | 3,086 |
| Pacific Cod | 3,848 | 2,030 | 35% | 0.02 | 100% | 2,030 | 4,475,779 |
| Pollock | 1,737 | 7,477 | 81% | 0.09 | 100% | 7,477 | 16,483,574 |
| Pacific Ocean Perch | 0 | 0 | 25% | 0.00 | 100% | 0 | 220 |
| Rockfish | 0 | 68 | 100% | 0.00 | 100% | 68 | 149,031 |
| Rocksole | 3,959 | 6,420 | 62% | 0.07 | 100% | 6,420 | 14,153,091 |
| Sablefish | 0 | 0 | 100% | 0.00 | 100% | 0 | 882 |
| Yellowfin Sole | 87,052 | 26,625 | 23% | 0.30 | 100% | 26,625 | 58,697,475 |
| Other | 203 | 5,719 | 97% | 0.07 | 100% | 5,719 | 12,608,769 |
| TOTAL GROUND FISH | 100,161 | 60,289 | 38% | 0.69 | 100% | 60,289 | 132,912,688 |
| Halibut | 0 | 706 | 100% | 0.01 | 100% | 706 | 1,555,802 |
| Herring (in pounds) | 0 | 364,331 | 100% | 4.14 | 100% | 165 | 364,331 |
| Bairdi (in numbers) | 0 | 1,586,047 | 100% | 18.03 | 100% | | 1,586,047 |
| Other Tanner (in numbers) | 0 | 10,532,438 | 100% | 119.75 | 100% | | 10,532,438 |
| Red King Crab (in numbers) | 0 | 50,665 | 100% | 0.58 | 100% | | 50,665 |
| Other King (in numbers) | 0 | 45,221 | 100% | 0.51 | 100% | | 45,221 |
| Chinook Salmon (in numbers) | 0 | 145 | 100% | 0.00 | 100% | | 145 |
| Other Salmon (in numbers) | 0 | 861 | 100% | 0.01 | 100% | | 861 |
| Total Grd'fish, Halibut & Herring Discards in the Trawl Yellowfin Sole Fishery (in mt and pounds) | | | | | | 61,160 | 134,832,821 |
| Total Crab and Salmon Discards in the Trawl Yellowfin Sole Fishery (in numbers) | | | | | | | 12,215,377 |

Source: NMFS Special Data Run (see Appendix 1)

FIGURE 3

Retained and Discarded Groundfish Catch
in the
Bering Sea Trawl Yellowfin Sole Fishery
(by species, in 1,000 pounds)



Source: NMFS (also see Table 6).

Table 7

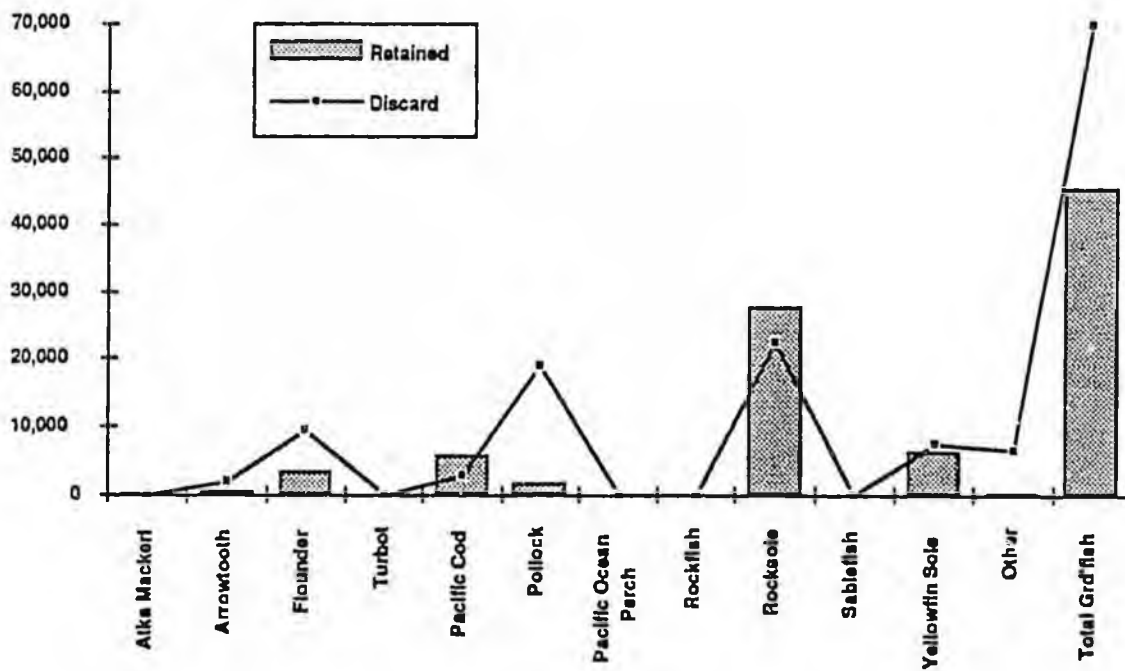
**Catch & Discards of All Species in the Bering Sea/Aleutian Islands
Rocksole Trawl Fishery During 1992**

| Species | Retained Catch (mt) | Discard Catch (mt) | Discard Rate (%) | Ratio of Discard Per mt of Retained Target Catch (mt) | Assumed Mortality Rate | Discard Loss (mt) | Discard Loss (lbs) |
|--|------------------------|-----------------------|---------------------|--|------------------------------|----------------------|-----------------------|
| Atka Mackerel | 63 | 10 | 14% | 0.00 | 100% | 10 | 22,707 |
| Arrowtooth | 207 | 892 | 81% | 0.07 | 100% | 892 | 1,966,283 |
| Flounder | 1,584 | 4,275 | 73% | 0.34 | 100% | 4,275 | 9,423,783 |
| Turbot | 6 | 0 | 3% | 0.00 | 100% | 0 | 441 |
| Pacific Cod | 2,628 | 1,325 | 34% | 0.11 | 100% | 1,325 | 2,921,315 |
| Pollock | 769 | 8,652 | 92% | 0.69 | 100% | 8,652 | 19,075,081 |
| Pacific Ocean Perch | 3 | 22 | 88% | 0.00 | 100% | 22 | 47,619 |
| Rockfish | 0 | 0 | 0% | 0.00 | 100% | 0 | 0 |
| Rocksole | 12,470 | 10,129 | 45% | 0.81 | 100% | 10,129 | 22,330,393 |
| Sablefish | 2 | 0 | 0% | 0.00 | 100% | 0 | 0 |
| Yellowfin Sole | 2,836 | 3,424 | 55% | 0.27 | 100% | 3,424 | 7,548,550 |
| Other | 53 | 3,017 | 98% | 0.24 | 100% | 3,017 | 6,651,719 |
| TOTAL GROUND FISH | 20,620 | 31,746 | 61% | 2.55 | 100% | 31,746 | 69,987,893 |
| Halibut | 0 | 742 | 100% | 0.08 | 100% | 742 | 1,635,460 |
| Herring (in pounds) | 0 | 7,508 | 100% | 0.60 | 100% | 3 | 7,508 |
| Bairdi (in numbers) | 0 | 588,279 | 100% | 47.18 | 100% | | 588,279 |
| Other Tanner (in numbers) | 0 | 1,381,321 | 100% | 110.77 | 100% | | 1,381,321 |
| Red King Crab (in numbers) | 0 | 54,363 | 100% | 4.36 | 100% | | 54,363 |
| Other King (in numbers) | 0 | 18,172 | 100% | 1.46 | 100% | | 18,172 |
| Chinook Salmon (in numbers) | 0 | 35 | 100% | 0.00 | 100% | | 35 |
| Other Salmon (in numbers) | 0 | 0 | 0% | 0.00 | 100% | | 0 |
| Total Grd'fish, Halibut & Herring Discards in the Trawl Rocksole Fishery (in mt and pounds) | | | | | | 32,492 | 71,630,861 |
| Total Crab and Salmon Discards in the Trawl Rocksole Fishery (in numbers) | | | | | | | 2,042,170 |

Source: NMFS Special Data Run (see Appendix 1)

Discards in the Groundfish Fisheries of the North Pacific

FIGURE 4
Retained and Discarded Groundfish Catch
in the
Bering Sea Trawl Rock Sole Fishery
(by species, in 1,000 pounds)



Source: NMFS (also see Table 7).

Table 8

**Catch & Discards of All Species in the Bering Sea/Aleutian Islands
Pacific Cod Trawl Fishery During 1992**

| Catch | Retained Catch (mt) | Discard Catch (mt) | Discard Rate (%) | Rate of Discard Per mt of Retained Target Catch (mt) | Assumed Mortality Rate | Discard Loss (mt) | Discard Loss (lbs) |
|---|------------------------|-----------------------|---------------------|---|------------------------------|----------------------|-----------------------|
| Atka Mackerel | 945 | 1,639 | 63% | 0.04 | 100% | 1,639 | 3,614,221 |
| Arrowtooth | 103 | 2,165 | 95% | 0.08 | 100% | 2,165 | 4,773,179 |
| Flounder | 232 | 2,281 | 91% | 0.08 | 100% | 2,281 | 5,029,354 |
| Turbot | 11 | 27 | 71% | 0.00 | 100% | 27 | 59,524 |
| Pacific Cod | 37,817 | 2,165 | 5% | 0.06 | 100% | 2,165 | 4,772,959 |
| Pollock | 1,836 | 10,698 | 85% | 0.28 | 100% | 10,698 | 23,581,283 |
| Pacific Ocean Perch | 385 | 288 | 43% | 0.01 | 100% | 288 | 629,854 |
| Rockfish | 6 | 192 | 97% | 0.01 | 100% | 192 | 422,842 |
| Rocksole | 740 | 1,926 | 72% | 0.05 | 100% | 1,926 | 4,245,178 |
| Sablefish | 10 | 0 | 0% | 0.00 | 100% | 0 | 0 |
| Yellowfin Sole | 44 | 476 | 92% | 0.01 | 100% | 476 | 1,050,271 |
| Other | 91 | 2,126 | 96% | 0.06 | 100% | 2,126 | 4,686,759 |
| TOTAL GROUND FISH | 42,219 | 23,980 | 36% | 0.63 | 100% | 23,980 | 52,865,428 |
| Halibut | 0 | 1,608 | 100% | 0.04 | 100% | 1,608 | 3,541,103 |
| Herring (in pounds) | 0 | 5,214 | 100% | 0.14 | 100% | 2 | 5,214 |
| Bairdi (in numbers) | 0 | 163,648 | 100% | 4.33 | 100% | | 163,648 |
| Other Tanner (in numbers) | 0 | 77,048 | 100% | 2.04 | 100% | | 77,048 |
| Red King Crab (in numbers) | 0 | 115 | 100% | 0.00 | 100% | | 115 |
| Other King (in numbers) | 0 | 359 | 100% | 0.01 | 100% | | 359 |
| Chinook Salmon (in numbers) | 0 | 4,290 | 100% | 0.11 | 100% | | 4,290 |
| Other Salmon (in numbers) | 0 | 26 | 100% | 0.00 | 100% | | 26 |
| Total Grd'fish, Halibut & Herring Discards in the Trawl Pacific Cod Fishery (in mt and pounds) | | | | | | 25,588 | 56,411,744 |
| Total Crab and Salmon Discards in the Trawl Pacific Cod Fishery (in numbers) | | | | | | | 245,486 |

Source: NMFS Special Data Run (see Appendix 1)

Discards in the Groundfish Fisheries of the North Pacific