Alaska Groundfish Fisheries

Unit 19

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INTRODUCTION

The groundfish complex is the most abundant of all fisheries resources off Alaska, totaling more than 21,000,000 metric tons (t) of exploitable biomass and contributing more than 2,000,000 t of catch each year. Another 1,000,000 t of underutilized sustainable potential yield is available.

Prior to the Magnuson Fisheries Conservation and Management Act of 1976, the only groundfish species of significant domestic catch and value was Pacific halibut. All other groundfishes were at or near full utilization by foreign fisheries. The Magnuson Act extended Federal fisheries management jurisdiction to 200 nautical miles and stimulated the growth of a domestic Alaska groundfish fishery that rapidly replaced the foreign fisheries. Much of the groundfish catches are exported, particularly to Asia, and such trade contributes prominently as a major source of revenue for U.S. fishermen.

SPECIES AND STATUS

Pacific Halibut

The Pacific halibut is found from the Bering Sea to California, with the center of abundance in the Gulf of Alaska. The resource is managed by a bilateral treaty between the United States and Canada and through research and quota recommendations from the International Pacific Halibut Commission (IPHC). Pacific halibut, considered as one large interrelated biological stock, is regulated by subareas through catch quotas, time-area restrictions, and (lately) by individual vessel quotas. The commercial fishery has a long tradition dating back to the 1880's. There is a growing recreational fishery as well.

Most components of the halibut fishery had a very successful year in 1997. The resource was healthy, and the total catch was near record levels, totaling 53,720 t. The breakdown by fishery was: commercial fisheries (39,240 t), recreational fisheries (5,050 t), personal use (325 t), bycatch in other fisheries (7,975 t), and mortality due to fishing by lost gear and discards (1,130 t).

The nature of the commercial fisheries has changed dramatically in recent years. Both Canadian and Alaskan halibut fisheries have moved from an open-access fishery with short fishing seasons to an individual fishing quota (IFQ) fishery of nearly 8 month's duration. In addition, IFQ share allocations have also been implemented for Treaty Indian, commercial, and recreational fisheries for the Washington-California region. Under such a tight allocation of quota shares, there has been a decline in overall size of the fishing fleet. Vessels licensed to fish in Canada remained at 435, while 2,000 vessels fished in the U.S. fisheries in 1997, down from 3,400 vessels in 1993.

The assessment of Pacific halibut stocks was radically revised in 1996 due to a revelation that changes in individual growth rates have affected fishing selectivity by the gear. The new approach (Sullivan and Parma, 1998) takes a model for growth, additional information from surveys and bycatch observations, and brings in commercial catch-at-age and catch-per-unit-effort (CPUE) data to determine the current and historical status of the population. The approach also considers uncertainties with selectivity by age versus length that resulted in two biomass estimates for each year. The IPHC concluded that the true biomass lies between the two estimates. However, for the purpose of being precautionary, the lower of the biomass estimates for the main range of Pacific halibut (Gulf of Alaska, Canada, and Washington-

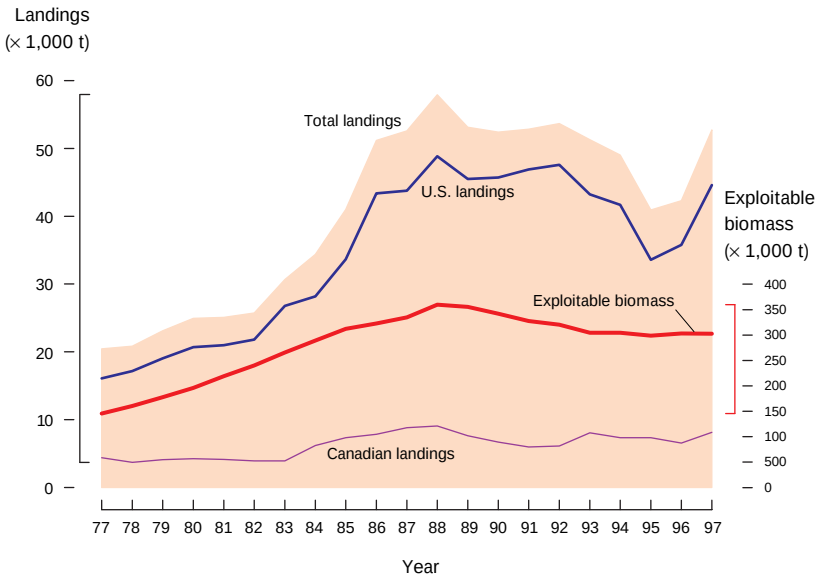

Figure 19-1
Landings and abundance of Pacific halibut in metric tons (t).

California) is shown in Figure 19-1.

The exploitable portion of the Pacific halibut stocks apparently peaked at 360,000 t in 1988 (Figure 19-1). The population has since declined slightly to a rather constant biomass level of 298,000–305,000 t over the past 5 years. The long-term average reproductive biomass for the resource was estimated at 130,000 t (Parma, 1998). Long-term average yield (equivalent to the long-term potential yield) was estimated by Parma (1998) at 29,750 t, round weight. The species is fully utilized. The recent average yield (1995–97) was 38,180 t for the United States and 7,710 t for Canada, for a combined total of 45,890 t for the entire Pacific halibut resource. This recent average yield was 6% higher than the estimated long-term potential yield, which reflected good condition of the underlying resource. The values for recent average yield and current potential yield shown in Table 19-1 are for all catches—commercial, recreational, bycatch, and waste.

Bering Sea and Aleutian Islands Groundfish

The average Eastern Bering Sea and Aleutian Islands groundfish catch during 1995–97 was about 1,780,000 t (Table 19-2, Figure 19-2). The total catch in 1997 was 1,740,000 t, valued at $405,000,000 (ex-vessel). The dominant species harvested were walleye pollock (1,090,000 t valued at $231,000,000), Pacific cod (240,000 t valued at $116,000,000), and yellowfin sole (150,000 t valued at $26,000,000).

Groundfish populations have been maintained at high levels since implementation of the Magnuson-Stevens Fishery Conservation and Management Act. Their long-term potential yield totals about 3,500,000 t. The current potential yield of 2,500,000 t for 1998 is slightly below the long-term potential yield. This potential, however, has not been fully utilized because catch quotas cannot exceed the 2,000,000 t optimum yield limit set in the groundfish fishery management plan.

Walleye Pollock: Pollock produce the largest catch of any single species inhabiting the U.S. Exclusive Economic Zone. The three main stocks, in decreasing order of abundance, are: eastern Bering Sea stock, Aleutian Basin stock, and the Aleutian Islands stock. The eastern Bering Sea stock, sustained by the strong 1989 and 1992 year classes, is near the target biomass (i.e. the level that produces the long-term potential yield) and fully utilized. The Aleutian Islands stock is believed to be slightly below the target level and increasing.

Table 19-1
Productivity in metric tons and status of Pacific halibut resources.

Species and area	Recent average yield (RAY)	Current potential yield (CPY)	Long-term potential yield (LTPY)	Fishery utilization level	Stock level relative to LTPY
Bering Sea	8,930	11,280	Not applicable	Full	Near
Gulf of Alaska	29,250	31,575	Not applicable	Full	Near
U.S. Pacific Coast	570	865	Not applicable	Full	Near
Canadian Pacific Coast	7,710	8,020	Not applicable	Full	Near
Total resource	46,460	51,740	51,740	Full	Near
U.S. subtotal	38,750	43,720	31,610	Full	Near

Until 1992, another large fishery targeted the portion of the Aleutian Basin stock residing outside of the U.S. and Russian exclusive economic zones in the "Donut Hole" of the central Bering Sea. Historical catches from this stock were apparently too high (well over 1,000,000 t throughout the late 1980's) and not sustainable. The abundance of the Aleutian Basin stock was consequently greatly diminished, and all fishing ceased in 1993.

Pacific Cod: Pacific cod abundance remained high and stable throughout the 1980's. Although a string of below-average year classes (those spawned in 1986–88) led to a downturn in abundance during the early 1990's, this trend has been reversed due to a subsequent string of above-average year classes (those spawned in 1989–91). The cod stock is now considered to be healthy, though declining slightly in abundance, and fully utilized.

Flatfishes: All flatfish species are underutilized and, with the exception of Greenland turbot, appear to be at above-average abundance levels. The underutilization of flatfish results from the fishery management plan requirement to maintain overall groundfish catches within the 2,000,000 t optimum yield cap and a desire to prevent excessive incidental catches of Pacific halibut and king and Tanner crabs.

Yellowfin sole is the most abundant of the flatfishes. Within the overall groundfish complex, yellowfin sole ranks second in abundance behind walleye pollock. In terms of harvest, yellowfin sole ranks third among the groundfish complex behind pollock and Pacific cod. Greenland turbot, the only flatfish stock below target abundance levels, shows a continued decline from the high levels during the early 1980's due to poor spawning success.

Among the other flatfish species, abundance continues to be high and stable. Rock sole is now the second most abundant of the flatfishes and the third most abundant of all groundfish species, having increased steadily throughout the survey

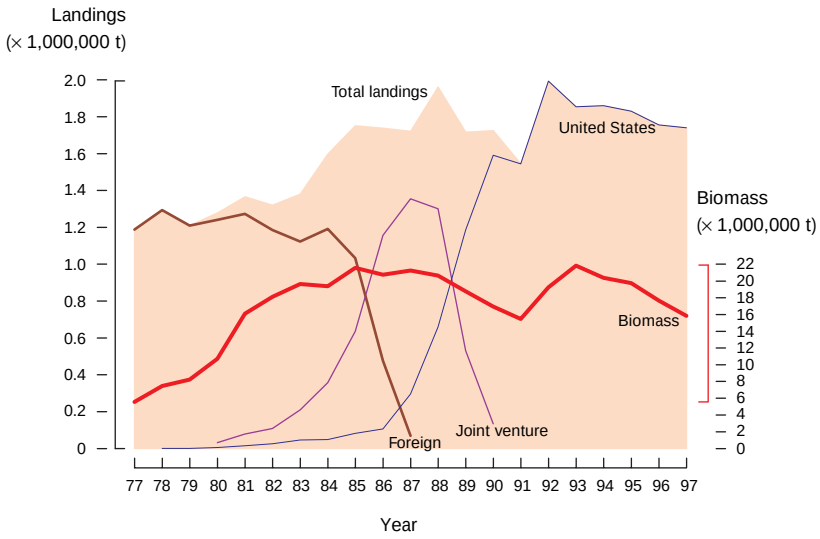

Figure 19-2
Landings and abundance trends in metric tons (t) for Bering Sea and Aletutian Island groundfish.

Species	Recent average yield (RAY)	Current potential yield (CPY)	Long-term potential yield (LTPY)	Fishery utilization level	Stock level relative to LTPY
Walleye pollock	1,140,400	1,140,000	1,800,000	Full	Near
Pacific cod	247,800	210,000	328,000	Full	Near
Yellowfin sole	145,300	220,000	277,000	Under	Near
Greenland turbot	7,400	15,000	18,500	Under	Below
Arrowtooth flounder	11,300	147,000	230,000	Under	Above
Rock sole	56,500	312,000	449,000	Under	Above
Other flatfish	38,100	164,000	253,000	Under	Above
Sablefish	1,600	1,300	2,160	Full	Below
Pacific ocean perch	13,600	13,800	20,640	Full	Above
Other rockfish	5,800	6,200	8,300	Under	Above
Atka mackerel	83,800	134,000	64,300	Under	Near
Other fish	24,000	136,600	27,800	Under	Above
Total	1,775,600	2,499,900	3,478,700		

Table 19-2
Productivity in metric tons and status of Bering Sea and Aleutian Islands groundfish resources.

Table 19-3
Productivity in metric tons and status of Gulf of Alaska groundfish resources.

Species and Area	Recent average yield (RAY)	Current potential yield (CPY)	Long-term potential yield (LTPY)	Fishery utilization level	Stock level relative to LTPY
Walleye Pollock	71,202	130,000	169,000	Full	Below
Pacific cod	68,602	77,900	56,700	Full	Above
Flatfish	36,294	293,920	169,000	Under	Unknown
Sablefish	15,957	14,120	23,700	Full	Below
Atka mackerel	873	600	Unknown	Unknown	Unknown
Slope rockfish	14,863	24,670	Unknown	Full	Below
Thornyhead rockfish	1,162	2,000	3,750	Full	Above
Pelagic shelf rockfish	2,605	5,000	Unknown	Unknown	Unknown
Demersal shelf rockfish	364	560	Unknown	Full	Unknown
Total	211,922	548,770	452,980		

time series (i.e. since 1975).

Sablefish: Sablefish (or blackcod) is a valuable species caught mostly with longline and pot gear in depths greater than those fished by trawlers. Sablefish is considered to be a single stock from the Bering Sea and Aleutian Islands region to the Gulf of Alaska. The population declined substantially in 1990, perhaps due to migrations into the Gulf of Alaska and a general retraction of the stock's range. Recent recruitment has been relatively weak, and the stock is considered below its long-term average level. Sablefish is fully exploited (within the context of allowing stock-rebuilding to occur).

Rockfish: Rockfishes are assessed and managed as two major groups: Pacific ocean perch and other rockfish. The former's abundance dropped sharply owing to intensive foreign fisheries in the 1960's and remained low into the early 1980's. In recent years, catch levels have been set well below current potential yield to help rebuild the stocks. The Pacific ocean perch group appears to have recovered and is currently harvested at full utilization levels (within the context of risk-averse management).

Atka Mackerel: The Atka mackerel stock lives mainly in the Aleutian Islands region. Previously, current potential yield for this species had been set conservatively low because of uncertainty regarding its abundance. However, trawl surveys conducted by the Alaska Fisheries Science Center in 1986 and 1991 have confirmed a higher abundance than was previously realized, and a gradual increase in the rate of exploitation was phased in from 1992. This stock is considered at its average level, declining slightly, and fully utilized.

Other Species: In recent years, other species have represented 1% or less of the total groundfish catch. Sculpins and skates probably constitute most of this resource, but the abundance of pelagic squids, smelts, and sharks is largely unknown. The current potential yield has been set at the average catch level.

Gulf of Alaska Groundfish

Groundfish abundance in the Gulf of Alaska increased since 1977, peaking at 5,300,000 t in 1982. Abundance since then has remained relatively stable, fluctuating between 4,500,000 and 5,300,000 t. The estimated long-term potential yield (451,440 t, Table 19-3) for Gulf of Alaska groundfish has not been updated since last reported (NMFS, 1996). The current potential yield for the groundfish complex totaled 548,770 t which reflects a high abundance of some stocks relative to their long-term potential yields. The recent average yield of the complex is 211,922 t. The wide disparity between the current potential yield and the recent average yield is due to underutilization of some groundfish species, particularly for flatfish, that could not be fully harvested without exceeding incidental catch limits of Pacific halibut set by the North Pacific Fisheries Management Council.

Gulf of Alaska groundfish catches have ranged from a low of 129,640 t in 1978 to a high of 352,800 t in 1984 (Figure 19-3). The groundfish

catches are dominated by pollock, followed by Pacific cod, flatfish, and rockfish. Groundfish catches since 1989 have fluctuated around 200,000 t. The 1997 groundfish catch of 225,000 t was valued at $144,000,000 (ex-vessel value). Sablefish comprised about 55% ($79,000,000). Other major revenue-producing species in 1997 were pollock ($19,000,000), Pacific cod ($33,000,000), and flatfishes ($7,000,000).

Pollock: Pollock abundance has been increasing in recent years due to strong recruitment from the 1994 year class. The western-central Gulf of Alaska pollock total allowable catch is further apportioned among three areas and three seasons. This temporal and spatial apportionment of the pollock quota was implemented to accommodate Steller sea lion concerns; pollock are a major prey item of Steller sea lions in the Gulf of Alaska. Pollock are considered fully utilized.

Pacific Cod: Pacific cod are abundant and fully utilized. The Pacific cod stock has been declining for the past several years due to a lack of significant recruitment. However, recruitment from the 1995 year class may reverse this trend in the near future. A risk-averse exploitation rate has been applied to Pacific cod in light of uncertainty about the natural mortality rate and the proportion of the population not sampled by the survey gear.

Flatfish: Flatfish are in general very abundant, largely due to great increases in arrowtooth flounder biomass. Flathead sole, rex sole, and arrowtooth flounder are managed as separate categories, and the rest of the flatfish are managed as deep-water or shallow-water groups. Flatfish are underutilized due to halibut bycatch considerations.

Sablefish: Sablefish are approaching their lowest observed population level and are projected to stabilize just above this lowest level in the near future. Sablefish have been on a slowly declining trend due to a lack of strong recruitment. They are fully utilized. Sablefish have been harvested under an individual fishing quota system since 1995. This has significantly changed the dynamics of the fishery.

Rockfish: For management purposes, rockfish in the Gulf of Alaska are divided into four assemblages or species groups: slope rockfish, pelagic shelf rockfish, thornyhead rockfish, and demersal shelf rockfish. Slope rockfish are at low levels of abundance and fully utilized. Within this group, Pacific ocean perch, shortraker and rougheye rockfish, and northern rockfish are managed as separate categories. The principal species of the slope group, Pacific ocean perch and shortraker and rougheye rockfish, are highly valued. Slope rockfish, particularly Pacific ocean perch, were intensively exploited by foreign fleets in the 1960's. In recent years, Pacific ocean perch have started to rebound from the heavy exploitation of three decades ago due to good recruitment from a series of year classes. Thornyhead rockfish are highly valued and believed to be at average levels of abundance. Dusky rockfish is the dominant species in the pelagic shelf rockfish group, but its abundance estimate is variable due to problems assessing this species with current trawl survey methodology. Demersal shelf rockfish assessment and management are focused on the target species, yelloweye rockfish. Traditional population assessment methods (e.g. trawl surveys) are not considered useful for surveying demersal shelf rockfish because of their affinity for rough terrain. They are currently being assessed using a manned submersible. While estimates of abundance have been calculated, there is insufficient historical information to determine trends. Rockfish in general are conservatively managed due their long life spans and consequent sensitivity to overexploitation.

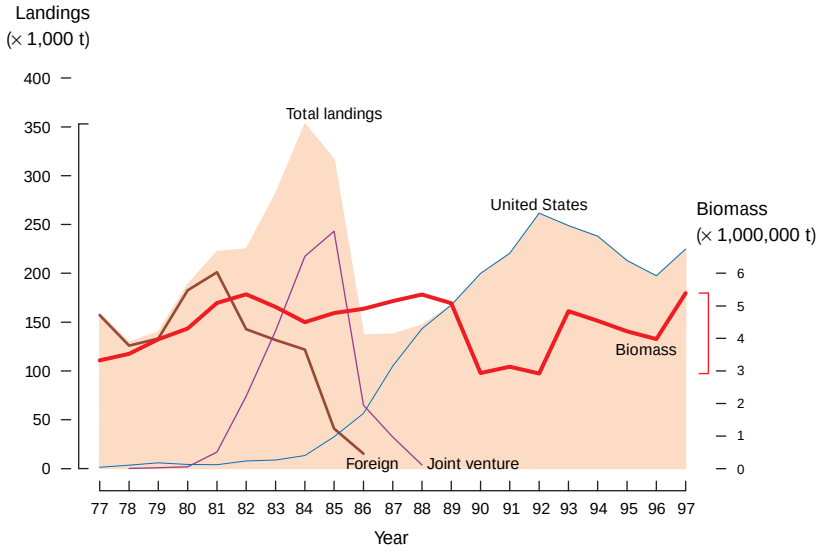

Figure 19-3
Landings and abundance trends for Gulf of Alaska groundfish.

Atka Mackerel: The Atka mackerel stock occurs mainly in the Aleutian Islands region. Its abundance in the Gulf of Alaska is much lower and highly variable. The resource supported a large foreign fishery in the Gulf through the mid 1980's but disappeared thereafter. Targeting on the species resumed in the Gulf in 1990, as the population increased. The absolute abundance of the stock has been difficult to estimate by trawl gear since it is a shallow, schooling species that tends to reside on rough and rocky bottoms. Due to extreme variance in survey catches, it has been concluded that stock abundance cannot be determined from trawl survey data. Because there is no reliable estimate of Atka mackerel biomass and this species has exhibited vulnerability to fishing pressure in the past, Atka mackerel are managed as a bycatch-only species. Quota levels are set at low levels which preclude a directed fishery but accommodate bycatch needs in other fisheries.

ISSUES AND PROGRESS

Transboundary Stocks and Jurisdiction

Some of the U.S.-origin eastern Bering Sea pollock migrate into the Russian zone of the northern Bering Sea, intermingle with Russian stocks, and are subject to Russian exploitation. Such exploitation is of concern to the United States as it could impact U.S. stocks and management. While this transboundary issue is a subject of continuing U.S.-Russia scientific studies and discussions, a coordinated exploitation and management scheme has not yet been reached. At this time, the United States can only indirectly consider the possible impact of Russian fishing on the U.S. stocks in setting exploitation strategies.

A former unregulated pollock fishery that occurred in the "Donut Hole" area of the central Bering Sea has not been a problem since the implementation of the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea. Under this Convention, signed by the Russian Federation, Japan, Poland, China, the Republic of Korea, and the United States, a central Bering Sea pollock fishery has not been authorized because of low biomass of the Aleutian Basin pollock stock. In fact, the moratorium on pollock fishing in the central Bering Sea was voluntarily imposed from 1993 as negotiations on the Convention were proceeding.

Bycatch and Multispecies Interactions

Pacific halibut, king, Tanner, and snow crabs, salmon, herring, and shrimp are considered prohibited species for groundfish fisheries. Their incidental take by the groundfish fisheries must be recorded and returned immediately to the sea up to specified amounts set by regulation. While the problems of incidental take may be biological because of the overharvest by groundfish fisheries, they are mostly allocative in nature. Bycatch limits on such incidentally caught species have been set to mitigate the problem and have generally constrained further expansion of the groundfish fisheries. When any bycatch limit is reached, the groundfish fisheries could get closed, often before all of the available groundfish quota is taken.

The North Pacific Fishery Management Council has also been testing an incentive program to control bycatch. This is an individual vessel incentive program where bycatch rates are established for the fleet and regulated by individual vessels. It is designed to give a vessel more control over its own fishing destiny by holding it directly accountable for its bycatch rates. The program has resulted in some success and is undergoing evaluation and change.

Marine mammal interactions with fish and fisheries are a growing concern to resource management. Fisheries compete for fish that marine mammal and other species, including seabirds, depend on for food in the marine ecosystem. The impact of fish removals on Steller sea lions has been postulated as an important factor for declining sea lion populations. The Steller sea lion is listed as threatened (eastern Pacific population) and endangered (western U.S. Pacific population) under the Endangered Species Act and continues to decline. Since sea lions feed on pollock and other fish species, groundfish fisheries are being regulated to reduce impact on them. In December 1998, the National Marine Fisheries Service (NMFS, 1998) issued a biological opinion under the Section 7 Consultation of the Endangered Species Act that the Bering Sea and Aleutian Islands and the Gulf

of Alaska pollock fisheries are likely to jeopardize the continued existence of the western population of Stellar sea lions and adversely modify its critical habitat. As a result of this jeopardy determination, the NMFS has proposed some reasonable and prudent alternatives to disperse the intensity of pollock fisheries in the critical habitat of sea lions and enact additional 10–20 nautical mile no-trawl zones around sea lion rookeries and haul-out areas.

As the domestic groundfish fisheries are now fully developed and overcapitalized, allocation disputes between user groups have also been a continuing problem. These problems include inshore versus offshore, fixed gear versus trawler, and other user conflict issues. The North Pacific Fishery Management Council has been addressing the problems as they arise and developing fishery management plan amendments to mitigate them. Recent amendments have made explicit allocations to inshore and offshore sectors of the industry as well as specific percentage allocation of target and bycatch amounts to specific gear types. The NMFS promulgated regulations to implement an individual fishing quota program for sablefish and Pacific halibut in 1995. Under this program, vessel owners are allocated transferrable quota shares of sablefish and Pacific halibut to use at their discretion. More efficient use of the resources are expected under this system.

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