Alaska Groundfish Fisheries

David Csepp

Unit 19

JAMES IANELLI
SANDRA LOWE
ANNE HOLLOWED
LOH-LEE LOW

NMFS Alaska Fisheries Science Center

Seattle
Washington

STEVEN HARE

International Pacific Halibut Commission

Seattle
Washington

INTRODUCTION

The groundfish complex is the most abundant fisheries resource off Alaska, with a combined biomass of more than 21.8 million metric tons (t). About 76% of the biomass is found in the Bering Sea and Aleutian Islands region, with the remainder in the Gulf of Alaska. From 2004 to 2006, groundfish catches averaged nearly 2.2 million t or about 10% of the total groundfish biomass, although harvest rates vary for individual species. Prior to 1976, the only groundfish species of significant commercial value to domestic fisheries was Pacific halibut; foreign fisheries harvested most other targeted commercial species. The implementation of the Magnuson Fisheries Conservation and Management Act of 1976 (1976 Act) extended Federal fisheries management jurisdiction to 200 nautical miles (n.mi.), excluding foreign fisheries and stimulating the growth of domestic fisheries. Although the domestic fisheries engaged initially in joint-venture operations with foreign partners after the 1976 Act, exclusively domestic fisheries had replaced these joint-venture operations by 1983. The North Pacific Fisheries Management Council (NPFMC) manages Alaska groundfish fisheries within the U.S. Exclusive Economic Zone (EEZ; 3–200 n.mi. offshore). Inshore groundfish resources (0–3 n.mi.) are managed by the Alaska Department of Fish and Game.

SPECIES AND STATUS

Pacific Halibut

Pacific halibut are 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 regulation recommendations from the International Pacific Halibut Commission (IPHC). Pacific halibut, considered to be

Photo above:
Walleye pollock catch.

Table 19-1
Productivity in metric tons (t) and status of Pacific halibut fisheries resources.

Species/stock	Recent average yield (RAY)[1]	Current yield (CY)[2]	Sustainable yield (MSY)	Stock level relative to B_{MSY}
Pacific halibut[3]				
Bering Sea	9,691	9,770	15,000	Above
Gulf of Alaska	39,341	35,431	40,000	Above
U.S. Pacific Coast	1,069	1,079	1,000	Near
Canadian Pacific Coast	9,024	7,811	7,000	Near
Total	59,125	54,091	63,000	
U.S. subtotal	50,101	46,280	56,000	

[1]2001–03 average.
[2]Yield for 2007.
[3]Status determinations for Pacific halibut are coastwide: the stock is classified as not overfishing and not overfished.

one large interrelated biological stock, are regulated by subareas through catch quotas, time–area restrictions, and by individual fishing quotas.

Although the commercial Pacific halibut fishery has a long tradition dating back to the 1880's, the nature of the fishery 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 months' duration. Under the IFQ system there has been a decline in overall size of the fishing fleet. In 2003, 220 vessels fished in Canada and 1,586 fished in Alaska, whereas in 2007, the number of vessels was 212 in Canada and 1,482 in Alaska. In addition, the Pacific Fishery Management Council adopted a catch-sharing plan for Treaty Indian, commercial, and recreational Pacific halibut fisheries for the Washington–California region.

Most components of the halibut fishery have been very successful in recent years, including the growing recreational fishery. The resource has been healthy, and the total catch has been near record levels. The recent average yield (2004–06) of halibut was 59,125 t (Table 19-1); the 2007 catch was slightly lower at 54,091 t. The breakdown by fishery sector in 2007 was 37,986 t for commercial fisheries, 6,004 t for recreational fisheries, 896 t for personal use, 7,321 t as bycatch in other fisheries, and 1,461 t as mortality due to fishing by lost gear and discards.

Because of the long history of the fishery, data on the Pacific halibut stock go back to the 1920's. The stock was depleted by unregulated commercial fishing early in the 20th century but recovered under IPHC management between 1930 and 1950. A combination of adverse environmental conditions, large bycatch of halibut in foreign fisheries in the 1960's, and continued high quotas again depressed the stock to a low level in the early 1970's. In the mid 1970's the IPHC adopted a stock rebuilding plan and greatly reduced commercial quotas. At the same time, the implementation of the 1976 Act limited bycatch of Pacific halibut. These factors, combined with a dramatic shift in the climate of the North Pacific, resulted in much higher reproductive success and a rapid recovery of the stock during the 1980's.

While the history of the halibut stock is well known, the modern assessment is conducted only for the time frame of 1996 to the present. The modern assessment relies heavily on data that have only been collected since the coastwide stock resource surveys began in 1996. The most recent assessment shows that the stock has declined from the very high levels of the late 1990's (Figure 19-1; Clark and Hare, 2002; Hare and Clark, 2008) but is still well above any level of concern for the spawning biomass. On a coastwide basis, removals are very close to the target 20% harvest rate identified for halibut as providing the optimal combination of precaution and exploitation. In the western Gulf of Alaska and Bering Sea and Aleutian Islands region, comprehensive surveys first conducted in the latter half of the 1990's showed a substantially greater abundance of halibut than previously estimated. After several years of increased quotas, harvest rates in those areas are now at the target level,

and the actual catch levels are likely right around the MSY. Although status determinations are not made for individual subareas, the coastwide stock is classified as not subject to overfishing and the stock status is not overfished.

Bering Sea and Aleutian Islands Groundfishes

The average eastern Bering Sea and Aleutian Islands groundfish catch in recent years (2004–06) was nearly 2 million t (Figure 19-2, Table 19-2). The dominant species harvested were walleye pollock (75%), Pacific cod (11%), yellowfin sole (4%), Atka mackerel (3%), and rock sole (2%). The rest of the species complex makes up 1% or less of the total catch.

Groundfish biomass has been maintained at relatively high levels since implementation of the 1976 Act in 1977. The current potential yield (2.68 million t) is slightly below the MSY (as estimated from long-term averages of all species combined) of just over 3 million t (Table 19-2). This yield, however, has not been allowed to be fully harvested because catch quotas have been capped at a 2 million t optimum yield limit set in the groundfish fishery management plan (FMP) for the Bering Sea and Aleutian Islands region. The economically more valuable species, such as walleye pollock and Pacific cod, have been allowed to be harvested closer to their full biological potential while many less valuable species are relatively lightly harvested.

Walleye pollock: The catch of walleye pollock is the largest of any single species within the U.S. EEZ. The three principal management stocks, in decreasing order of abundance, are eastern Bering Sea, Bogoslof Island (in the Aleutian Basin), and Aleutian Islands. The biomass of eastern Bering Sea pollock has fluctuated in the past three decades as a result of variable strengths of recruiting year-classes. Recent trends indicate that the stock has declined since 2003 due to poor recruitment from the 2001–05 year-classes. This string of consecutive below-average year-classes is unusual, but the two surveys conducted in 2007 indicate that the 2006 year-class may be above average, and if so, the stock should stabilize and begin increasing after 2009. The eastern Bering Sea stock is considered fully utilized and is well managed for bycatch and other issues such as minimizing impacts on Steller sea lion populations. Near-term projections indicate that the recent reductions in quota will persist for 2009.

The Bogoslof Island management stock is considered to be below the peak biomass levels observed during the late 1980's. Recent analyses suggest that due to stock structure uncertainty and

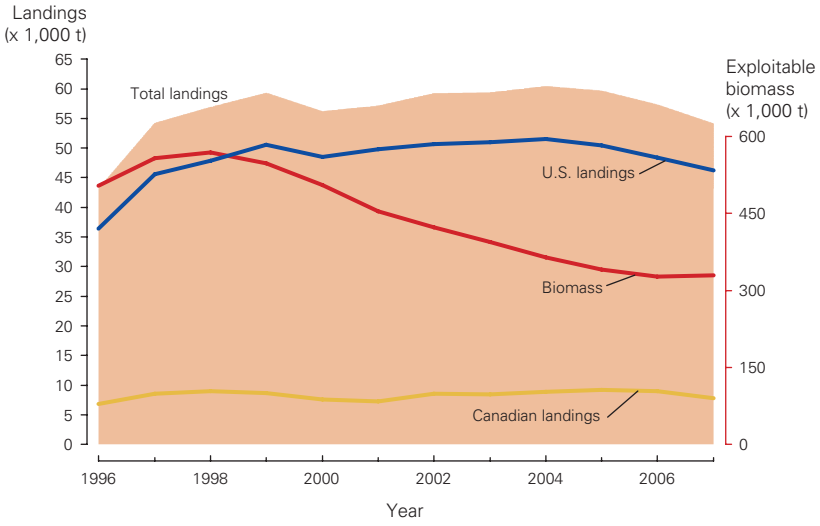

Figure 19-1
Pacific halibut landings and exploitable biomass in metric tons (t), 1996–2007.

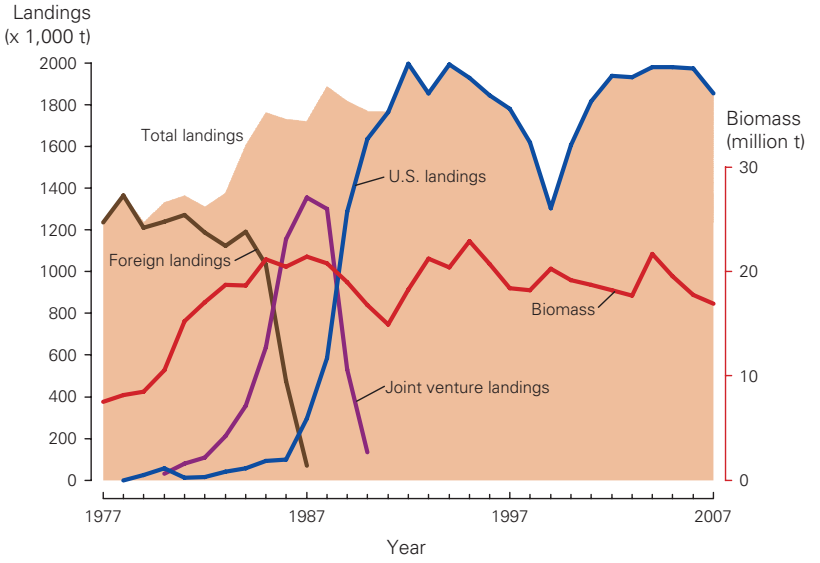

Figure 19-2
Bering Sea and Aleutian Islands groundfish landings and biomass in metric tons (t), 1977–2007.

Table 19-2
Productivity in metric tons (t) and status of Alaska groundfish fisheries resources. BSAI = Bering Sea and Aleutian Islands; GOA = Gulf of Alaska.

Species/stock	Recent average yield (RAY)[1]	Current yield (CY)	Sustainable yield (MSY)[2]	Stock level relative to B_{MSY}	Harvest rate	Stock status
Flatfish						
Alaska plaice (BSAI)	11,951	190,000	241,000	Above	Not overfishing	Not overfished
Arrowtooth flounder						
BSAI	14,934	158,000	193,000	Above	Not overfishing	Not overfished
GOA	20,909	184,008	214,828	Above	Not overfishing	Not overfished
Flathead sole						
BSAI	17,164	79,200	95,300	Above	Not overfishing	Not overfished
GOA	2,685	37,110	48,658	Above	Not overfishing	Not overfished
Greenland halibut (BSAI)	2,247	2,440	15,600	Above	Not overfishing	Not overfished
Rex sole (GOA)	2,311	9,100	11,900	Above	Not overfishing	Not overfished
Rock sole (BSAI)	39,835	198,000	200,000	Above	Not overfishing	Not overfished
Yellowfin sole (BSAI)	87,499	225,000	240,000	Above	Not overfishing	Not overfished
Deepwater Flatfishes (GOA)	499	8,707	10,431	Unknown	Not overfishing	Not overfished
Shallow water Flatfishes (GOA)	5,168	51,450	62,418	Unknown	Not overfishing	Undefined
Other Flatfishes (BSAI)	4,167	21,400	28,500	Unknown	Not overfishing	Undefined
Subtotal, flatfish	209,369	1,164,415	1,361,635			
Rockfish						
Northern rockfish						
BSAI	4,157	8,190	9,750	Above	Not overfishing	Not overfished
GOA	4,856	4,938	5,890	Above	Not overfishing	Not overfished
Pacific ocean perch						
BSAI	11,720	21,900	26,100	Above	Not overfishing	Not overfished
GOA	12,130	14,636	17,158	Above	Not overfishing	Not overfished
Shortraker/rougheye rockfishes						
BSAI[3]	285	626	833	Unknown		
GOA[4]	933	1,831	2,270	Above		
Demersal Shelf Rockfishes (GOA)	256	410	650	Unknown	Not overfishing	Undefined
Other Slope Rockfishes (GOA)[5]	844	4,154	5,394	Unknown	Not overfishing	Undefined
Pelagic Shelf Rockfishes (GOA)	2,575	5,542	6,458	Above	Not overfishing	Not overfished
Thornyheads (GOA)	816	2,209	2,945	Unknown	Not overfishing	Undefined
Other Rockfishes (BSAI)	533	999	1,330	Unknown	Not overfishing	Undefined
Subtotal, rockfish	39,105	65,435	78,778			

possibly environmental conditions, expectations to return to the peak stock levels may be unrealistic since pollock fishing within this region has been prohibited since 1992. Survey biomass estimates for Bogoslof since 2000 have all been lower than estimates prior to 2000, ranging from a low of 198,000 t in 2003 to a high of 301,000 t in 2000. The 2007 estimate is the highest since the 2000 estimate.

Similar stock-structure uncertainty exists for the Aleutian Islands region, which was closed to directed pollock fishing from 1999–2005. Age 2+ biomass is estimated to have increased from 1999 to 2004, after which it has been stable. Spawning biomass is estimated to have been increasing slowly since 1999. The 2000 year-class is estimated to have been well above average (third-largest in the time series), and preliminary indications are that the 2005 and 2006 year-classes may be slightly above average. The status of the stock in this region indicates that 28,200 t could potentially be harvested. Current regulations restrict the Aleutian Islands pollock quota to be at or below 19,000 t due to concerns over potential interactions or food competition with Steller sea lions in this area (which contains significant portions of the critical habitat for the species). To better understand interactions between Steller sea lions and fisheries, an exempted fishing permit was granted in 2006 and 2007. This project is restricted to catch fewer than 3,000 t and

Table 19-2
Continued from previous page.

Species/stock	Recent average yield (RAY)[1]	Current yield (CY)	Sustainable yield (MSY)[2]	Stock level relative to B_{MSY}	Harvest rate	Stock status
Other groundfish						
Atka mackerel						
BSAI	60,977	74,000	86,900	Above	Not overfishing	Not overfished
GOA	831	4,700	6,200	Unknown	Not overfishing	Undefined
Pacific cod						
BSAI	208,717	176,000	207,000	Below	Not overfishing	Not overfished
GOA	46,641	68,859	97,000	Near	Not overfishing	Not overfished
Sablefish (blackcod)[6]						
Eastern Bering Sea	1,099	2,980	3,520	Near		
Aleutian Islands	1,083	2,810	3,320	Near		
Gulf of Alaska	14,323	14,310	16,906	Near		
Walleye pollock						
Aleutian Islands	1,502	44,500	54,500	Above	Not overfishing	Not overfished
Bogoslof Island[7]	Trace	5,220	48,000	Unknown	Not overfishing	Undefined
Eastern Bering Sea	1,483,411	1,394,000	1,640,000	Below	Not overfishing	Not overfished
GOA[8]	72,262	68,307	95,429	Below		
Other Species (BSAI)[9]	28,648	68,800	91,700	Unknown	Not overfishing	Undefined
Squids (BSAI)	1,133	1,970	2,620	Unknown	Not overfishing	Undefined
Subtotal, other groundfish	1,920,627	1,926,456	2,353,095			
Total	2,169,101	3,156,306	3,794,108			
Subtotal, BSAI	1,981,062	2,676,035	3,188,973			
Subtotal, GOA	188,039	480,271	605,135			

[1]2004–06 average.

[2]MSY is equal to the overfishing level for all stocks.

[3]Status determinations are made separately for these stocks: shortraker rockfish is not overfishing and undefined stock status; rougheye rockfish is not overfishing and undefined stock status.

[4]Status determinations are made separately for these stocks: shortraker rockfish is not overfishing and has undefined stock status; rougheye rockfish is not overfishing and not overfished.

[5]Other Slope Rockfishes are predominately comprised of harlequin and sharpchin rockfishes.

[6]Status determinations for sablefish are made for the entire Alaska region; this stock is not overfishing and not overfished.

[7]Trace amounts of catch only; the TAC in recent years has been set well below the ABC to account for bycatch in other directed fisheries.

[8]Status determinations are made for individual areas in the GOA: the Western/Central GOA stock is not overfishing and not overfished; the Eastern GOA stock is not overfishing and has undefined stock status.

[9]BSAI Other Species includes sculpins, skates, sharks, and octopus.

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Arrowtooth flounders.

has strict guidelines for providing scientifically validated survey information. For both the Aleutian Islands and Bogoslof Island regions, stocks of pollock are underutilized by directed fishing.

Pacific cod: Estimated Pacific cod abundance reached a high of about 2.5 million t in 1985, then declined, and has fluctuated between 1.5 and 1.0 million t between 1991 and 2007. Since 2003, estimated biomass has declined to just below 1 million t. The 2007 eastern Bering Sea (EBS) shelf bottom trawl survey estimate is 18% lower than the 2006 survey estimate and is the all-time low in the survey biomass time series. This recent decline is due mainly to a sequence of five consecutive year-classes of the EBS Pacific cod stock, from 2001–05 (that ranged from 204 to 399 million age-0 fish), which are noticeably below the 30-year average year-class strength (658 million age-0 fish during 1977–2006). However, the 2006 year-class appears to be more than 2.5 times higher than the average recruitment. Although substantially lower than the high levels of the 1980's, the current biomass is still relatively high when compared to the much lower abundance levels of the 1970's. The stock is considered to be fully utilized. Developments in the assessment model include a revised maturity-at-age schedule and the incorporation of new age data into the assessment.

John Butler, SWFSC

An unidentified octopus rests in a curled up position on the sea floor.

Flatfishes: All flatfish species in the Bering Sea and Aleutian Islands area are underutilized as a result of the requirement in the groundfish FMP to maintain overall groundfish catches within the 2 million t optimum yield cap and the need to prevent excessive bycatch of Pacific halibut and king and Tanner crabs in flatfish trawl fisheries. Yellowfin sole is the most abundant of the flatfish complex, followed by northern rock sole, Alaska plaice, arrowtooth flounder, flathead sole, and Greenland halibut. Greenland halibut, a deep-water flatfish species found on the Continental Slope, is the only flatfish species that is relatively low in historical abundance. The biomass of Greenland halibut increased during the 1970's from the early 1960's level and is currently about 61% of the level expected under no fishing using average recruitment since 1977. Recruitment of young juvenile Greenland halibut appeared to have been poor for about 15 years since the early 1980's after several strong year-classes during the 1970's. Recently, there has been evidence of positive recruitment for Greenland halibut beginning in 2000. The biomass of all the other flatfish species has generally gone through a long period of increases from the late 1960's to the early 1990's, due to recruitment of a succession of strong incoming year-classes. The strength of the year-classes recruiting after 1985 has stabilized, and the biomass of flatfishes is high and stable.

Sablefish: Sablefish (blackcod) is a valuable species caught mostly with longline and pot gear in depths greater than those fished by trawlers. Sablefish are considered to belong to a single stock from the Bering Sea and Aleutian Islands region to the Gulf of Alaska. Sablefish abundance increased during the mid 1960's due to strong year-classes from the 1960's. Abundance subsequently dropped during the 1970's due to heavy fishing; catches peaked at 53,000 t in 1972. The population recovered due to strong year-classes from the late 1970's, and spawning abundance peaked again in 1987. The population then decreased as these strong year-classes died off. Abundance has increased from an all-time low in 2000. The 2000 year-class now appears to be larger than the 1997 year-class and is expected to comprise 18% of the spawning biomass in 2008. Sablefish abundance is now considered moderate, and current spawning biomass is estimated to be 37% of unfished biomass. The stock is fully utilized. Sablefish have been harvested under an IFQ system since 1995, which significantly changed the dynamics of the fishery.

Rockfishes: Rockfishes are assessed and managed in several species groups: Pacific ocean perch, northern rockfish, rougheye and shortraker rockfish, and other rockfishes. The abundance of Pacific ocean perch dropped sharply in the 1960's due to intensive foreign fisheries, and remained low into the early 1980's. In the mid 1980's effort levels were low and have helped rebuild the stock. The Pacific ocean perch stock appears to be recovered and is currently estimated to be at high levels similar to peak levels in the 1960's. Northern rockfish, rougheye rockfish, and shortraker rockfish were previously managed in the "other red rockfishes" species complex, but have now been separated into single-species management groups and have assessment models to help guide management. Northern rockfish were managed as a separate species beginning in 2002. Shortraker rockfish and rougheye rockfish were managed as separate species beginning in 2004. The trend in survey biomass for each of these three species is highly variable. However, model estimates of abundance show an increasing trend since 1980 for northern rockfish, a declining trend for rougheye rockfish, and a stable trend for shortraker rockfish. The "other rockfishes" species group is composed largely of shortspine

thornyhead and dusky rockfish. Based on bottom trawl survey information, shortspine thornyhead and dusky rockfish biomass appears to be increasing since 1997. Yields of rockfishes are established based on their longevity and productivity; hence, recommended exploitation rates are low relative to other groundfish species.

Atka mackerel: The Atka mackerel stock is centered mainly in the Aleutian Islands region. Total biomass built up steadily from a biomass of 279,000 t in 1977 to a peak of 677,000 t in 1992 due to particularly strong recruitment from the 1988 year-class. From 1992 to about 1996, the resource declined rather rapidly due to more moderate recruitment from incoming year-classes. From 1996 to 2000, the population trend was fairly stable with several above-average year-classes contributing to the population. After 2000, biomass increased rapidly, reaching a peak of nearly 750,000 t in 2004 due to several back-to-back strong year-classes, and particularly strong recruitment from the 1999 year-class. The biomass is now in the 500,000 t range and is expected to decrease in the near future as recent strong year-classes pass through the population. The stock is fully utilized.

Other Species: The Other Species complex is made up of sharks, skates, sculpins, and squids and octopuses. In response to a developing fishery in the Gulf of Alaska (GOA), the GOA FMP was amended to remove skates from the Other Species category. A similar FMP amendment was initiated by the North Pacific Fishery Management Council in 1999 to remove both skates and sharks from the Other Species category in the Bering Sea and Aleutian Islands area to increase the level of management attention and control for these potentially vulnerable species groups; this action is still in the process of revision and review. Additional FMP amendments are being proposed to split the Other Species category into component groups in both the BSAI and GOA.

Most of the species in this complex are expected to be underutilized and below their MSY. No targeted fisheries for any species in this category exist at this time; their current yields are all taken as bycatch amounts to other target groundfish fishing operations. In recent years, the species that make up this category have received special attention as data on the individual species have been accumulated and are being analyzed. Biomass levels are being estimated for the individual species, and management of the complex by species or major taxonomic groups is being evaluated.

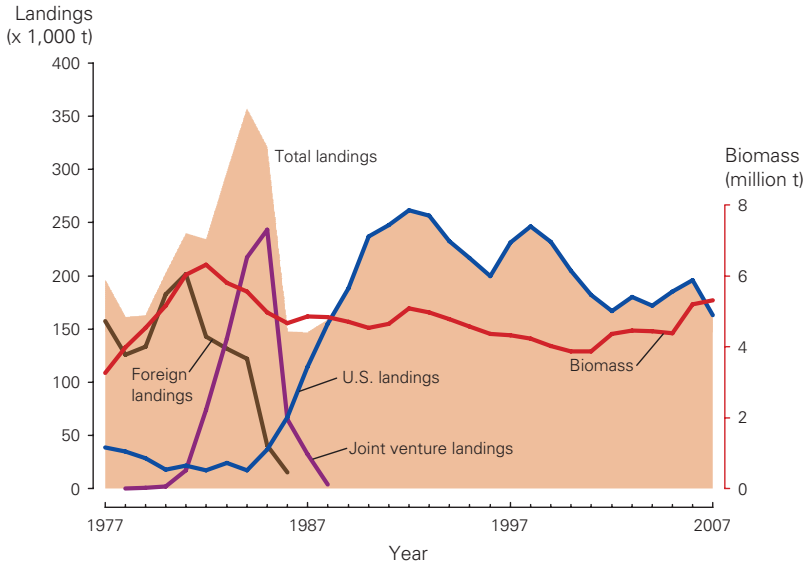

Figure 19-3
Gulf of Alaska groundfish landings and biomass in metric tons (t), 1977–2007.

Gulf of Alaska Groundfishes

Groundfish abundance in the Gulf of Alaska has increased since 1977, peaking at 6.3 million t in 1982 and most recently in 2007 at 5.3 million t, primarily due to increasing arrowtooth flounder biomass. Abundance since 1986 has remained relatively stable, fluctuating between about 4 and 5 million t. The recent average yield (2004–06) for groundfish in the Gulf of Alaska was just over 188,000 t (Table 19-2). This is substantially lower than the current yield of 480,271 t due to underutilization of some groundfish species (particularly flatfish species) that cannot be fully harvested without exceeding the bycatch limits for Pacific halibut set by the NPFMC. The MSY for GOA groundfishes is higher than the current yield at just over 600,000 t. Gulf of Alaska groundfish catches have ranged from a low of 146,703 t in 1987 to a high of 356,659 t in 1984 (Figure 19-3). Recent groundfish catches have been dominated by walleye pollock as well as flatfish, Pacific cod, and rockfish. Groundfish catches since 1989 have fluctuated around 200,000 t.

Walleye pollock: Pollock abundance in the Gulf of Alaska increased dramatically during the 1970's, peaked in the early 1980's, and subsequently declined. Current abundance is estimated to be at the lowest levels in the time series. The 2007 winter Shelikof Strait hydroacoustic survey was 38% lower than the 2006 estimate and is the lowest biomass estimate observed from this region. Estimated harvest rates have never exceeded 15%, suggesting that the extreme variation in pollock abundance is primarily a result of environmental forcing. Pollock abundance may also be negatively impacted by increases in piscivorous fish species in the Gulf of Alaska. The 1999 and 2000 year-classes are the most recent confirmed strong year-classes. Currently, the 2004 and 2005 year-classes appear to be above average, but levels are highly uncertain. Pollock are carefully managed due to concerns about the impact of fisheries on endangered and threatened Steller sea lions; pollock are a major prey item of Steller sea lions in the Gulf of Alaska. Sea lion protection measures include closed areas around rookeries and haul-outs, apportionment of the western central Gulf of Alaska pollock total allowable catch among 3 years and 4 seasons, and the use of more conservative harvest policy to determine the acceptable biological catch (ABC). Pollock in this area are considered fully utilized.

Pacific cod: The trawl survey biomass estimates of Pacific cod peaked in 1990 at about 350,000 t and are presently about 230,000 t based on the most recent trawl survey biomass estimate. The Pacific cod stock is considered healthy but declining and is fully utilized. Assessment modeling of Pacific cod in this region has improved with the addition of age composition data, improved estimates of growth and maturity, and acknowledgements of uncertainties on assumed natural mortality and survey catchability. Additionally, ecosystem analysis of the role Pacific cod plays in the environment has been expanded.

V. O'Connell, ADFG; OAR/NURP

Yelloweye rockfish.

Flatfishes: Flatfishes in the Gulf of Alaska are in general very abundant, largely due to great increases in arrowtooth flounder biomass. Arrowtooth flounder continues to dominate this group (and leads all groundfish based on the 2007 survey biomass estimates for the western and central GOA. Flathead sole, rex sole, and arrowtooth flounder are managed as separate categories, while the rest of the flatfishes are managed as deepwater and shallow water groups. Flatfishes are underutilized due to halibut bycatch considerations.

Sablefish: Sablefish in the Gulf of Alaska are part of a single stock throughout the Gulf, Bering Sea, and Aleutian Islands. For more information on the Alaska sablefish stock, see the sablefish section under Bering Sea and Aleutian Islands Groundfish.

Rockfishes: For management purposes, rockfishes in the Gulf of Alaska are divided into four assemblages or species groups: slope rockfishes, pelagic shelf rockfishes, thornyheads, and demersal shelf rockfishes. The slope rockfishes comprise the largest biomass component of Gulf of Alaska rockfishes. Within this group, Pacific ocean perch, shortraker and rougheye rockfish, and northern rockfish are managed as separate categories along with an "other slope rockfishes" category that aggregates the less abundant species. Slope rockfishes, particularly Pacific ocean perch, were intensively exploited by foreign fleets in the 1960's. Since the 1990's, Pacific ocean perch has rebounded from the heavy exploitation due to apparently favorable recruitment conditions. Their abundance is at moderately high levels compared to the low abundance levels of the 1980's, and is increasing. Pacific ocean perch are fully utilized. As with Pacific ocean perch, the northern rockfish and rougheye rockfish assessments are now based on age-structured models. Thornyheads are highly valued and believed to be at above-average levels of abundance, based on stable to increasing survey trends.

Ivan Loyola, IPHC

The crew of the F/V *Clyde* pose with a large Pacific halibut caught in the Aleutian Islands while on an International Pacific Halibut Commission stock assessment survey.

In the pelagic shelf rockfishes group, dusky rockfish is the dominant species and is now assessed with an age-structured model. The abundance estimate for the dusky rockfish is variable but appears to be at above-average levels (due to low to moderate fishing pressure). Assessments results for dusky rockfish indicate a stable to increasing trend. Other species in the pelagic shelf group have more uncertain estimates of abundance because their occurrence is relatively rare.

Demersal shelf rockfish assessment and management focuses primarily on yelloweye rockfish; the six other species in this group are much less abundant. Traditional population assessment methods (e.g. bottom trawl surveys) are considered problematic for these species due to their affinity for rough terrain. They are currently assessed using submersible line-transect methods. Available information suggests that abundance is stable for this species group, but overall, the trend is uncertain.

Rockfish stocks in general appear to be in good condition due to favorable conditions and precautionary management practices.

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. Fisheries targeting 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 reliably 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 currently managed as a bycatch-only species. Quota levels are set at low levels that 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 walleye 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.-Russian scientific studies and discussions, a coordinated exploitation and man-

AFSC, RACE Division

School of yellowtail rockfish.

agement 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 domestic exploitation strategies.

A former unregulated pollock fishery that occurred in the Donut Hole area of the central Bering Sea has come under regulation since the implementation of the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea in 1997. Under this Convention, signed by the Russian Federation, Japan, Poland, China, the Republic of Korea, and the United States, a central Bering Sea walleye pollock fishery has not been authorized because of low biomass of the Aleutian Basin stock. In fact, the moratorium on pollock fishing in the central Bering Sea was voluntarily imposed beginning in 1993 as negotiations on the Convention were proceeding. Parties to the convention meet annually to discuss current conditions and experimental fishing guidelines (if agreed), and exchange relevant scientific reports.

Bycatch

Pacific halibut, king, Tanner, and snow crabs, salmon, herring, and shrimp all fall under the "prohibited species" category for groundfish fisheries. When taken incidentally in the groundfish fisheries their numbers are reported and counted against cap levels that are set in regulation. Some species are returned immediately to the sea, whereas other species are landed and given to food banks or other non-profit programs. The cap levels for incidental take restrict a number of directed fisheries. For example, the Pacific halibut cap constrains Bering Sea flatfish fisheries. As such, the prohibited species regulations affect the allocation of directed fishery quotas. Since bycatch limits of prohibited (and other managed) species are strictly followed, directed groundfish fisheries could be closed before the entire available groundfish quota is taken.

The NPFMC also has an incentive program to control bycatch whereby 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 strategy by holding it directly accountable for its bycatch rates.

Multispecies Interactions

Marine mammal interactions with fish and fisheries are a great concern to Alaska fishery resource

management. Fisheries compete for prey items that marine mammals and other species, including seabirds, depend on for food in the marine ecosystem. The impact of fish removals on Steller sea lions has been implicated as an important factor in the decline of 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. Since sea lions feed on walleye pollock, Atka mackerel, and Pacific cod, these groundfish fisheries have been regulated to reduce impact on them. In November 2000, the National Marine Fisheries Service 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 walleye pollock fisheries are likely to jeopardize the continued existence of the western population of Steller sea lions and adversely modify its critical habitat (NMFS, 1998). As a result of this jeopardy determination, NMFS has proposed some reasonable and prudent alternatives to disperse the intensity of pollock, Atka mackerel, and Pacific cod fisheries in the critical habitat of sea lions and to enact additional prohibitions, including 10–20 n.mi. no-trawl zones around sea lion rookeries and haul-out areas.

Allocation Issues

As the domestic groundfish fisheries are now fully developed and capitalized, emerging allocation issues between user groups are important management problems. The NPFMC has been addressing problems as they arise and developing FMP amendments to mitigate them. Recent amendments have made explicit allocations to inshore and offshore sectors of the industry as well as specific percentage allocations of target and bycatch amounts to specific gear types. Industry-sponsored regulation (The American Fisheries Act) has developed a successful cooperative system for the Bering Sea pollock fishery. In 1995, NMFS promulgated regulations to implement an IFQ program for sablefish and Pacific halibut. Under this program, vessel owners are allocated transferable quota shares of sablefish and Pacific halibut that resulted in more efficient use of the resources than under an open-access system.

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