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Regional Information Report No. 5J01-03

Run Forecasts and Harvest Projections for 2001 Alaska Salmon Fisheries and Review of the 2000 Season

Edited by

Harold J. Geiger

and

Marianne McNair

June 2001

Alaska Department of Fish and Game
P.O. Box 25526, Juneau, Alaska 99802-5526

Frank Rue
Commissioner

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EXECUTIVE SUMMARY

The Alaska Department of Fish and Game is expecting the overall commercial salmon catch in 2001 to be similar to the catch level in 2000, with an increase in pink salmon harvest and a slight decrease in chum salmon harvest. Specific projection numbers by species and fishing area are shown in Table 1. The all-species commercial catch is expected to be near 142 million fish, with the catch distributed as 419 thousand chinook, 28.7 million sockeye, 4.78 million coho, 92.7 million pink, and 15.3 million chum salmon. In some cases the projections are based on formal run forecasts using information on previous spawning level, the environment, and other factors. In other cases, the catch projections are simply recent average catch levels. With two or three exceptions, such as the Southeast chinook troll fishery and South Peninsula June fishery, Alaskan salmon management will be based on actual observed salmon run strength. The primary goal of Alaskan managers is maintaining spawning population sizes — not reaching preseason catch projections.

At this time last year, department biologists were expecting an all-species commercial catch of 153 million fish for the 2000 season. As it turned out, the all-species catch reached 137 million. In 2000, the catch of all species but chum salmon came in lower than expected. The 24.3 million chum harvest set a statewide record, as did regional chum salmon harvests in Southeast Alaska and Prince William Sound. Pink salmon did not materialize as expected in Southeast Alaska (an actual catch of 20.2 million compared to the preseason projection of 37.5 million). However, the Prince William Sound pink salmon harvest came in stronger than expected and, on a statewide level, helped bolster pink salmon numbers. Western Alaska was once again faced with extremely low chinook and chum salmon returns.

In the AYK region, as in some other areas of the state, salmon production notably decreased for many stocks. Yukon and Kuskokwim Rivers chinook salmon stocks have been classified as stocks of concern under the guidelines established in the Sustainable Salmon Fisheries Policy for the State of Alaska. Similarly, chum salmon from the Kuskokwim, Yukon (summer and fall), and Nome Areas have also been classified as stocks of concern. The loss of productivity has been the subject of much interest and concern and is probably due to poor ocean survival caused by mechanisms that are still not understood.

The exvessel value of the commercial harvest dropped considerably from 1999; a preliminary estimate for the total value of Alaska's 2000 harvest is $275 million, down from estimates of $383 million in 1999, although higher than the 1998 estimate of $261 million.

Look for inseason harvest information, postseason statistics, and other information about salmon in Alaska on the World Wide Web at http://www.cf.adfg.state.ak.us/.

INTRODUCTION

The Alaska Department of Fish and Game's (ADF&G) four major fishery management regions (Southeast, Central, Arctic–Yukon–Kuskokwim, and Westward) are shown in Figure 1. These regions supersede any references to the department's former statistical regions.

Forecasts of runs (catch + escapement) for major salmon fisheries and projections of the statewide commercial salmon harvest have been published every year by ADF&G since 1969 (ADF&G 1969–1973, 1975–1982, 1983a, 1983b; Eggers 1985, 1986; Eggers and Dean 1987, 1988; Geiger and Savikko, 1989–1993; Geiger and Simpson 1994, 1995; and Geiger and Frenette 1996, 1997; Geiger et al. 1997; Hart et al. 1998; Geiger and Hart 1999, Scott and Geiger 2000). Though the department does not produce formal run size forecasts for all salmon runs in the state, local salmon biologists prepare harvest projections or harvest outlooks for all areas. Projections are based on formal forecasts, when available; when the formal forecasts are not available local biologists use average historical catches and local knowledge of recent events to develop these outlooks. Projections for the 2001 Alaska commercial salmon harvest, by species and area, are found in Table 1. Harvest outlooks for the Arctic–Yukon–Kuskokwim Region are developed as ranges; these ranges are listed in Appendix B. Trends in total statewide salmon harvests and catch projections in numbers of fish, by species, are found in Figures 2–6. Tables 2–7 provide detailed information on the 2000 harvest.

This report contains a detailed review of Alaska's 2000 commercial salmon season. We normally release it before final catch figures are available to provide preliminary information to the Board of Fisheries, the fishing industry, and the public.

Predominant ages and brood years for 2001 salmon runs, by species, are as follows:

	Age of Returning Salmon in Years				
Species	2	3	4	5	6
Pink	1999				
Chum		1998	1997	1996	
Coho		1998	1997		
Sockeye			1997	1996	1995
Chinook			1997	1996	1995

The common and scientific names for Alaska's Pacific salmon species are as follows:

Common (and Vernacular) Names	Scientific Name
chinook (king) salmon	*Oncorhynchus tshawytscha*
sockeye (red) salmon	*Oncorhynchus nerka*
coho (silver) salmon	*Oncorhynchus kisutch*
pink (humpy, humpback) salmon	*Oncorhynchus gorbuscha*
chum (dog) salmon	*Oncorhynchus keta*

DEFINITIONS OF TERMS

Biological escapement goal	The number of salmon in a particular stock that ADF&G has determined should be allowed to escape the fishery to spawn to achieve the maximum yield (human use). This determination is based on biological information about the fish stock in question. (Also see *optimum escapement goal.*)
Commercial harvest	Harvests of fish that are used for commercial purposes. This includes fish caught by the commercial common property fishery (see below) and by hatchery operators for cost recovery; it excludes sport, subsistence, and personal use harvests.
Commercial common property harvest	Harvests taken by traditional, competitive commercial fisheries (gillnet, purse seine, and troll), as opposed to commercial harvests resulting from hatchery cost recovery, fishing derbies, and sale of confiscated fish.
Common property harvest	Harvests taken by the commercial common property fisheries (see above), as well as the sport, subsistence, and personal use fisheries. This category excludes hatchery cost recovery harvests.
Conservation concern	A concern arising out of a chronic inability to meet escapements above the *sustainable escapement threshold*, despite the use of specific management measures.
Cost recovery harvest	Harvests of salmon by hatchery operators in specially designated areas to fund the operation of hatcheries and other enhancement activities.
Enhancement of runs	Hatcheries and other means of artificial propagation to create salmon runs or make existing salmon runs larger. Enhancement includes remote fish stocking, fertilization of lakes, and other techniques.
Escapement, spawning population, or broodstock	The portion of a salmon run that is not harvested and survives to reach the spawning grounds or hatchery.
Harvest projections or harvest outlooks	Harvest outlooks are the best available estimates of upcoming harvest levels. Prepared by local biologists, outlooks are based on formal run forecasts, when available. At other times outlooks are based on historical average catches, subjectively adjusted based on recent trends and local knowledge.

Management concern	A concern arising out of a chronic inability to meet the escapement goal, despite specific management measures.
Optimum escapement goal	The number of salmon in a particular stock that should be allowed to spawn to achieve social and allocative needs, yet still sustain the runs and meet biological needs of the stock.
Run forecast	Forecasts of a run (harvest + escapement) are estimates of the fish that will return in a given year based on such information as parent-year escapements, subsequent fry abundance, and spring seawater temperatures. Run forecasts are generally thought to be more reliable than harvest outlooks, but run forecasts are provided only for selected areas.
Salmon run	The total number of mature salmon returning in a given year from ocean-rearing areas to coastal waters.
Sustainable escapement goals	A level of escapement, shown by an index or some other estimate, that has been shown to provide a sustainable yield over a 5- to 10-year period.
Sustainable escapement threshold	An escapement level, below which the ability of a stock to sustain itself is jeopardized.

PRELIMINARY REVIEW OF THE 2000 ALASKA COMMERCIAL SALMON FISHERIES

Southeast and Yakutat

The 2000 Southeast Alaska commercial salmon harvest, including hatchery cost recovery, totaled over 39 million fish. This was the 31st largest harvest in the history of the region's commercial salmon fishery, which extends back to 1878. The five largest harvests in the history of the fishery occurred during the decade of the 1990s. The exvessel value of this year's salmon harvest was $72.2 million, which is below the 1990s average of $90.8 million. The exvessel values by species were: chinook salmon — $5.8 million, sockeye salmon — $7.0 million, coho salmon — $9.7 million, pink salmon — $8.1 million, and chum salmon — $41.7 million.

Highlights of the 2000 season were a below-1990s average pink salmon return, including harvest and escapement, throughout the entire region. The actual region-wide harvest of 20.2 million pink salmon was lower than the department's preseason forecast for a strong harvest in the 31 million–51 million fish range. With the exception of the Sitka area (District 113), seine harvests throughout Southeast Alaska were below 1990s average. Pink salmon escapements by stock group ranged from 3% to 42% below the 1990s average. Even with lower escapements in 2000, escapement remains on an upward trend for all three sub-regions of Southeast Alaska: Southern, Northern Inside, and Northern Outside.

The 15.8 million chum salmon harvest was the highest on record and the exvessel value of $41.7 million was an all-time record. The top seven chum harvests have all occurred in the past seven years when hatchery-origin fish have dominated the harvests. Chum salmon escapement indices, by stock group, had mixed results with escapements to the majority of stock groups above average in 2000 throughout Southeast Alaska.

Sockeye salmon harvests were below average throughout Southeast Alaska. The regionwide harvest totaled 1.22 million fish compared to the 1990s average of 2.2 million. Sockeye escapements throughout Southeast Alaska varied by location but appeared to be on an upward trend from the past few years. In the transboundary rivers, escapements of sockeye salmon were at the midpoint of the goal range in the Taku River but below goals in the Alsek and Stikine Rivers.

The 1.95 million coho salmon harvest was below the 1990s average of 3.4 million fish. Escapements were mixed in the four wild indicator stocks. Helicopter and foot surveys of index systems throughout the region indicated that escapements were above the 10-year average in most systems.

Prince William Sound

The 2000 Prince William Sound Area commercial salmon harvest of 46.2 million fish is the third highest on record. The harvest was comprised of 38.8 million pink, 1.43 million sockeye, 5.20 million chum, 715,000 coho, and 32,400 chinook salmon. The majority of the catch, 33.4 million salmon, was common property harvest, and 12.8 million were sold for hatchery cost recovery (exclusive of post egg-take roe sales).

The estimated value of the combined commercial salmon harvest is $52.7 million, including hatchery sales. During the 2000 season, 535 drift gillnet permit holders fished. The drift gillnet catch is valued at $22.5 million, setting the average earnings at $42,000. The set gillnet catch is valued at $998,000,

setting the average earnings of the 28 participating permits at $35,600. The seine fishery was worth $18.86 million for an average exvessel value of $144,000 for the 131 permit holders that participated this year. Revenue generated for hatchery operations (exclusive of post egg-take roe sales) was approximately $10.4 million.

The Copper River sockeye harvest of 880,000 fish ranked as the fifteenth largest on record, but was significantly below the recent 10-year average harvest of 1.51 million sockeye salmon. The harvest of 31,300 chinook salmon was well below the projected harvest and ranked as the sixteenth largest chinook harvest on record. The coho salmon harvest of 305,000 ranked as the ninth largest commercial harvest. The 2000 inriver goal for salmon passing the Miles Lake sonar was set at 768,000 salmon, which included 225,000 surplus hatchery salmon.

Sockeye escapement goals in the lower Copper River were met in 2000. An extended fishery closure in the Bering River District (to improve upper Copper River salmon escapement) subsequently resulted in a harvest of only 1,280 sockeye salmon from the Bering River District – well below the recent 10-year average of 20,000. Similarly, the coho harvest of 56,300 fish fell below the recent 10-year average of 105,000. The coho escapement goal was achieved for the Bering River District, although peak counts occurred approximately three weeks later than anticipated as weather conditions precluded surveys throughout most of September.

The chum harvest in the Coghill District set a record in 2000 with 1.64 million fish being taken in common property harvests and an additional 1.73 million being taken for hatchery sales by Prince William Sound Aquaculture Corporation. In the Unakwik District, 1,100 sockeye salmon were harvested; in the Eshamy District, the gillnet harvest was 27,500 chum, 235,000 sockeye, and 375,000 pink salmon. The escapement goal of 35,000 fish at Eshamy Lake was not achieved with 22,700 sockeye salmon past the Eshamy River weir by early September.

The return of 41.5 million pink salmon to Prince William Sound was 1.3 times larger than the forecast, and this return resulted in the third highest single-season harvest of 38.8 million fish. The ratio of enhanced pink salmon to wild pink salmon in the 2000 total commercial common property harvest is estimated to have been 4:1. The pink salmon escapement was estimated to have been the tenth highest escapement since 1960. Even so, Northern, Eshamy, and Northwestern Districts failed to meet their minimum escapement goals.

The wild and enhanced chum salmon returns to Prince William Sound were strong and the areawide chum salmon purse seine harvest set a record in 2000 with 1.74 million adults. Seiners were able to target wild chum salmon in the Eastern and Southeastern Districts and enhanced chum salmon returns in the Montague and Southwestern Districts. The Port Chalmers remote release site in the Montague District had a harvest of just under 1 million chum salmon, which was 1.5 times the preseason catch projection. Overall, wild-stock chum escapement exceeded the midpoint escapement goals in the Eastern, Southwestern, Montague, and Southeastern Districts. The purse seine fleet harvested 264,000 coho salmon in 2000, the majority of which came from the Solomon Gulch Hatchery.

Upper Cook Inlet

The preliminary 2000 Upper Cook Inlet salmon harvest of 1.9 million salmon was well below the 10-year average of 4.8 million fish. The Upper Cook Inlet salmon harvest produced an estimated value of $8.2 million in exvessel revenue. Sockeye prices at the beginning of the season were $0.80 to $0.90 per pound. Typically this price would have risen by the end of the season to well over $1.00, but this did not occur this season.

The 2000 harvest of 1.33 million sockeye salmon in Upper Cook Inlet was 1.34 million less than 1999. Harvest was restricted in much of the region. The escapement to the Kenai River was at the lower end of the escapement goal target of 750,000 to 950,000. Sockeye salmon produced an exvessel value of $7.3 million.

The 2000 harvest of 126,000 chum salmon was approximately 50,000 less than in 1999. The 2000 chum harvest would likely have been much higher except for management actions restricting the drift fleet for Kenai River sockeye salmon. Peak aerial escapement counts were about twice the previous record, which goes back to 1971. Fishermen were paid $0.15 to $0.40 per pound for chum salmon, producing an exvessel value of $210,000, or just 2.5% of the overall fishery exvessel value.

The 2000 harvest of 149,000 pink salmon was the lowest harvest for an even-year in Upper Cook Inlet since 1954. The average even-year harvest from1954 to 2000 is 1.2 million pink salmon. As with chum salmon, management actions restricting the drift fleet and Upper Subdistrict set gillnet fishery for Kenai sockeye salmon are the primary reasons for these poor harvests. Prices paid for pink salmon were $0.05 to $0.10 per pound resulting in an exvessel value for this species of $47,000.

The 2000 coho harvest of 239,000 was substantially improved from harvests during the last three years. The coho harvest this year, like that for pink and chum salmon, is not reflective of run strength due to extremely prolonged closures of the drift fleet and the Upper Subdistrict set gillnet areas for most of the season to conserve Kenai River sockeye. The exvessel value of coho salmon to Upper Cook Inlet fishermen is estimated at approximately $620,000.

The 2000 harvest of 7,230 chinook salmon was about half of the recent 10-year average harvest and about equal to the 1998 harvest of 8,000. The 2000 chinook salmon harvest was valued at $160,000, approximately 1.9% of the total exvessel value. The directed chinook fishery in the Northern District harvested approximately 2,200 chinook salmon during the three scheduled fishing periods. The set gillnet fishery in the Kenai, Kasilof, and East Forelands sections harvested 3,750 chinook salmon, far below average levels due to the closures for sockeye conservation. The sonar count into the Kenai River was 45,500 with an estimated 12,000 fish harvested in the recreational fishery. This means the escapement was near the upper end of the escapement goal range.

Lower Cook Inlet

The final 2000 Lower Cook Inlet all-species salmon harvest of 1.71 million fish was the fifth highest during the past decade, exceeding both the most recent 10- and 20-year averages. However, the overall harvest totaled less than three-fourths of the preseason catch projection, yielding an estimated exvessel value of about $1.79 million – just over half of that for the 1999 season and the lowest since 1994. Once again, Lower Cook Inlet commercial salmon harvests relied heavily on the success of hatchery and

enhanced fish production. The overall return of pink salmon to Tutka Hatchery, estimated at around 1.25 million fish, was the sixth highest on record for the facility.

Returns of naturally produced sockeye salmon were variable, with escapement goals met at three of four systems in the management area. Natural returns of pink salmon in Lower Cook Inlet were also quite variable, with several systems (Seldovia Bay-Southern District, Port Dick-Outer District, Bruin Bay–Kamishak Bay District) experiencing exceptionally strong runs this season. Most of the major monitored pink systems in the management area achieved their escapement goals. Undoubtedly the brightest spot in the management area was the chum salmon harvest, totaling just over 73,000 fish and representing the highest catch since 1988. Additionally, chum escapements were relatively good for most systems, including Koyuktolik (Dogfish) Bay in the Outer District and most west side (Kamishak Bay) systems. An exception to the strong show of chum salmon occurred at McNeil River, where escapement fell short of the established goal for the ninth time in the last 11 years despite the complete absence of commercial fishing effort and harvest.

The 2000 sockeye harvest of nearly 242,000 fish was the lowest for Lower Cook Inlet since 1994, representing less than half the preseason catch projection. Sockeye salmon accounted for less than 15% of the landings in numbers of fish but, due to the price differential, comprised over 60% of the exvessel value of the fishery in 2000. The Lower Cook Inlet commercial set gillnet harvest of about 26,500 sockeye salmon fell slightly below the recent 10-year average of 28,000 fish. Although the commercial set gillnet fishery in Port Graham Subdistrict, targeting the English Bay Lakes sockeye return, was allowed to open this season, the run was weak and the area was closed after only two weeks of fishing. The final escapement, estimated at 12,600 sockeye salmon, fell short of the goal of 15,000 fish for the first time since 1996.

Returns of pink salmon, the dominant species in numbers of fish in Lower Cook Inlet, fell below preseason expectations in 2000, with an overall harvest of 1.39 million fish. The catch was about 14% greater than the most recent 20-year average, representing the seventh highest catch during that time period. Approximately 1.07 million pink salmon (77% of the total) were taken in the Southern District, the bulk of which came from Tutka Hatchery production. However, about 98% (1.04 million pink salmon) of these were used to help attain Tutka Hatchery's cost recovery revenue goal. The estimated hatchery return, including escapement, brood stock, and commercially harvested fish, was 1.25 million pink salmon, about 9% shy of the preseason projection of 1.38 million fish.

The 2000 Lower Cook Inlet commercial chum harvest was the highest since 1988, topping 73,000 fish, which easily exceeded the recent 10-year average of 10,500 and almost attained the 20-year average harvest of 90,000. Prior to the season, low numbers were once again anticipated based on the recent trend of weak returns coupled with a soft market and low prices. Nearly all of the chum harvest this season came in Kamishak Bay, targeting strong returns to the Big and Little Kamishak River systems.

The commercial harvest of 8,900 coho salmon in 2000 was the third lowest total for this species in Lower Cook Inlet during the past decade, representing only about two-thirds of the average for that time period. The majority of the harvest (91%) once again occurred in the Eastern District, primarily for the Seward Silver Salmon Derby and Cook Inlet Aquaculture Association cost recovery at Bear Lake. The remainder of the catch came mostly from set gillnetters in the Southern District.

The 2000 harvest of chinook salmon, not normally a commercially important species in Lower Cook Inlet, totaled 1,190 fish, below the recent 10-year average of 1,600 but close to the long-term average of 1,300. Virtually all of the catch came from the Southern District and can be primarily attributed to

enhanced production at Halibut Cove Lagoon and Seldovia Bay. Set gillnetters accounted for 86% of the Southern District chinook catch, with purse seiners taking the remaining 14%.

Bristol Bay

The inshore run of sockeye salmon totaled approximately 28.4 million fish and was the 13th largest inshore return in the last 20 years and the third largest in the last five years. It was approximately 15% less than the preseason forecast of 33.4 million fish. The commercial harvest of 20.5 million sockeye salmon was slightly below, but within 10% of, the 22.2 million preseason forecast. Fishery managers achieved a total escapement of approximately 7.8 million sockeye salmon. The west side of the bay, Togiak and Nushagak Districts, had strong runs that came in significantly higher than preseason forecasts. Two out of three east side districts finished below forecasts with only the Egegik District returning above forecasted levels. The Kvichak River had the lowest peak year since 1956.

There was no directed commercial chinook salmon fishery in any district this year. The commercial harvest of approximately 23,000 chinook salmon was the lowest catch in the last 20 years. The chum harvest totaled approximately 381,000 fish. This harvest is about one-third the long-term average and the second lowest catch in 20 years. The pink harvest of about 57,000 fish is about 6% of the average of even-year returns from 1980–1999. However, it is the largest harvest since 1994. The coho salmon harvest of approximately 126,000 fish was 65% of the 20-year average of 193,000 fish, but it is 23% higher than the 1990–1999 average of 103,000 fish.

The calculated exvessel value of the 2000 Bristol Bay salmon fisheries totaled $81.1 million, which is the fourth lowest exvessel value in 20 years (1980–1999) and 39% below the 20-year average exvessel value of $133 million.

The 2000 inshore sockeye run was 5 million fish less than the forecast. Sockeye runs to the Naknek-Kvichak and Ugashik Districts were less than forecast. Egegik, Nushagak, and Togiak Districts all exceeded forecasted returns. Escapements in the Wood, Igushik, and Togiak Rivers exceeded the escapement goal range. Escapements in the Naknek, Egegik, Ugashik, and Nushagak Rivers fell within the escapement goal range. The Kvichak escapement did not reach the lower end of the escapement goal range and was the lowest peak-year return since state management began. The Nushagak River escapement of 403,000 sockeye salmon was 72% above the 235,000 fish escapement goal minimum set by the Board of Fisheries in the spring of 1999.

The Naknek-Kvichak District sockeye harvest of approximately 4.7 million fish was the fifth smallest harvest for that district since 1980. The Egegik District sockeye harvest of 7.1 million fish was 87% of the 20-year average but was the 11th largest in the last 20 years. The Ugashik District sockeye harvest of approximately 1.5 million sockeye salmon was the fourth smallest since 1980. The Nushagak District harvest of 6.4 million sockeye was the second largest harvest since 1980 and 63% higher than the 20-year average. Likewise, the Togiak District sockeye harvest of approximately 794,000 fish was second only to the 1988 harvest of 822,000, almost double the 20-year average of 438,000.

Fishing started somewhat earlier than anticipated in 2000. The first commercial opening in the Nushagak District occurred on June 21. On the East side, commercial fishing ostensibly opened June 1, but active emergency order management began later. Egegik kicked off the season on June 20. Fishing in Egegik District continued off and on after that; an opening in the Naknek section was announced for June 25. The Ugashik District was opened for the first time on June 26.

The Nushagak District did not open again until June 26. The Igushik section was reopened that afternoon. The Wood River Special Harvest Area also opened for the first time in the 2000 season on that date. An aerial survey June 28 revealed a push of sockeye salmon up the Nushagak River. The Nushagak District was opened based on this survey, and sonar counts began to increase shortly after the opening. June 29 catches were exceptional in the Nushagak District; over 980,000 sockeye were caught; several processors went on limits; and two processors suspended buying for several hours. Fishing continued in the Nushagak District for sockeye until July 27, though catch rates dropped dramatically after July 14. Fishing opened again on July 31 for coho salmon. Good catches of coho continued through August 18, and the fishery closed for the year on August 21 at noon.

The chinook harvests in all Bristol Bay districts, except Egegik, were below average. There was no directed chinook fishery in any district, and all catches were incidental to other fisheries. Aerial surveys indicate the 10,000 fish goal was achieved in the Togiak River. Portage Creek sonar counted 56,000 chinook salmon past that site on the Nushagak River, significantly below the 75,000 fish inriver goal.

The total Bristol Bay chum harvest of 381,000 fish was well below the recent 20-year average of 1.1 million. All of the districts, except Togiak, produced harvests that were 50% or less of their 1980–1999 averages. The Togiak harvest was 63% of its 1980–1999 average of 223,000. Escapements for both the Togiak and Nushagak were the second lowest in the last 20 years.

Pink salmon return in strength to Bristol Bay only during even-numbered years. The 2000 run produced a commercial harvest of only 57,000 fish. Pink escapement counts are available only for the Nushagak River. Escapement in the Nushagak was estimated to be 135,000; the historical average for even years is 1.4 million.

The coho run to the Nushagak district was strong in 2000; however, the bay-wide coho harvest of approximately 126,000 fish was 35% below the 1980–1999 average of 193,000 fish. The Nushagak harvest of 109,000 was the largest harvest in that fishery since 1984. The rest of the districts sustained coho harvests that were below average.

Kuskokwim Area

The total 2000 commercial salmon harvest for the Kuskokwim Area was 493,000 fish, the third lowest since 1976. Fishing time during the season was well below average because of critically low chinook and chum salmon runs to the Kuskokwim River and poor coho salmon runs in Kuskokwim Bay. Overall, the Kuskokwim areawide chinook harvest of 26,000 fish was 44% below the recent 1990–1999 average of 47,000 fish. The Kuskokwim area sockeye harvest of 110,000 fish was below average. Fishers harvested 50,000 chum salmon, 85% below the recent 10-year average of 333,000 fish. The coho harvest was 307,000, 44% below the recent 10-year average of 548,000 fish. Only 623 of the 832 Kuskokwim Area permit holders participated in the commercial fishery in 2000. The exvessel value of the harvest was $1.2 million, 65% below the recent 10-year average exvessel value of $3.4 million. The average exvessel earning per permit holder was $1,900, well below the most recent 10-year average value of $4,300.

Within the Kuskokwim River, fishing time during the chum salmon fishery was limited to one 6-hour, half-district period because of extremely weak chinook and chum salmon runs. The chinook salmon harvest of 444 fish was the lowest on record. The chum harvest of 12,000 fish was 96% below the recent 10-year average, and the lowest since 1970. The sockeye harvest of 4,000 fish, taken incidentally during the chum fishery, was well below average because of the reduced fishing time. The coho harvest of

261,000 fish was 44% below the recent 10-year average. During the coho fishery there were 11 half-district openings and one full district opening in District W-1 and 2 openings in District W-2.

In 2000, the state and federal governments declared the Kuskokwim River drainage an economic disaster area because of the extremely poor chinook and chum salmon runs. Recently, the Alaska Board of Fisheries classified Kuskokwim River chinook and chum stocks as yield concerns based on guidelines established in the Sustainable Salmon Fisheries Policy for the State of Alaska. Chinook and chum escapement goals were not achieved in 2000 for the Kuskokwim River. Only the coho escapement goal for Kogrukluk River was achieved.

The Quinhagak District, within Kuskokwim Bay, opened on June 15 and commercial fishing occurred on a normal schedule in June and July because of average chinook and sockeye harvests. The chinook harvest of 21,000 fish was slightly above the recent 10-year average; the sockeye harvest of 69,000 fish was 9% above the recent 10-year average. The incidental chum harvest of 31,000 fish was 46% below the recent 10-year average. Commercial fishing time in August, specifically directed at coho salmon, was curtailed because of below average catches of coho salmon. Accordingly, commercial fishing time in August was well below average. The associated coho salmon harvest of 31,000 fish was 49% below the recent 10-year average.

The Goodnews Bay District, within Kuskokwim Bay, opened in late June to provide for a directed harvest of sockeye salmon and protect earlier running chinook salmon, which continue to experience weak runs. The chinook harvest of 4,000 fish was 83% above the recent 10-year average. Chinook escapement, as monitored through the Middle Fork Goodnews River weir, was 5% below the established escapement goal of 3,500 salmon. The sockeye harvest of 37,000 fish was 5% below the recent 10-year average. However, the Middle Fork Goodnews River escapement goal of 25,000 sockeye salmon was achieved. The incidental chum harvest of 7,000 fish was 50% below the recent 10-year average while the chum salmon counted through the weir on the Middle Fork Goodnews River was slightly below the escapement objective. The coho harvest of 16,000 fish was 22% below the recent 10-year average. An escapement goal for coho salmon has not been established for the Middle Fork Goodnews River.

Yukon Area

The 2000 Yukon Area commercial harvest was composed of 9,000 chinook salmon and 7,000 summer chum salmon. Lower Yukon Area fishermen accounted for the entire Yukon River commercial harvest. This is the first time since statehood no openings were allowed in the Upper Yukon Area. No fall chum salmon or coho salmon were harvested in 2000 because of the salmon runs for both species. The 2000 chinook salmon harvest was the lowest commercial harvest since 1937 and 91% below the recent 10-year average harvest of 97,000 chinook salmon. The summer chum commercial harvest was the lowest since the inception of directed fishing on summer chum in 1967 and 98% below the recent 10-year average harvest of 390,000 fish. Yukon River fishermen in Alaska received an estimated $736,600 for their chinook and summer chum harvest in 2000, approximately 88% below the recent 10-year average of $6.2 million for the whole river, and 86% below the 10-year average for the Lower Yukon River. Exceedingly poor chinook and summer chum runs caused most of the drop in exvessel value. Four buyer-processors operated in the Lower Yukon Area. The estimated average price was $4.57 per pound for chinook salmon and $0.17 per pound for chum salmon. The average price paid for chinook salmon in the Lower Yukon Area was well above the recent 10-year average of $2.82 per pound. Prices paid for summer chum salmon in the round continued to be low, as observed since 1995. The average income for Lower Yukon Area fishers that participated in the 2000 commercial fishery was $1,300.

The 2000 Yukon River salmon runs continued to exhibit the decline in productivity observed in recent years. In general, chinook escapement estimates were well below the 1995–1999 average. However, aerial survey counts of chinook salmon spawning in the Anvik and Salcha Rivers met the established minimum escapement goals for these rivers. The chinook spawning escapement estimate of 12,600 for the Canadian mainstem Yukon River was less than 48% of the 1990–1999 average and 55% below the interim escapement objective. The Yukon River chinook salmon stock has been classified as a yield concern by the Alaska Board of Fisheries under the guidelines established in the Sustainable Salmon Fisheries Policy for the State of Alaska.

Like the previous season, the poor abundance of chum salmon resulted from the good parent-year escapements documented throughout the drainage in 1995 and 1996. No fall chum salmon escapement goals were met. The Yukon River fall chum stock has been classified as a yield concern, while the Toklat River fall chum stock has been classified as a management concern by the Alaska Board of Fisheries, under the guidelines established in the Sustainable Salmon Fisheries Policy for the State of Alaska.

Summer chum salmon spawning escapements to selected tributaries in 2000 were well below most other years. The number of chum salmon returning to the Anvik River was 59% below the goal of 500,000 and the lowest estimated escapement since the inception of the sonar-based escapement project in 1979. No other summer chum escapements in monitored tributaries met minimum goals or were considered adequate. Counts of spawning chum salmon ranged from 57% (Chena River) to 82% (Nulato River) below 1995–1999 averages. The Yukon River summer chum stock has been classified as a management concern by the Alaska Board of Fisheries under the guidelines established in the Sustainable Salmon Fisheries Policy for the State of Alaska.

Norton Sound

The commercial harvest in the Norton Sound Area totaled 218,000 fish, and was comprised of 1,000 chinook, 44,000 coho, 167,000 pink, and 6,000 chum salmon. The chinook and chum commercial harvests were the lowest on record. The chinook harvest was 90% below the recent 5-year average and 89% below the recent 10-year average. The chum harvest was 72% below the recent 5-year average and 85% below the recent 10-year average. The coho harvest was 16% above the recent 5-year average but 21% below the recent average 10-year average. The pink salmon harvest was 18% below both the recent 5– and 10-year harvest.

The commercial season opened in Eastern Norton Sound on June 22 to target chinook salmon. After another opening in June with very poor chinook catches, Eastern Norton Sound opened again on July 2 targeting pink salmon. As the season progressed, some Western Norton Sound subdistricts also opened to target pink salmon. Overall commercial catches of pink salmon were poor. The first coho commercial opening occurred on July 24 in Eastern Norton Sound and on August 7 in some Western Norton Sound subdistricts.

The Norton Sound Salmon District has 201 salmon permits of which 79 actually were fished during the 2000 season. The number of participating fishers this season was 9% below the recent 5-year average and was 26% below the recent 10-year average. The exvessel value of the fishery was $150,000, one of the lowest values in the last 30 years and second lowest only to 1999. The 2000 exvessel value of the fishery was 50% below the recent 5-year average and 63% below the recent 10-year average. The average price paid was $1.30 per pound for chinook salmon, $0.30 per pound for coho, $0.15 per pound for chum, and $0.10 per pound for pink salmon. The average income for Norton Sound fishers that participated in the 2000 commercial fishery was $1,900.

Escapement surveys of chum salmon spawning streams that flow into Norton Sound was hampered by poor survey conditions. Only 3 of the 15 streams that have established chum salmon escapement goals were successfully surveyed. Only two of these three systems were observed to have escapements within the established escapement goal range. Additionally, the weir count of chum salmon in the Kwiniuk River was 37% below the established escapement goal.

Within the Norton Sound District and the Nome Subdistrict, the chum salmon stocks have been classified as management concerns, while the chum salmon stocks of the Gloving and Moses Point Subdistricts have been classified as yield concerns under the guidelines established in the Sustainable Salmon Fisheries Policy for the State of Alaska.

Kotzebue

The commercial harvest in the Kotzebue Area was 160,000 chum salmon. The chum harvest was 13% above the previous 5-year average but 2% below the previous 10-year average. During 2000, 64 out of 203 permit holders fished or made at least one delivery. The recent 5-year average was also 64 permits fished, but the recent 10-year average was 99 permits fished. In the 1980s, the average number of permits fished was 183. Because of lower fish prices, higher fuel prices, and a limited market, fishing effort has been lower in the 1990s.

Two buyers operated in Kotzebue during the 2000 season. The season opened on July 10, by regulation, and closed after August 24 when the last buyer ceased operations. The exvessel value of the fishery was $247,000, and the price paid was $0.18 per pound. The average income for Kotzebue commercial fishers that participated in the 2000 commercial fishery was $3,900. Although the exvessel value was 52% above the recent 5-year average it was 84% below the average exvessel value of $1.5 million in the 1980s. Because of low salmon prices, fishers concentrated their effort close to Kotzebue to minimize fuel costs.

No aerial survey counts of spawning chum salmon were possible during this season because of poor survey conditions.

Kodiak

The 2000 Kodiak management area commercial salmon fishery began on June 9, and the last landing occurred on September 16. Harvests were approximately 12,000 chinook, 2.91 million sockeye, 329,000 coho, 9.93 million pink, and 1.19 million chum salmon. The harvests of chinook, sockeye, and pink salmon were less than expected, while those of chum and coho salmon were better than expected. The estimated exvessel value of the 2000 salmon fishery was $21.4 million, less than 60% of the 1990–1999 average of $36.2 million. Commercial fishing effort was down for the third consecutive year. Of the 608 eligible permit holders, only 399 participated. By gear type, a total of 2 beach seine, 173 set gillnet, and 224 purse seine permit holders fished.

The 2000 chinook harvest of 12,000 fish was less than the 1990–1999 average harvest of 22,000 fish.

The sockeye harvest of 2.91 million fish was substantially less than the 1990–1999 average of 4.26 million fish. Early sockeye runs appeared to be very strong in early June but dwindled off (an early and compressed run timing), with most early-run fish coming in at or slightly above forecast. Late-run sockeye salmon were generally weaker than expected. Supplemental production contributed 294,000 to the overall sockeye harvest. The Cape Igvak fishery contributed about 340,000 sockeye salmon to the total. The North Shelikof fisheries harvested about 27,000 of the allowable harvest cap of 65,000 sockeye salmon; this was only the second time since 1990 that offshore zone closures were not required.

The coho harvest was 329,000 fish in 2000, which was slightly more than the preseason catch projection of 300,000 fish and the 1990–1999 average harvest of 312,000 fish. Of the total, 135,000 coho salmon were harvested as a result of supplemental production from the Kitoi Bay Hatchery.

The harvest of 9.93 million pink salmon was just below the preseason catch projection of 10.2 million fish, and well below the 1990–1999 average harvest of 15.9 million fish. The Kitoi Bay Hatchery contributed over 3.66 million pink salmon to the common property harvest.

Chum salmon runs in 2000 were excellent for the second consecutive year. The harvest was 1.19 million chum salmon, which was substantially more than the preseason catch projection of 700,000 fish and greater than the 1990–1999 average harvest of 743,000 fish. Approximately 304,000 of the total chum harvest was attributed to production from the Kitoi Bay Hatchery.

Escapement objectives for all species were met or exceeded in 2000. Many smaller streams went dry from early August through early October due to sunny weather with little rainfall. These dry conditions may affect production from this year's salmon escapements, particularly pink salmon. In addition, the low stream flows and warm nearshore water significantly delayed inshore migration and escapement of coho salmon in many areas.

Chignik

Approximately 3,000 chinook, 1.78 million sockeye, 123,000 coho, 428,000 pink, and 121,000 chum salmon were caught in the Chignik Management Area in 2000. The season was characterized by a very strong early run of sockeye salmon and a below-average late run to the Chignik Lakes system. The salmon fishing season began on June 11, and the last landing occurred on August 31. The 2000 season provided fair fishing opportunity with a few closures lasting up to two weeks. Eighty-five percent of the commercial harvest of sockeye salmon within the Chignik Management Area took place from June 11 through July 25. The late sockeye salmon run to Chignik Lake resulted in no fishing periods during the

month of September. The last salmon purchase by local processors was made on August 31. The majority (100) of the Chignik Management Area salmon permits were fished in 2000, and 3,268 deliveries were made. The exvessel value of the 2000 commercial salmon harvest was approximately $12 million, about $2 million below the 1990–1999 average of $14 million and equated to about $120,000 per permit holder. Approximately 96% of the total value was attributable to sockeye salmon harvests.

The 2000 Chignik chinook harvest was approximately 3,000 fish, slightly less than preseason catch projection of 4,000 fish and substantially less than the 1990–1999 average of approximately 7,000 fish.

The 2000 harvest of sockeye salmon was 1.78 million fish, which was about half of the preseason forecast of 3.43 million fish. The 1990–1999 average harvest was 1.72 million sockeye salmon. The total number of sockeye salmon bound for the Chignik River system through September 17, including escapement plus harvest and fish harvested in the Cape Igvak and the Southeast District Mainland fisheries, was estimated at 2.97 million fish.

The coho harvest was about 123,000 fish, which was less than the forecast of 200,000 fish and the 1990–1999 average harvest of 186,000 fish. Approximately 428,000 pink salmon were harvested in 2000, which was less than half of the preseason forecast of 1 million fish and substantially less than the 1990–1999 average harvest of 1.1 million fish. The chum harvest in 2000 was approximately 121,000 fish, compared to the preseason forecast of 200,000 fish and the 1990–1999 average of 201,000 fish.

A total of 4,280 chinook salmon escaped into the Chignik River system in 2000, compared to the 10-year average escapement of 3,600 fish. Chinook escapement was well above the escapement goal of 1,450–2,700 spawners, after subsistence and sport fishing removals. Sockeye escapement into the Chignik River system was well above goals, with a total estimated escapement of 805,000 fish, of which 513,000 were apportioned to the Black Lake run and 293,000 were apportioned to the Chignik Lake run by post-season scale pattern analysis. The 1990–1999 average total escapement was 792,000 sockeye salmon. The escapement goal for the Black Lake portion of the Chignik sockeye run is 400,000, and for the Chignik Lake portion it is 250,000 through August 31. Other species enumerated through the Chignik River weir in 2000 included 7,060 coho salmon, 4,280 pink salmon, and 48 chum salmon.

In most years Chignik River escapement is estimated by video counts of fish passing through a weir, and escapement is estimated by aerial surveys for all other streams. A high water event washed out an 80-foot section of the weir on June 8. During the period of time when the Chignik weir was not fish tight, a majority of the salmon escapement was estimated through the use of a split-beam sonar. The high water level in the Chignik River prevented the reinstallation of the weir panels until July 12. Weir operation continued through September 3. The 2000 Chignik chinook, sockeye, pink, and chum salmon escapements goals were also met.

South Peninsula and Aleutian Islands

The 2000 South Peninsula Area commercial salmon fishery began on June 13, and the last landing occurred on September 29. Of the 397 eligible permit holders, 309 participated. The total South Peninsula harvest of approximately 5,000 chinook salmon in 2000 was half of the 10,000 fish preseason catch projection. The sockeye catch was 1.99 million fish, which was about 1 million less than the preseason catch projection of 3 million fish. The coho catch of about 257,000 was 57,000 more than the preseason catch projection of 200,000 fish. The pink harvest of approximately 3.81 million fish was about 1 million short of the preseason catch projection. The total South Peninsula chum catch was 1.06 million fish, slightly more the forecast of 1 million fish. The total exvessel value of the South Peninsula salmon fishery, including the $6.6 million derived from the June fishery, was $12.5 million. This compares to an exvessel value of $23.6 million in 1999, of which $19.6 million was attributed to the sockeye harvest. In 2000, sockeye salmon contributed $10.0 million, pink salmon $1.2 million, chum salmon $820,000, coho salmon $430,000, and chinook salmon $40,000.

The sockeye escapement of 70,000 fish to the South Peninsula was at the lower end of the escapement goal range of 67,000–124,000 fish and was 68% of the 1990–1999 average of 103,000 fish. A total of 38,000 coho salmon were documented in 19 South Peninsula streams, which likely represents less than half of the total coho escapement. Many major coho salmon systems were not surveyed at all or were not surveyed during peak escapement timing due to inclement fall weather. The indexed total pink escapement to the South Peninsula was near the midpoint of the even-year goal range. The indexed total escapement of chum salmon was approximately midway between the lower and upper goals.

In 2000, pink salmon runs in the Aleutian Islands area were strong. However markets were limited and less than four fishermen fished commercially. Because so few fishermen participated, the harvest information is confidential. An August 12 survey indicated that pink salmon escapements were good in few Unalaska Island streams that were surveyed. The sockeye salmon escapement into McLeese Lake, the major Unalaska subsistence sockeye salmon source, was estimated to be 4,400 fish, which was slightly above the goal of 4,000.

There was no commercial fishing effort or escapement information for the Atka–Amlia Island area.

South Peninsula June Fishery

The combined South Unimak–Shumagin Islands sockeye salmon guideline harvest level was approximately 2.01 million fish, based upon an 8.3% allocation of the preseason forecast of harvestable Bristol Bay sockeye salmon. Of this allocation, 1.65 million was applied to South Unimak and 363,000 to the Shumagin Islands. Based on the 1999 harvest of summer chum salmon in the Arctic–Yukon–Kuskokwim Region, the 2000 South Unimak–Shumagin Islands June chum guideline harvest level was set to a range of 350,000–400,000 chum salmon.

The June sockeye harvests were about 892,000 fish in the South Unimak fishery and 359,000 fish in the Shumagin Islands fishery. The total South Peninsula June catch of approximately 1.25 million sockeye salmon was substantially less than the combined June fishery guideline harvest level of about 2 million fish. The combined South Unimak–Shumagin Islands June fisheries harvested about 239,000 chum salmon, which was also well below the chum guideline harvest level range of 350,000–400,000 fish.

The June South Unimak–Shumagin Islands fisheries also resulted in harvests of about 3,000 chinook salmon, 360,000 pink salmon, and 300 coho salmon.

Southeastern District Mainland Fishery. Overall, approximately 300 chinook, 306,000 sockeye, 20,000 coho, 411,000 pink, and 85,000 chum salmon were harvested in the Southeastern District Mainland in 2000. These catches were less than the most recent 10-year averages for each salmon species. Both the early and late Chignik River sockeye salmon runs were weaker than expected; however, they were considered strong enough to allow a fishery. Consequently, approximately four days of fishing during June and seven days in July were permitted to target Chignik stocks in the Southeastern District Mainland prior to July 25.

The Northwest Stepovak Section is managed on the basis of local stocks beginning July 1. In 2000, the estimated final escapement into Orzinski Lake was 21,500 sockeye salmon, which slightly exceeded the upper limit of the escapement goal range of 15,000–20,000 sockeye salmon. Fishing was permitted in the Northwest Stepovak Section beginning on July 1 with a total of 14 days of fishing time during July 1–25. An additional seven days of fishing was permitted in Orzinski Bay during the July 1–25 time period.

A harvest of about 202,000 sockeye salmon was reported in Southeastern District Mainland through July 25. Of these, 103,000 fish were considered to be Chignik-bound. This constituted 5.5% of the total Chignik-bound sockeye salmon harvest through July 25 toward the 6.0% allocation. Also, of the total sockeye salmon harvest, approximately 79,000 fish were harvested in the Southeastern District Mainland in June.

South Peninsula Post-June Fishery. Including the Southeastern District Mainland harvests, the approximate South Peninsula post-June harvests in 2000 were as follows: 2,000 chinook salmon, compared to the 1990–1999 average of 3,000 fish; 655,000 sockeye salmon, compared to the 1990–1999 average of 779,000 fish; 259,000 coho salmon, compared to the 1990–1999 average of 248,000 fish; 3.2 million pink salmon, compared to the 1990–1999 average of 7.4 million fish; and 814,000 chum salmon, compared to the 1990–1999 average of 740,000 fish. Test fishing in the Shumagin Islands from July 2–4 indicated the presence of immature salmon. The number of immature fish did not exceed the Board of Fisheries mandated threshold of 100 salmon per purse seine set. Thus, the first post-June commercial salmon fishing period began on July 6 without restrictions in areas of immature abundance. For non-terminal areas, during the period July 22–31, there is a 60,000 fish cap on coho salmon harvests. During this period in 2000, approximately 56,000 coho salmon were harvested.

North Peninsula

The 2000 harvest included about 4,000 chinook, 1.97 million sockeye, 84,000 coho, 34,000 pink, and 94,000 chum salmon. The total exvessel value for the North Peninsula salmon fisheries was about $9.90 million, of which approximately 97% ($9.6 million) was attributable to sockeye salmon. In 2000, 227 permit holders, participated in commercial salmon fisheries along the North Peninsula. Thirty of these were Bristol Bay (Area T) permit holders. Fishing began on June 5. The last landing of 2000 was made on September 28. The North Peninsula is predominantly a sockeye fishery, although directed chinook, chum, and coho salmon fisheries occur in some locations. During even numbered years, pink salmon are targeted in some locations if abundance is high and market conditions are favorable.

The Ilnik River run was strong, and the June 25 cumulative weir counts of 56,900 sockeye salmon was well above the 20,000 fish threshold that is specified in the Northern District Salmon Fisheries Management Plan (5 AAC 09.369). Accordingly, a fishery was announced for eight hours beginning on

June 25. Catch reports were obtained from the fleet that indicated the sockeye salmon catch would not exceed 100,000 fish, which, according to the management plan, allowed the fishery to be extended for 8-hour intervals up to a maximum of 24 hours. Another fishery was announced to begin on June 27, following the same management strategy. The two 24-hour periods resulted in a harvest of about 100,000 sockeye salmon. The Ilnik Section remained closed to commercial salmon fishing until July 5.

For the third year in a row, the North Peninsula salmon harvest of all species combined was below the previous 10-year average. The chinook salmon harvest was the lowest since 1975, about half of the 8,000 preseason catch projection. The sockeye catch was near the preseason catch projection, and similar to the 1999 harvest of 1.8 million fish. The harvest of coho salmon was below the preseason catch projection, as was the catch of pink salmon. The chum catch was more than the catch projection.

The North Peninsula indexed total chinook escapement exceeded the lower end of the escapement goal range. The North Peninsula sockeye escapement was estimated to be 920,000 fish. Escapement goals were met or exceeded at all major sockeye salmon systems. The weired systems (Bear, Nelson, Sandy, and Ilnik) accounted for 64% of North Peninsula sockeye salmon escapement. The total North Peninsula escapement goal range is approximately 631,000–872,000 sockeye salmon. The North Peninsula indexed total chum salmon escapement was within the escapement goal range. Due to poor market conditions, there was very little fishing effort directed on chum salmon. Most of the chum harvest was incidental to fishing for other species. The North Peninsula pink salmon escapement was at least 50,000 fish. The North Peninsula is normally a minor pink salmon producer.

PRELIMINARY FORECASTS OF 2001 SALMON RUNS TO SELECTED ALASKA FISHERIES

ADF&G prepares forecasts for salmon runs that affect major fisheries around the state. Salmon runs to be forecasted are selected using several criteria, including economic importance, feasibility, compatibility with existing programs, and management needs. For the 2001 fishing year, forecast fisheries are as follows:

Southeast	—	pink salmon
Prince William Sound	—	no forecasts submitted
Copper River	—	no forecasts submitted
Copper and Bering Rivers	—	no forecasts submitted
Upper Cook Inlet	—	sockeye salmon
Lower Cook Inlet	—	pink salmon
Kodiak	—	pink salmon
Upper Station Lakes	—	sockeye salmon
Frazer Lake	—	sockeye salmon
Ayakulik River (early and late)	—	sockeye salmon
Spiridon Lake	—	sockeye salmon
Karluk Lake (early and late)	—	sockeye salmon
Chignik	—	sockeye salmon
Bristol Bay	—	sockeye salmon
Alaska Peninsula, Nelson River	—	sockeye salmon
Alaska Peninsula, Bear Lake	—	sockeye salmon

A variety of information was used to make salmon run forecasts. In most cases the principal indicator of future abundance is the escapement magnitudes of parental stocks. Other information that might have been considered includes spawning stock distribution, egg deposition, survival to intermediate life stages, environmental conditions, and historical age composition. A range of run possibilities are predicted for each forecasted fishery. In general, based on past experience, the actual run can be expected to fall within the range (between the lower and upper limits) less than half the time. Please see the appendices for further details.

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Table 1. Preliminary projections of 2001 Alaska commercial salmon harvests by fishing area and species, in thousands of fish.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Southeast Region Total	236 [a]	1,800 [a]	2,700 [a]	42,000 [b]	10,000	56,700
Prince William Sound						
Common Property	49	1,370	587	17,300	1,210	20,500
Cost Recovery	0	171	0	12,000	710	12,900
Upper Cook Inlet	14	2,700	323	250	216	3,500
Lower Cook Inlet	1	280	14	1,689	16	2,000
Bristol Bay	53	15,600	60	330	510	16,600
Central Region Total	117	20,100	980	31,600	2,660	55,500
Kodiak Area	20	2,170	350	12,000	750	15,300
Chignik	4	1,040	185	1,100	186	2,500
South Peninsula	5	2,000	200	6,000	1,000	9,200
North Peninsula	5	1,500	100	15	50	1,670
Aleutian Islands	0	0	0	0	0	0
Westward Region Total	34	6,710	800	19,100	1,990	28,700
AYK Region Total	32	90	302	1	628	1,100
Statewide Total	419	28,700	4,780	92,700	15,300	142,000

Columns and rows may not total exactly due to rounding.

[a] Average harvest for the five-year, 1996–2000, period.

[b] Midpoint of the 55–85 million predicted return minus the 32 million midpoint of the 24–40 million escapement goal.

Modified March 9, 2001

Table 2. Preliminary 2000 Alaska commercial salmon harvests, by fishing area and species, in thousands of fish.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Southeast Region Total	232 [a]	1,220	1,950	20,200	15,800	39,500
Prince William Sound	32	1,430	715	38,800	5,200	46,200
Upper Cook Inlet	7	1,330	239	149	127	1,900
Lower Cook Inlet	1	242	9	1,390	73	1,700
Bristol Bay	23	20,500	126	57	381	21,100
Central Region Total	63	23,500	1,100	40,400	5,800	70,900
Kodiak Area	12	2,910	329	9,930	1,190	14,400
Chignik	3	1,780	123	428	121	2,460
South Peninsula & Aleutians	5	1,990	257	3,840	1,060	7,150
North Peninsula	4	1,970	84	34	94	2,190
Westward Region Total	24	8,650	793	14,200	2,470	26,200
AYK Region Total	36	110	351	167	223	887
Total Alaska	360	33,500	4,190	75,000	24,300	137,000

Missing data indicate no harvest, and zeros indicate harvest activity but <1,000.
Columns may not total exactly due to rounding.

[a] Total commercial harvest of chinook salmon for the October 1, 1999 to September 30, 2000 catch accounting period.

Modified March 9, 2001

Table 3. Preliminary 2000 Alaska commercial salmon harvests, by fishing area and species, in thousands of pounds.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Southeast Region Total	3,800	7,330	13,900	69,100	149,000	243,000
Prince William Sound	674	9,320	6,690	133,000	41,900	192,000
Upper Cook Inlet	165	7,270	1,650	563	919	10,600
Lower Cook Inlet	17	1,280	73	3,510	679	5,600
Bristol Bay	359	126,000	956	208	2,620	130,000
Central Region Total	1,220	144,000	9,370	137,000	46,100	338,000
Kodiak Area	183	16,700	2,660	32,500	9,760	61,800
Chignik	35	13,700	944	1,180	1,030	16,900
South Peninsula & Aleutians	84	12,200	1,710	10,700	8,110	32,800
North Peninsula	55	11,100	641	102	661	12,600
Westward Region Total	400	53,700	5,960	44,500	19,600	124,000
AYK Region Total	578	750	2,420	370	1,840	5,960
Total Alaska	6,000	206,000	31,700	251,000	217,000	712,000

Missing data indicate no harvest, and zeros indicate harvest activity but <1,000.

Columns may not total exactly due to rounding.

Modified March 9, 2001

Table 4. Preliminary 2000 Southeast Region commercial salmon harvests, by fishing area and species, in thousands of fish.

Fishing Area	Species					
	Chinook	Sockeye	Coho	Pink	Chum	Total
Tree Point Gillnet	1	94	18	421	199	730
Prince of Wales Island Gillnet	1	90	96	157	200	540
Stikine River Gillnet	2	16	5	9	40	70
Seine - Southern Districts	1	414	143	10,800	1,900	13,260
Southern S.E. Alaska Total	5	613	263	11,400	2,300	14,600
Taku-Snettisham Gillnet	1	166	7	55	667	900
Lynn Canal Gillnet	0	96	35	17	504	650
Yakutat Setnet	2	99	171	64	1	340
Seine - Northern Districts	0	65	59	6,840	1,650	8,610
Northern S.E. Alaska Total	4	426	273	7,000	2,820	10,500
Winter Troll [a]	36	0	0	0	0	40
Experimental Troll	21	1	1	4	77	100
Hatchery Terminal Area Troll	8	0	0	0	2	10
Summer Troll	94	4	1,120	183	399	1,800
Troll Fishery Harvest Total	159	4	1,120	187	478	1,900
Hatchery Terminal Area Gillnet	8	31	5	17	946	1,010
Hatchery Terminal Area Seine	19	10	4	493	4,740	5,270
Hatchery Cost Recovery	32	107	265	268	4,360	5,030
Annette Island	5	23	18	918	165	1,130
S.E. Alaska - Other Total	64	172	292	1,700	10,200	12,400
Southeast Region Total	232	1,220	1,950	20,200	15,800	39,500

[a] Includes salmon caught by troll gear from October 11, 1999 through April 14, 2000.

Columns may not total exactly due to rounding.

Modified March 2, 2001

Table 5. Preliminary 2000 Central Region commercial salmon harvests, by fishing area and species, in thousands of fish.

Fishing Area	Species					
	Chinook	Sockeye	Coho	Pink	Chum	Total
Purse Seine						
Eastern	0	2	187	9,820	240	10,200
Northern	0	4	3	4,070	10	4,090
Coghill	0	3	32	3,270	1	3,310
Northwestern	0	2	0	17	1	20
Southwestern [b]	0	24	42	9,300	429	9,800
Montague [a]	0	0	0	88	992	1,080
Southeastern	0	0	1	550	72	623
Unakwik	0	0	0	20	0	20
Drift Gillnet						
Bering River [b]	0	1	56	0	0	57
Copper River [a, b]	31	880	305	10	5	1,230
Unakwik	0	1	0	0	0	1
Coghill	0	176	83	88	1,644	1,990
Eshamy	1	235	5	375	27	643
Set Gillnet						
Eshamy	0	101	1	139	12	253
Hatchery [c]	0	0	0	11,100	1,730	12,800
Misc. PWS [d]	0	0	0	0	0	0
Prince William Sound Total	32	1,430	715	38,800	5,200	46,200
Southern District	1	124	1	1,070	5	1,200
Kamishak District	0	32	0	6	66	104
Outer District	0	22	0	307	0	329
Eastern District	0	64	8	4	2	78
Lower Cook Inlet Total	1	242	9	1,390	73	1,710
Central District	5	1,282	170	129	122	1,708
Northern District	2	45	69	20	4	140
Upper Cook Inlet Total	7	1,330	239	149	126	1,850
Bristol Bay Total	23	20,500	126	57	381	21,100
Central Region Total	60	23,500	1,090	40,400	5,780	70,900

[a] Totals include discarded sockeye, coho, pink and chum salmon.

[b] Does not include salmon taken for home use as reported on fish tickets.

[c] Hatchery sales for operating expenses. Includes meal production/roe salvage sales, processor discards. Excludes post egg-take roe sales at hatcheries.

[d] Some of these fish were donations landed by Coghill District and Copper River District drift gillnet permit holders.

Missing data indicates no harvest and zeros indicate harvest activity but <1,000.

Columns may not total exactly due to rounding

Modified March 3, 2001

Table 6. Preliminary 2000 Westward Region commercial salmon harvests, by fishing area and species, in thousands of fish.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Kodiak	12	2,910	329	9,930	1,190	14,400
Chignik	3	1,780	123	428	121	2,460
South Peninsula and Aleutian Islands	5	1,990	257	3,810	1,060	7,120
North Peninsula	4	1,970	84	34	94	2,190
Alaska Peninsula Total	9	3,960	341	3,840	1,150	9,310
Westward Region Total	24	8,650	793	14,200	2,460	26,200

Missing data indicates no harvest and zeros indicate harvest activity but <1,000.
Columns may not total exactly due to rounding

Modified March 7, 2001

Table 7. Preliminary 2000 Arctic–Yukon–Kuskokwim Region commercial salmon harvests, by fishing area and species, in thousands of fish.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Kuskokwim River	0	4	261	0	12	278
Kuskokwim Bay	26	106	46	0	38	216
Kuskokwim Area Total	26	110	307	0	50	493
Lower Yukon River	9				7	15
Upper Yukon River [a]						0
Yukon River Total [a]	9	0	0	0	7	15
Norton Sound	1	0	44	167	6	218
Kotzebue Area	0				160	160
AYK Region Total	36	110	351	167	223	886

[a] The Upper Yukon River catch includes the estimated harvest to produce roe sold.

Missing data indicates no harvest and zeros indicate harvest activity but <1,000.

Columns and rows may not total exactly due to rounding

Modified January 2, 2001

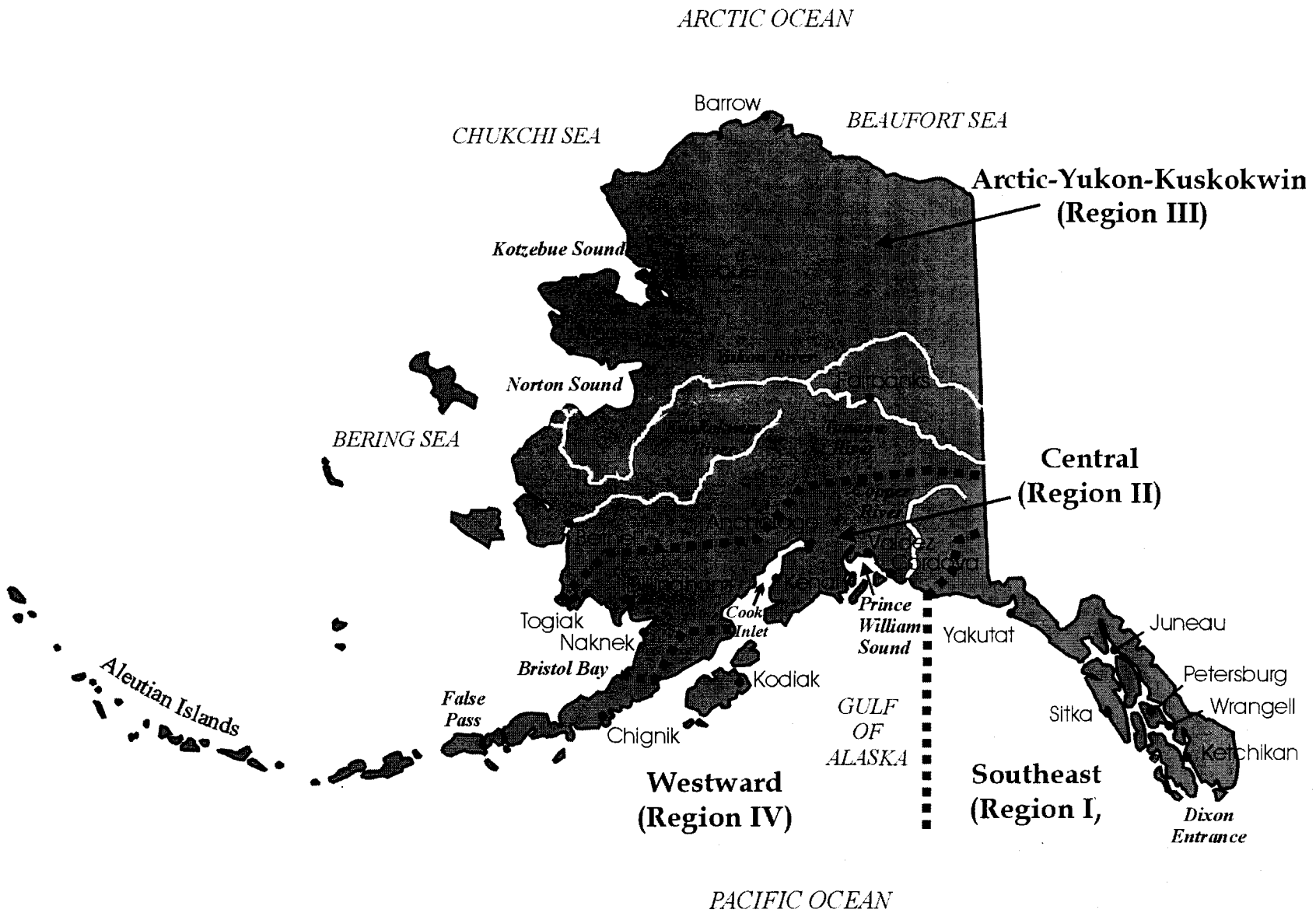

Figure 1. The four fishery management regions (Southeast, Central, Arctic–Yukon–Kuskokwim, and Westward) of the Alaska Department of Fish and Game, Division of Commercial Fisheries.

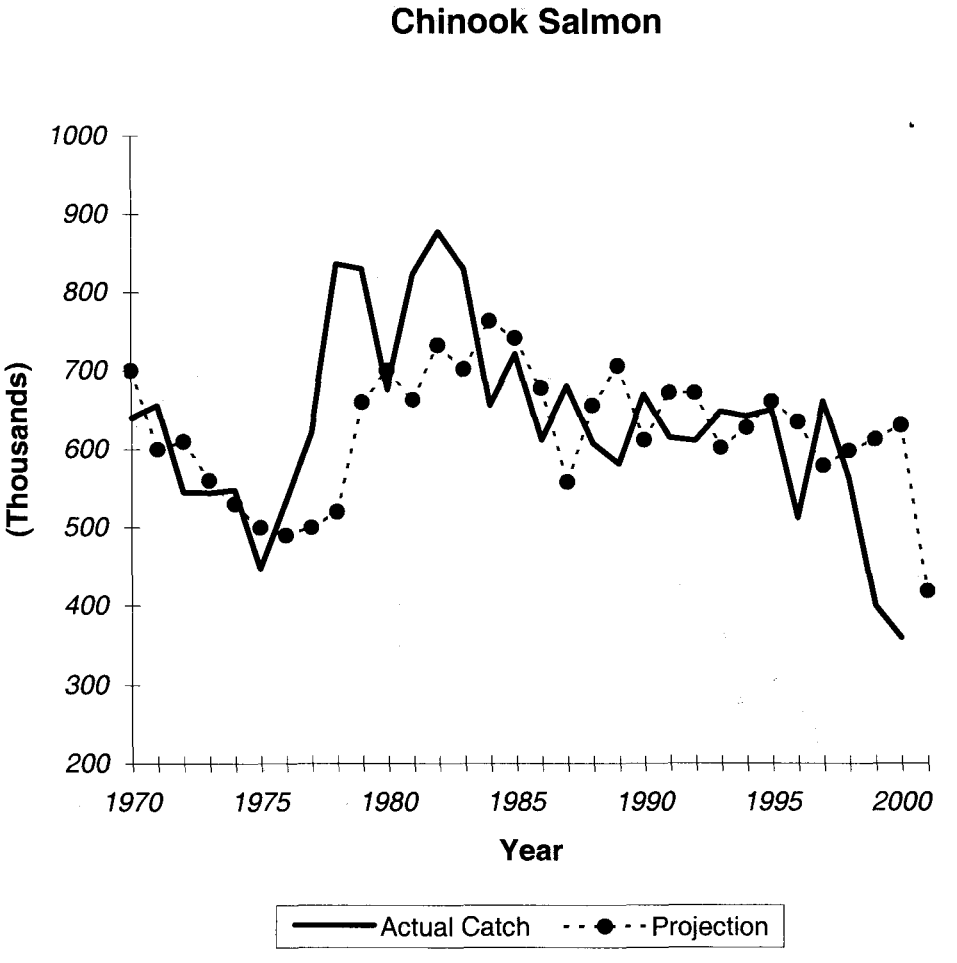

Figure 2. Relationship between actual catch (thousands) and projected catch (thousands) for Alaska chinook salmon fisheries from 1970–2000, with the 2001 projection.

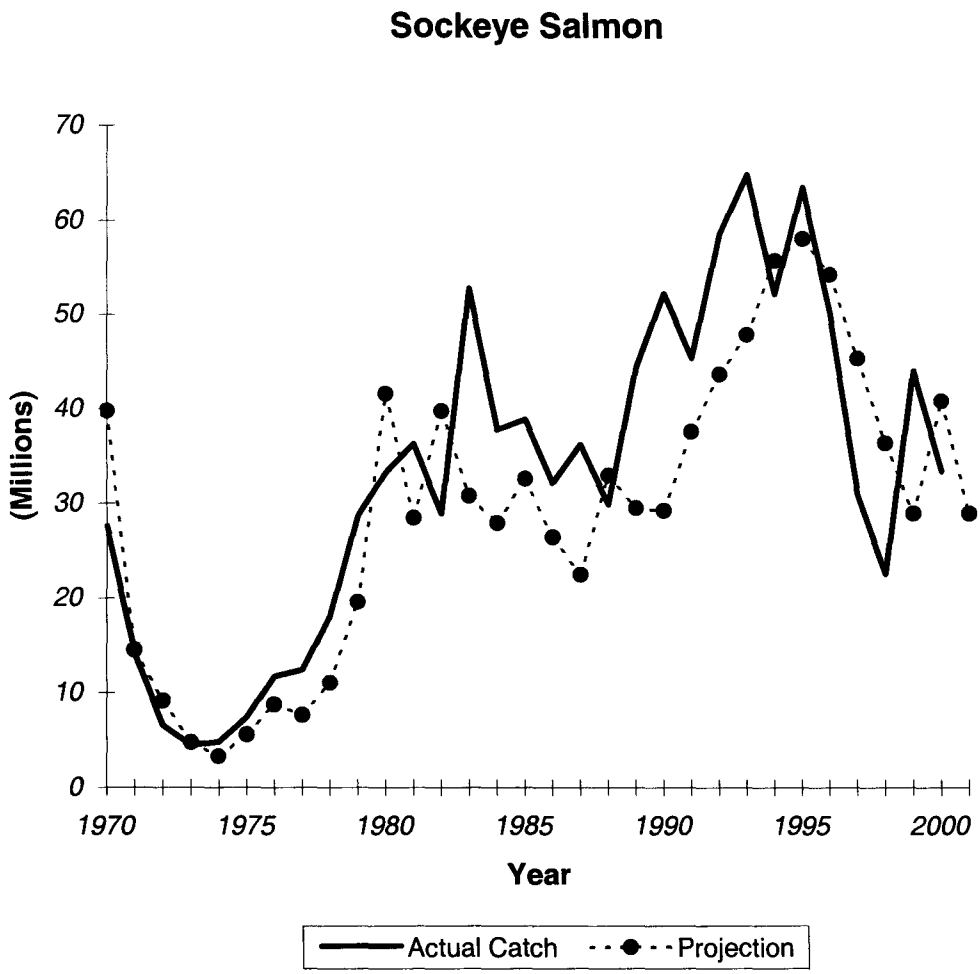

Figure 3. Relationship between actual catch (millions) and projected catch (millions) for Alaska sockeye salmon fisheries from from 1970–2000, with the 2001 projection.

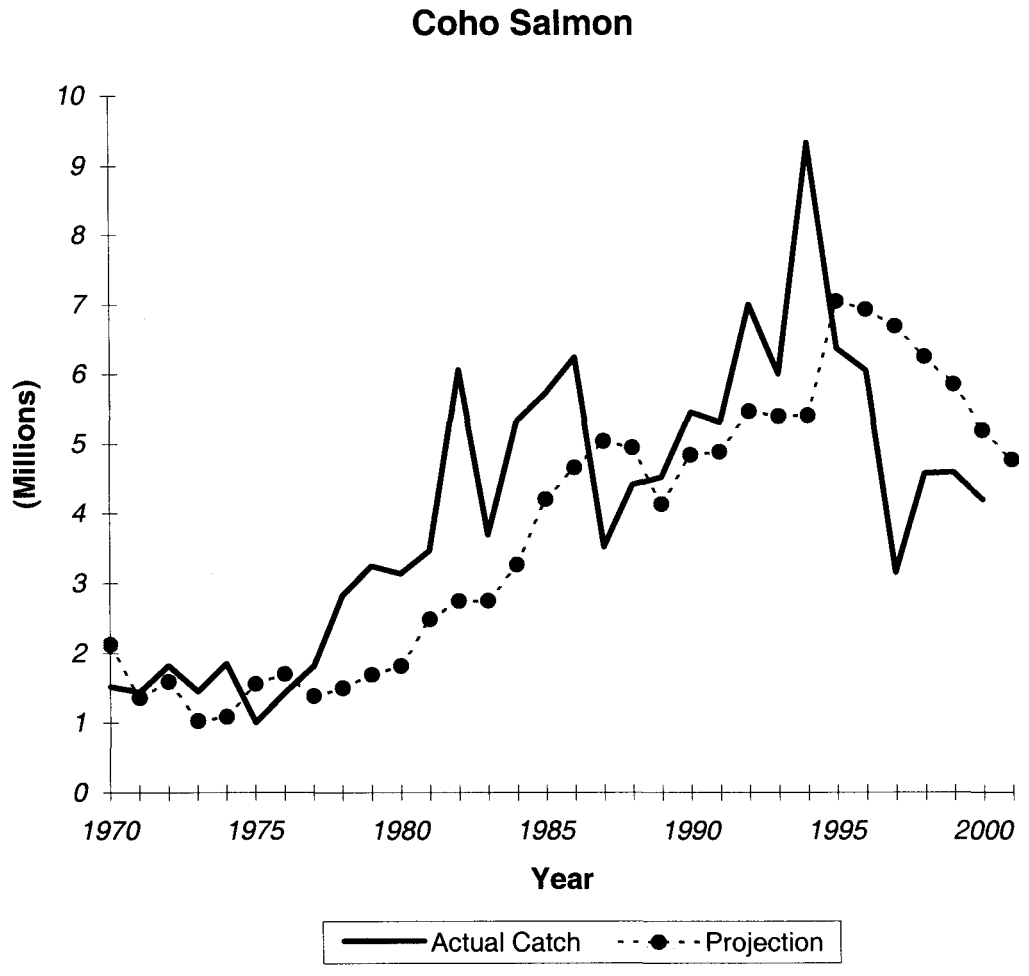

Figure 4. Relationship between actual catch (millions) and projected catch (millions) for Alaska coho salmon fisheries from 1970–2000, with the 2001 projection.

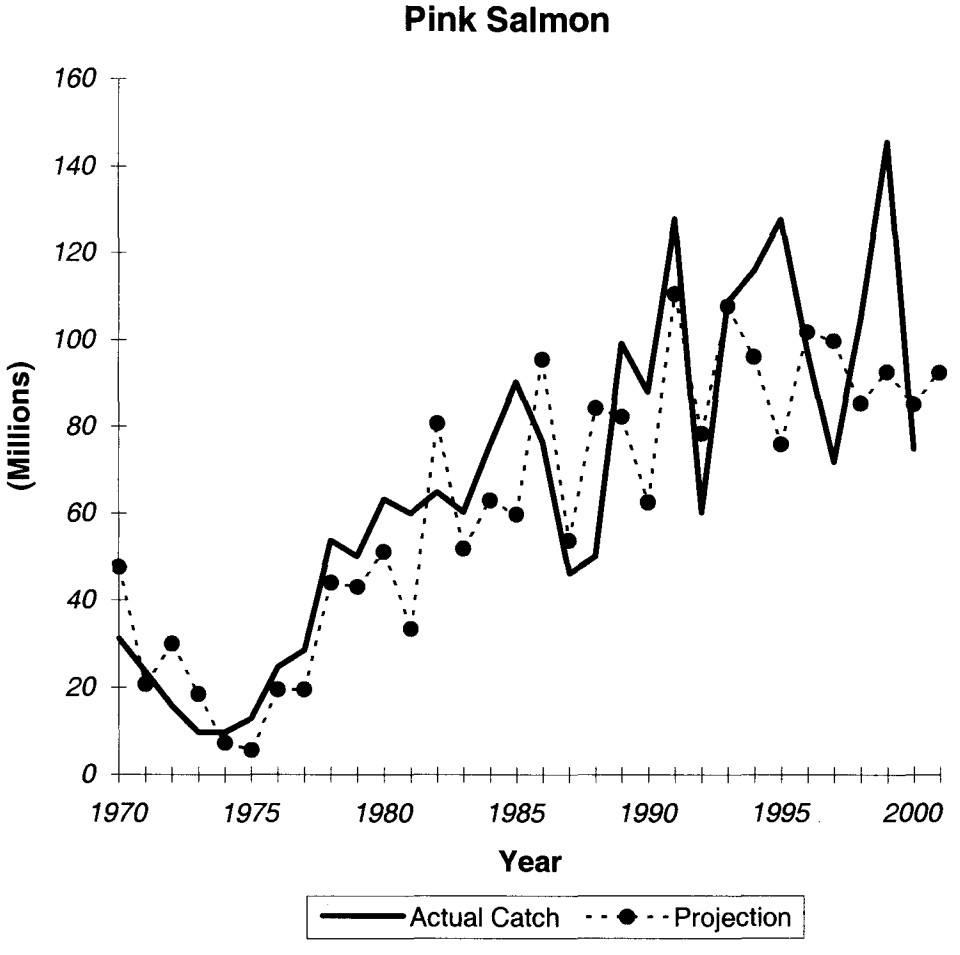

Figure 5. Relationship between actual catch (millions) and projected catch (millions) for Alaska pink salmon fisheries from 1970–2000, with the 2001 projection.

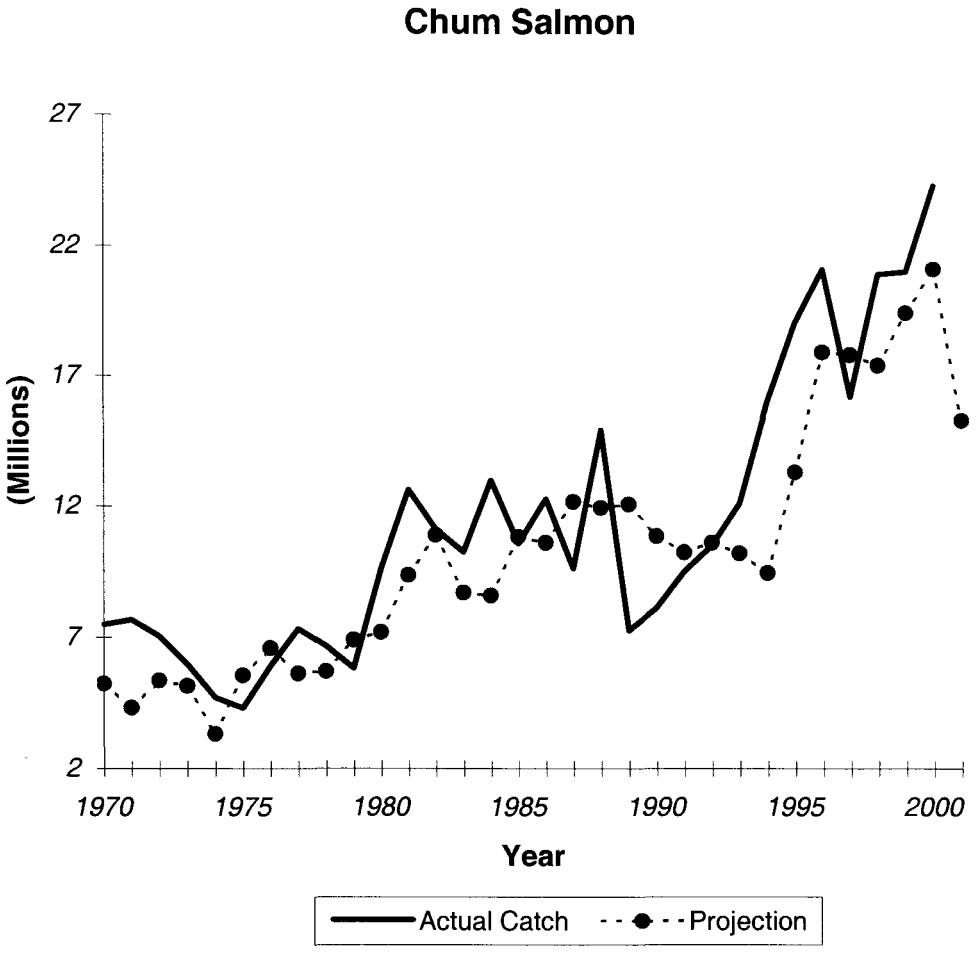

Figure 6. Relationship between actual catch (millions) and projected catch (millions) for Alaska chum salmon fisheries from 1970–2000, with the 2001 projection.

Appendix

FORECAST AREA: **Southeast Alaska**
SPECIES: **Pink Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (millions)	Forecast Range (millions)
NATURAL PRODUCTION:		
Natural Run	69.5	55–85
Escapement Goal	27.5	24–40
Common Property Harvest	42.0	34–50
HATCHERY AND SUPPLEMENTAL PRODUCTION:		
Hatchery Run	0.05	0.035–0.065
Broodstock Needs	0.05	
Supplemental Escapement	0	
Common Property Harvest	0	0–0
TOTAL PRODUCTION:		
Run Estimate	69.5	55–85
Natural Escapement Goal	27.5	
Broodstock Needs	0.05	
Supplemental Escapement	0	
Common Property Harvest	42	34–50

Forecast Methods

The preseason prediction of the total return of pink salmon to Southeast Alaska in 2001 is based on a subjective combination of multiple regression analysis, using 40 years of escapement and return (catch + escapement) data, winter air temperature data, and expert opinion. Predicted returns are then categorized into%iles based on Southeast Alaska's pink salmon return during the 1962 through 2000 time period.

These categories are:

Category	Range	Percentile
Disaster	Less than 18 million	Less than 20^{th}
Weak	18 to 34 million	21^{st} to 40^{th}
Average	34 to 55 million	41^{st} to 60^{th}
Strong	55 to 84 million	61^{st} to 80^{th}
Excellent	More than 84 million	Greater than 80^{th}

Forecast Discussion

A 55 to 85 million pink salmon run is expected for Southeast Alaska in 2001. If realized, a run of this size would be considered strong and in the upper range of returns in the past 38 years.

We considered the spawner-recruit, winter incubation temperatures, and anecdotal spring fry observations to be the most important indicators making this forecast. These three sources suggest an overall strong but possibly sporadic return for the region. The 1999 parent year for this return was the highest ever recorded for the region. The spawner-recruit model demonstrates over-escapement in certain stock group areas, thus estimating poor returns, while other stock group areas have unprecedented returns thus estimating returns over twice as high as previously observed. Winter temperatures were slightly above average for the region and should not have any detrimental effect on the incubation period. Anecdotal early marine fry observations varied from the highest ever seen in some areas to extremely low in others that would cause the sporadic returns in stock group areas from excellent to very weak. Regardless of modeling, the results demonstrate that as we venture into high escapements, the range of returns actually increase on a magnitudinal scale. Any detrimental effect that happens during any part of the life cycle can cause catastrophic declines in the adult return similar to those observed in 1987 and 1988. Contrary to this, if all life cycle phases encounter optimum conditions we could see monumental returns never before observed, even higher than observed in 1999.

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SSE Salmon Research Program Manager/
Pink and Chum Research Biologist
Ketchikan

FORECAST AREA: **Prince William Sound**

No forecasts were submitted for Prince William Sound.

FORECAST AREA: **Upper Cook Inlet**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (millions)	Forecast Range (millions)
NATURAL PRODUCTION:		
Total Run	4.2	0.7–7.7
Escapement Goal		1.5
Harvest Estimate		2.7

Forecast Methods

The major sockeye salmon systems in Upper Cook Inlet (UCI) are the Kenai, Kasilof, Susitna and Crescent Rivers, and Fish Creek. Spawner, sibling, and fry data, if available, were examined for each system. Forecasts for all systems and age classes, except Kenai age-1.3 sockeye salmon, were made from two models: one using the relationship between adult returns and spawners and the other the relationship between adult return and siblings. In most cases, sibling relationships were used. The return of age-1.3 sockeye salmon to Kenai River in 2001 was forecast using the mean return predicted by both a sibling model and a fry model. The sibling-model prediction was based on the return of age-1.2 sockeye salmon to Kenai River in 2000. The fry-model prediction was based on a relationship between adult returns and fall fry abundance measured in Kenai and Skilak lakes. An approximate 80% confidence interval for the total forecasted run was calculated using the squared deviations between past forecasts and actual runs as the forecast variance (mean square error).

Forecast Discussion

The total run to UCI in 2000 was 2.9 million sockeye salmon, while the preseason forecast was 4.5 million. The Kenai River sockeye salmon return of 1.4 million fish was approximately 1 million fish weaker than forecast due to weak returns of all age classes. The Kasilof River sockeye salmon return was estimated at 577 thousand fish, as contrasted with the preseason forecast of 786 thousand. The Susitna River return was 58 thousand fish less than the forecast of 482 thousand sockeye salmon. The sockeye salmon return to Crescent River was only 9 thousand fish less than the forecast of 99 thousand. The sockeye return to Fish Creek and minor systems was estimated at 339 thousand compared to a forecast of 672 thousand.

There is great uncertainty associated with the forecast of age-1.3 sockeye salmon returning to the Kenai River. The sibling model predicted a return of 980 thousand age-1.3 sockeye salmon, but the fry model predicted a return of 2.5 million age-1.3 sockeye salmon. Since we have no way to determine which data set will provide a more accurate prediction, we used the average of these two estimates (1.74 million) for the 2001 forecast. If the lower estimate is correct, the harvest will be reduced by 760 thousand sockeye salmon. Conversely, if the higher estimate is correct, the harvest will be increased by 760 thousand sockeye salmon. If realized, the forecast sockeye salmon return would be the fifth largest run to UCI over the past 10 years.

Forecast runs to individual freshwater systems are as follows:

System	Run	Inriver Goal
Crescent River	63,000	25,000–50,000
Fish Creek	20,000	50,000
Kasilof River	688,000	150,000–250,000
Kenai River	2,438,000	750,000–950,000
Susitna River	425,000	200,000
Minor System	545,000	N/A

Mark Willette
Research Project Leader

FORECAST AREA: **Lower Cook Inlet**
SPECIES: **Pink Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
NATURAL PRODUCTION:		
Total Run	321	94–1,151
Escapement	287	94–478
Commercial Harvest	35	0–673
SUPPLEMENTAL PRODUCTION:		
Total Run	1,860	949–2,837
Broodstock	205	203–207
Commercial Harvest	1,655	746–2,630
TOTAL AREA PRODUCTION:		
Total Run	2,181	1,043–3,988
Broodstock and Escapement	492	297–685
Commercial Harvest	1,690	746–3,303

Notes:
All values are rounded to the nearest thousand fish.
Escapement values include an escapement goal shortfall of 96 thousand fish for systems with a forecast in 2001.
Commercial Harvest = Total Run – Escapement/Broodstock.
Commercial harvests of supplemental production include both common property and cost recovery harvests.
Additional harvests may be expected in systems not included within the forecast.

Forecast Methods

The forecast of wild pink salmon returns to 11 harvest areas in the Lower Cook Inlet Management area was based on log-log regression of total return on spawner escapement from 33 to 40 years of observations. An 80% confidence range about the forecast of natural production was developed using cross-validation methods. Projected harvest from natural production was obtained by subtracting the escapement goal from the forecasted run for each of our 11 index areas and then summing the resulting values. Forecasts of supplemental production by the Tutka and Port Graham hatcheries was based on odd-year marine survival rates of 2.8 and 3.2%, respectively (personal communication, G. Fandrei, Cook Inlet Aquaculture Association, and P. McCollum, Port Graham Hatchery). Projected harvest from supplemental production was obtained by subtracting broodstock goals from the supplemental production forecast.

Forecast Discussion

The natural production forecast model was tested using cross-validation methods. The model correctly predicted 34 out of 39 changes in direction of annual run size. Accordingly, we have some confidence

that the 2001 total return will break the cycle of more fish returning in odd numbered years. Last year, we correctly predicted that 2000 would be the first even year since 1986 to realize a greater return than adjacent odd numbered years. However, we are sometimes less successful in correctly predicting the actual size of individual runs. Although forecasts have usually fallen within the 80% confidence interval, in 1999, the last odd numbered year, only 4 of the 11 systems for which a forecast was made had runs within the forecast range. The poor forecast performance in 1999 was due to extremely low returns per spawner for our index streams, none of which made their escapement goals. Consequently, only four of our 11 index areas are expected to provide a harvestable surplus next year. The 2001 forecast for natural production of 321 thousand pink salmon has an 80% confidence interval of 94.5 thousand to 1.15 million pink salmon. Given very poor parent year escapement and the recent trend towards lower return per spawner ratios, the lower end of this range appears more probable than the point estimate. If realized, a natural run of 321 thousand pink salmon would be 22% below the median run size of 412 thousand fish for even years between 1960 and 2000. The pink salmon escapement goal is 383 thousand for systems with a forecast, but a combined escapement shortfall of 95.8 thousand fish is expected. The resulting escapement forecast is 287 thousand pink salmon.

No harvest of naturally produced pink salmon is expected in the Southern District. The 1999 escapements to each of the three index streams in this district, Humpy Creek and Seldovia and Port Graham rivers, were well below their escapement goals. Supplemental production of pink salmon in the Southern District has contributed from 24% to 90% of the total lower Cook Inlet commercial harvest in recent years. The Tutka Hatchery released 65.1 million fry in 2000. Assuming an average odd-year ocean survival rate of 2.8%, about 1.82 million pink salmon are expected to return to Tutka Bay and Lagoon in 2001 (personal communication, G. Fandrei, Cook Inlet Aquaculture Association). The Port Graham Hatchery released 1.14 million fry in 2000. Assuming a marine survival rate of 3.2%, about 36.6 thousand pink salmon are expected to return to Port Graham Bay in 2001 (personal communication, P. McCollum, Port Graham Hatchery). All of the supplemental return of pink salmon to Port Graham Bay in 2001 will be used for broodstock. Because cost recovery requirements are dependent upon inseason fish prices, the allocation of Tutka Hatchery's supplemental production salmon returns between common property and cost recovery fisheries cannot be determined at this time.

In the Outer District, harvests are projected to be 7.3 thousand pink salmon in Port Dick and 7.1 thousand in Port Chatham. No harvest is anticipated from Nuka Island, Windy Bay, or Rocky Bay. If realized, the Port Dick harvest would be the highest in an odd year since 1993.

In the Eastern District, a harvestable surplus of 19.3 thousand pink salmon is projected for Resurrection Bay. This would be the largest odd-year harvest in the Eastern District since 1985. However, commercial fishing specifically directed at pink salmon has not been allowed in that area in recent years due to potential conflicts with the Resurrection Bay Salmon Management Plan (RBSMP), which limits commercial interference with the sport coho salmon fishery.

In the Kamishak Bay District, a harvestable surplus of 1.0 thousand fish is projected in Ursus and Rocky Coves. If realized, it would be the first pink salmon harvest from this index area since 1995. Low market value and generally low returns have limited the incentive to harvest pink salmon in the Kamishak District in recent years.

Edward O. Otis
LCI Research Biologist
Homer

Lee F. Hammarstrom
Area Finfish Management Biologist
Homer

FORECAST AREA: **Kodiak**
SPECIES: **Pink Salmon**

Preliminary Forecast of the 2001 Run	Harvest Forecast (millions)
Wild Stock Production: **AVERAGE**	6–10
Kitoi Bay Hatchery Production:	3–5
Wild Stock Production by District:	
Afognak	0.5–0.8
Westside	2.4–3.3
Alitak	1.3–2.8
Eastside	1.3–2.4
Mainland	0.5–0.7

Forecast Methods

Previous forecasts for Kodiak Management Area (KMA) wild pink salmon production utilized preemergent fry overwinter survival data in regression analysis. Budget reductions eliminated preemergent fry sampling. Regional climatic and environmental factors were reviewed in 1998, however no consistent relationship to pink salmon returns was found. As a consequence, the preseason prediction for the 2001 total return of wild stock pink salmon to the KMA was made by qualitative methods, using spawner-recruit models and environmental conditions.

The 2001 wild pink salmon forecast was based on selecting one of five different harvest magnitude categories. Categories were delimited by melding harvest quintiles with forecast categories used by management biologists to determine initial fishing periods.

Harvest Category	Range (millions)
Very Weak	Less than 3
Weak	3 to 6
Average	6 to 10
Strong	10 to 14
Excellent	Greater than 14

Category selection was made considering the following:

1. 1999 and 2000 climatological data for the spawning period, the egg to fry overwinter period, the fry outmigration and nearshore period, and the early-ocean growth period for pink salmon.
2. The total 1999 brood year escapement index for the KMA and individual fishing districts, compared to past escapements, subsequent returns, escapement and harvest averages, and recent production trends.
3. Ricker spawner-recruit models based on 1967–1999 escapements versus return and harvest.

The Kitoi Bay Hatchery pink salmon forecast was developed using survival rates from the 1979–1999 odd-numbered brood years. Range estimates were calculated by using the average survival rate of the three lowest and three highest odd-year returns, after removal of outliers. That range was further narrowed based on qualitative assessment of condition of the fry upon release.

Forecast Discussion

Based on a qualitative evaluation, the 2001 wild stock pink salmon harvest should be AVERAGE, or 6 to 10 million pink salmon. The expected harvest from the Kitoi Bay Hatchery should be at or above the midpoint projection (approximately 4 million pink salmon). Combined, hatchery and wild pink salmon harvest should be STRONG, or 10 to 14 million pink salmon.

Environmental conditions were, on the whole, average for the winter of 1999/2000. The mean daily temperatures during December and January were slightly below average. However, the average snow-pack for December and January was above average. It is unlikely that temperatures caused significant mortality for those months. For the remainder of the winter and spring months, both temperature and precipitation were near average. Nearshore ocean temperatures, as noted by the ADF&G during the April 2000 Kodiak herring fishery, were colder than normal, and herring spawning was delayed. The Kitoi Bay Hatchery manager reported that plankton production near the hatchery was less than in past years. The month of May was very sunny, and fishermen reported that ocean temperatures rose to greater than normal levels from June through September. Overall, no unusual climatological events were documented that might have caused substantial mortality of early-stage pink salmon.

KMA wild stock pink salmon production has been STRONG to EXCELLENT, but this trend may not continue. The 1990–1999 average return (17.6 million) was almost twice that of the 1970–1979 average (9.1 million). In 1999 (the parent or brood year for the 2001 return), wild pink salmon production was much reduced (11.9 million) compared to previous years. Also, KMA pink salmon exhibit odd- versus even-numbered year dominance. From 1948 to 1988 KMA pink salmon were considered even-year dominant, with even-year runs larger than odd-year runs. Beginning in 1989, odd-year pink salmon production surpassed even-year. In fact, the 1993 and 1995 pink salmon runs each set new records (26.2 and 48.8 million, respectively). KMA wild pink salmon production in 1999 was the lowest odd-year run since 1987.

The 1999 KMA pink salmon escapement was 4.1 million fish. This exceeded the odd-year escapement goal (1.0 to 3.0 million) and the 1967–1999 odd-year average escapement (3.7 million). The 1999 pink salmon escapement was lower than the average of the previous five odd years (1989–1997; 7.4 million) and the average of the previous ten odd years (1979–1997; 5.1 million).

Several Ricker spawner-recruit models were constructed, based on data from 1967–1999 all or odd-year escapements to total return or harvest. All produced similar estimates and, after accounting for escapement requirements, yielded harvest projections in the AVERAGE or STRONG category. Somewhat lower, but similar, results were found when summing predictions for each KMA fishing district.

The KMA is divided into geographic fishing districts, and the forecast was divided as follows:

AFOGNAK: Afognak systems are typically even-year dominant. The relationship between escapement and return is not very strong for this district. Brood year escapement (492 thousand) was just slightly lower than the average of the previous five odd years (1989–1997; 519 thousand), but greater than the average of the previous ten odd years (1979–1997; 411 thousand). The Afognak

District typically accounts for approximately 8% of the overall KMA harvest. The 2001 projected harvest range is 0.5 to 0.8 million pink salmon.

AFOGNAK SUPPLEMENTAL: Approximately 138 million fed fry were released from the Kitoi Bay Hatchery, with the average fry size larger than in past years. Hatchery personnel noted poor plankton production but timed the release to be similar with past years. Traditional forecast methods result in a wide harvest range (1 to 7 million pink salmon). However, the Kitoi Bay Hatchery manager anticipates a strong harvest, based on recent odd-year survivals and good condition of fry upon release. He felt that the harvest forecast range should be narrower (3 to 5 million pink salmon) with the estimated harvest at or above the midpoint (4 million pink salmon).

WESTSIDE (Southwest and Northwest Kodiak Districts combined): Westside systems are typically even-year dominant. The relationship between escapement and return has been good for this district. Brood year escapement (778 thousand) was well below the average of the previous five odd years (1989–1997; 2.0 million) and the average of the previous ten odd years (1979–1997; 1.3 million). The Westside typically accounts for approximately 43% of the overall KMA harvest, but it is expected to be less in 2001. The projected harvest range is 2.4 to 3.3 million pink salmon.

ALITAK: Major pink salmon systems in the Alitak Bay District are odd-year dominant, and 1999 escapements into some of the major systems were very good. Again, a fairly good relationship exists between escapement and return for this district. Brood year escapement (965 thousand) was below the average of the previous five odd years (1989–1997; 1.7 million) and the average of the previous ten odd years (1979–1997; 1.1 million). The Alitak Bay District typically accounts for approximately 18% of the overall KMA harvest, and is expected to produce somewhat more in 2001. The projected harvest range is 1.3 to 2.8 million pink salmon.

EASTSIDE (Eastside and Northeast Kodiak Districts combined): Major pink salmon systems in these districts are even-year dominant. The relationship between escapement and return is not very strong for this district. Brood year escapement (1.2 million) was just below the average of the previous five odd years (1989–1997; 1.7 million) and the average of the previous ten odd years (1979–1997; 1.3 million). Escapements were good in the southern portion, but fairly weak in Kiliuda and Ugak Bay systems. The Eastside typically accounts for approximately 26% of the overall KMA harvest. The projected harvest range is 1.3 to 2.4 million pink salmon.

MAINLAND: Some Mainland District pink salmon systems are even-year dominant, but most do not show either even or odd year dominance. The relationship between escapement and return is poor for this district. Brood year escapement (621 thousand) was just below the average of the previous five odd years (1989–1997; 1.4 million) and the average of the previous ten odd years (1979–1997; 948 thousand). However, the number of escapement surveys was limited by weather and budget constraints. The Mainland District typically accounts for approximately 5% of the overall KMA harvest. The projected harvest range is 0.5 to 0.7 million pink salmon.

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Finfish Research	Assistant Area	Area Management	Kitoi Bay
Biologist	Management Biologist	Biologist	Hatchery Manager
Kodiak	Kodiak	Kodiak	Kodiak

FORECAST AREA: **Kodiak, Upper Station (Early Run)**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	111	63–159
Escapement Goal	50	25–75
Harvest Estimate	61	

Forecast Methods

The 2001 Upper Station early-run forecast was prepared primarily by investigating simple linear regression models employing recent brood year (1981–1996) sibling relationships for five major age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were considered and applied where appropriate. Age classes 1.2, 1.3, and 2.3 were predicted from 1.1, 1.2, and 2.2, respectively. Similar to the 2000 forecast, the age-0.3 and 2.2 sibling relationships were not significant (P value ≥ 0.25); therefore, the median return was used as the forecast estimate. Minor age classes (ages-0.1, 0.2, 1.1, 2.1, 0.4, 3.1, 1.4, 3.2, 3.3, and 2.4) were estimated by summing individual age class estimates by run year and taking the median (1987–2000). The variances for the median forecasts were calculated assuming the distribution of the mean. The total run forecast was calculated by summing individual age class estimates along with the estimate for the minor age classes. The variances associated with individual and pooled age classes were summed to calculate 80% prediction intervals.

Forecast Discussion

The 2001 forecast is approximately 4 thousand fish less than the 2000 forecast (115 thousand) and about 19 thousand fish less than the actual 2000 run of 130 thousand fish. The 2000 run fell within 80% prediction intervals of the forecast and individual age class predictions were fair; therefore, our confidence in this forecast is fair. The 2001 run should be composed of approximately 19% four-year-old fish and 63% five-year-old fish. If this run is realized it will be slightly less than the recent 10-year average run of 122 thousand fish.

The biological escapement goal (BEG) range is 50–75 thousand; however, the Alaska Board of Fisheries has adopted 25 thousand as a sustainable yield goal within the Alitak Bay District Management Plan. The projected harvest of 61 thousand fish is based on achievement of the midpoint of the escapement goal range of 25–75 thousand (the lower bound of the BEG). Similar to the 2000 run, the major age classes in the 2001 run should be 2.2 (42%) and 1.3 (20%).

Nick Sagalkin
Finfish Research Biologist
Kodiak

FORECAST AREA: **Kodiak, Upper Station (Late Run)**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	378	65–692
Escapement Goal	175	150–200
Harvest Estimate	203	

Forecast Methods

The 2001 Upper Station late-run forecast was prepared primarily by investigating simple linear regression models employing recent brood year (1981–1996) sibling relationships for six major age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were considered and applied where appropriate. Age-2.2 fish were forecasted from age-1.2 fish (similar to the 1999 and 2000 forecast), and age-1.3 fish were also predicted from age-1.2 siblings. Age-0.2, 1.2, and 2.3 sibling relationships were not significant (P value ≥ 0.25); therefore, the median return was used as the forecast estimate. In previous years age-0.3 fish were forecasted from age-0.2 fish; however, this year the number of age-0.2 fish was lower than previously observed. Thus, the forecast estimate for age-0.3 fish was based upon the lowest previously observed age-0.3 return. The variance of this estimate was solved from the coefficient of variation and assuming similar relative error. Minor age classes (ages 0.1, 1.1, 2.1, 3.1, 0.4, 1.4, 3.2, 3.3, and 2.4) were estimated by summing individual age class estimates by run year and taking the median (1987–2000). The variances for the median forecasts were calculated assuming the distribution of the mean. The total run forecast was calculated by summing individual age class estimates. The variances associated with individual and pooled minor age classes were summed to calculate 80% prediction intervals.

Forecast Discussion

The 2001 forecast is about 163 thousand fish less than the 2000 forecast (541 thousand) and about 65 thousand fish greater than the actual 2000 run of 313 thousand fish. Individual age class predictions were fair to poor; therefore, our confidence in this forecast is poor. The 2001 run should be composed of approximately 20% four-year-old fish and 57% five-year-old fish. If this run is realized it will be below the recent 10-year average run of 533 thousand fish.

The projected harvest of 203 thousand fish is based on achievement of the lower bound of the escapement goal range of 150–200 thousand. The major age classes in the run should be 2.2 (48%) and 1.2 (20%).

Nick Sagalkin
Finfish Research Biologist
Kodiak

FORECAST AREA: **Kodiak, Frazer Lake (Dog Salmon River)**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	500	218–782
Escapement Goal	140	140–200
Harvest Estimate	360	

Forecast Methods

The 2001 Frazer Lake (Dog Salmon River) forecast was prepared primarily by investigating simple linear regression models employing recent brood year (1981–1996) sibling relationships for five major age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were considered and applied where appropriate. Ages 1.3, 2.2, 2.3, and 3.2 were predicted from age-1.2, 2.1, 2.2, and 3.1 siblings, respectively. The age-1.2 versus age-1.1 sibling relationship was not significant (P value ≥ 0.25); therefore, the median return was used as the forecast estimate. Minor age classes (ages-0.2, 1.1, 0.3, 2.1, 3.1, 1.4, 2.4, and 3.3) were estimated by summing individual age class estimates by run year and taking the median (1987–2000). The variances for all of the median forecasts were calculated assuming the distribution of the mean. The total run forecast was calculated by summing individual age class estimates along with the estimate for the minor age classes. The variances associated with individual and pooled age classes were summed to calculate 80% prediction intervals.

Forecast Discussion

The 2001 forecast is about 53 thousand fish greater than the 2000 forecast (447 thousand) and about 131 thousand fish greater than the actual 2000 run of 369 thousand fish. While the 2000 run fell within the 80% prediction interval of the forecast, the estimated run was considerably lower than the point estimate, and individual age class predictions were fair to poor; therefore, our confidence in this forecast is fair. The 2001 forecast is influenced by the forecast of the dominant age class, age 2.2. This age class forecast is based upon the age-2.1 sibling relationship; however, if the 1999 smolt outmigration estimates are indicative of the adult returns, the realized run will be considerably lower. The 2001 run should be composed of approximately 63% five-year-old fish and 25% six-year-old fish. If this run is realized it will be slightly lower than the recent 10-year average run of 649 thousand fish.

The projected harvest of 360 thousand fish is based on achievement of the lower bound of the escapement goal range of 140–200 thousand. The major age classes in the run should be 2.2 (53%) and 2.3 (22%).

Nick Sagalkin
Finfish Research Biologist
Kodiak

FORECAST AREA: **Kodiak, Ayakulik (Red River)**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	603	216–990
Escapement Goal	300	200–300
Harvest Estimate	303	

Forecast Methods

The 2001 Ayakulik (Red River) forecast was prepared primarily by investigating simple linear regression models utilizing recent brood year (1980–1997) sibling relationships for four age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Prediction estimates from regression models were only used in cases where the slope of the regression was significantly different from zero (P value ≤ 0.25). Ages 1.2, 1.3, and 2.3 were predicted from age-1.1, 1.2, and 2.2 siblings, respectively. A sibling regression model was also employed to estimate the age-2.2 component of the run from returns of age-1.2 sockeye salmon. All "other" age classes were estimated by summing 12 minor age class run estimates (0.1, 0.2, 1.1, 0.3, 2.1, 0.4, 3.1, 1.4, 3.2, 2.4, 3.3, and 3.4) by year (1991–2000) and calculating the pooled median contribution. The total run forecast was calculated by summing individual and pooled age class estimates. When the median return by age class was used, the variance calculated from the mean distribution was used. The variances associated with individual and pooled age class estimates were summed to calculate 80% prediction intervals.

Forecast Discussion

The 2001 forecast is about 142 thousand fish less than the 2000 forecast (745 thousand) and about 158 thousand fish greater than the actual 2000 run estimate of 445 thousand fish. Our confidence in this forecast is fair due to the error realized in the 2000 forecast. The 2001 run should be composed of approximately 52% five-year-old fish and 24% six-year-old fish. If realized, this run will be 253 thousand fish less than the recent 10-year average (1991–2000) run of 856 thousand fish.

The projected harvest of 303 thousand fish is based on achievement of the upper bound of the escapement goal range (300 thousand fish). The dominant age class in the run should be age 2.2 (41%).

Patricia Nelson
Finfish Research Biologist
Kodiak

FORECAST AREA: **Kodiak, Spiridon Lake**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	201	141–261
Escapement Goal	0	
Harvest Estimate	201	141–261

Forecast Methods

The 2001 Spiridon Lake forecast was estimated based on: 1) 1998–2000 smolt estimates, 2) 1995–2000 average adult age composition from terminal harvests and average adult age of returns from 1992–1996 stocking years, and 3) average, low, and high observed smolt-to-adult survival from 1991–1995 stocking years. The 1998 smolt emigration from Spiridon Lake was composed of approximately 515 thousand age-1. and 211 thousand age-2. fish. The 1999 emigration was composed of approximately 780 thousand age-1. and 119 thousand age-2. smolt. Approximately 789 thousand age-1. smolt and 492 thousand age-2. smolt emigrated in 2000. Smolt to adult survival has averaged 31%, ranging from 18% to 44%, for fry stocking years 1991–1995. A smolt to adult survival of 30% (a lower range of 20% and upper range of 40%) was used for forecasting the 2001 run. The age compositions of the 1995–2000 terminal harvest area sockeye salmon runs were averaged separately for 1995–1997 and 2000 (Upper Station broodstock) and 1998–1999 (primarily Saltery Lake broodstock) to enable estimating both the Upper Station and Saltery Lake components of the run. Similarly, the age compositions of the sockeye salmon returns were averaged for 1992–1994 and 1996 stocking years (Upper Station broodstock) and also for the 1995 stocking year (Saltery Lake broodstock) to provide an alternative technique for estimating both the Upper Station and Saltery Lake components of the 2001 run. These proportions were applied to the total return estimates from the 1998–2000 smolt emigrations to generate numbers of returning fish by age (and year) and results were summed to estimate the expected total run by age in 2001 for each technique. Lastly, the results of the two methods were averaged to estimate adult returns expected in 2001.

Forecast Discussion

A barrier falls prevents escapement into Spiridon Lake; thus, sockeye salmon fry stocking is intended to provide 100% harvest of returning adults. The forecast for 2001 is based upon the marine age-at-return remaining similar to previous years (predominantly 2-ocean); however, Saltery Lake sockeye, which were stocked in 1995, in some years are predominantly 3-ocean. The 2001 run is predicted to be about 20% less than average (1994–2000 average run was 257 thousand sockeye salmon) and about 25 thousand fish less than forecast for the 2000 run (226 thousand) but approximately the same as the actual return in 2000 (202 thousand). The predominant age class in the run is expected to be age-1.2 fish (approximately 80%) as a result of Saltery Lake stock fry releases. Returning age-2.2 fish (about 10% of the run) will be from Upper Station stock releases. The majority of the remaining fish will return as a result of Saltery Lake fry releases. The run timing should be similar to the 1998–2000 runs, approximately three weeks earlier than in 1994–1997. The run is expected to begin in late June–early

July and end by mid September. The run will be bimodal: Saltery Lake stock returns peaking in mid to late July and late-run Upper Station stock returns peaking early to mid August. The July peak (age-1.2 fish) should be substantially larger than the August peak.

Steven G. Honnold
Finfish Research Biologist
Kodiak

FORECAST AREA: **Kodiak, Karluk Lake (Early Run)**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	386	178–594
Escapement Goal	200	150–250
Harvest Estimate	186	

Forecast Methods

The 2001 Karluk Lake early-run forecast was prepared primarily by investigating simple linear regression models utilizing recent brood year (1979–1996) sibling relationships for six age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Prediction estimates from regression models were only used in cases where the slope of the regression was significantly different from zero (*P* value $\leq$0.25). Ages 1.3, 2.2, 2.3, 3.2, and 3.3 were predicted from age-1.2, 2.1, 2.2, 3.1, and 3.2 siblings, respectively. Following non-significant regression results, the median brood year return by age class was used to estimate the age-1.2 component of the run. All "other" age classes were estimated by summing 13 minor age class run estimates (ages 0.2, 1.1, 0.3, 2.1, 0.4, 3.1, 1.4, 4.1, 2.4, 4.2, 3.4, 4.3, and 4.4) by year (1991–2000) and calculating the pooled median contribution. The total run forecast was calculated by summing individual and pooled age class estimates. When the median return by age class was used, the variance calculated from the mean distribution was used. The variances associated with individual and pooled age class estimates were summed to calculate 80% prediction intervals.

Forecast Discussion

The 2001 forecast is about 82 thousand fish less than the 2000 forecast (468 thousand) and about 172 thousand fish less than the actual 2000 run estimate of 558 thousand fish. Our confidence in this forecast is fair due to the error realized in the 2000 forecast. The 2001 run should be composed of approximately 49 percent six-year-old fish and 35% five-year-old fish. If realized, this run will be 106 thousand fish less than the recent 10-year average (1991–2000) run of 492 thousand fish.

The projected harvest of 186 thousand fish is based on achievement of the midpoint of the escapement goal range (200 thousand fish). The predominant age classes in the run should be ages 2.2 (35%) and 2.3 (33%).

Patricia Nelson
Finfish Research Biologist
Kodiak

FORECAST AREA: **Kodiak, Karluk Lake (Late Run)**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	650	368–932
Escapement Goal	400	400–550
Harvest Estimate	250	

Forecast Methods

The 2001 Karluk Lake late-run forecast was prepared primarily by investigating simple linear regression models utilizing recent brood year (1979–1996) sibling relationships for six age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Prediction estimates from regression models were only used in cases where the slope of the regression was significantly different from zero (P value ≤ 0.25). A significant sibling regression model was employed to estimate the age-2.3 component of the run from returns of age-2.2 sockeye salmon. Following non-significant regression results, the median brood year return by age class was used to estimate the age-1.2, 1.3, 2.2, 3.2, and 3.3 components of the run. All "other" age classes were estimated by summing 12 minor age class run estimates (ages 0.1, 0.2, 1.1, 0.3, 2.1, 0.4, 3.1, 1.4, 2.4, 4.2, 3.4, and 4.3) by year (1991–2000) and calculating the pooled median contribution. The total run forecast was calculated by summing individual and pooled age class estimates. When the median return by age class was used, the variance calculated from the mean distribution was used. The variances associated with individual and pooled age class estimates were summed to calculate 80% prediction intervals.

Forecast Discussion

The 2001 forecast is about 319 thousand fish less than the 2000 forecast (969 thousand) and about 7 thousand fish less than the actual 2000 run estimate of 657 thousand fish. The poor predictive value of the sibling relationships for most age classes led to the use of the median estimator for a majority (78%) of the run. Therefore our confidence in this forecast is fair. The 2001 run should be composed of approximately 54% five-year-old fish and 39% six-year-old fish. If realized, this run will be 198 thousand fish less than the recent 10-year average (1991–2000) run of 848 thousand fish.

The projected harvest of 250 thousand fish is based on achievement of the lower bound of the escapement goal range (400 thousand fish). The predominant age classes in the run should be ages 2.2 (53%) and 2.3 (22%).

Patricia Nelson
Finfish Research Biologist
Kodiak

FORECAST AREA: **Chignik**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Early Run (Black Lake)		
Total Run Estimate	1,004	212–1,796
Escapement Goal	400	350–400
Harvest Estimate	604	
Late Run (Chignik Lake)		
Total Run Estimate	911	325–1,498
Escapement Goal	250	200–250
Harvest Estimate	661	
Total Chignik System		
Total Run Estimate	1,915	959–2,872
Escapement Goal	650	550–650
Harvest Estimate	1,265	

These figures include harvests of Chignik-bound sockeye salmon by the Southeastern District Mainland and Cape Igvak fisheries; approximately 1,034 thousand sockeye salmon are projected to be harvested in the Chignik management area.

Forecast Methods

The forecasts for Black and Chignik Lakes 2001 runs were based on simple linear regressions between sibling relationships or median estimators of age class returns for brood years since 1977. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Regression models were only used in cases where the slope of the regression was significantly different from zero (P value ≤ 0.25). The Black Lake age-0.3, 1.3, and 2.3 components of the run and Chignik Lake age-1.2, 1.3, 1.4, 2.2, and 2.4 components of the run were estimated based on the abundance of their sibling returns in 2000. Following non-significant regression results, the median brood year return by age class was used to estimate all other age class components of the run. When regression relationships were used, the variance of the estimate was calculated from the error structure of the regression. When the median return by age class was used, the variances calculated from the mean distributions, by age, were applied to the estimate. The variances associated with individual estimates were summed to calculate 80% prediction intervals for each individual run and for the total Chignik system run.

Forecast Discussion

The 2001 sockeye salmon run to the Chignik River is expected to be 1.9 million fish, which is approximately 1.0 million fish less than the run of 2000. The early run is expected to be approximately 1.0 million fish fewer than the run in 2000. The late run is expected to be similar in magnitude to the

2000 run. The 2001 sockeye salmon run to Chignik is expected to be approximately 1.0 million fish less than the recent 10-year average return.

Approximately 82% of the 2001 early run was forecasted using sibling relationships. All of these relationships yielded estimates below median values. The majority of the ages forecasted for the late run using sibling relationships were also below median levels. A significant sibling relationship did not exist for the age-2.3 component of the late run; however, it is usually a major component of the late run. If the general trends indicating runs below median values are realized, the age-2.3 component of the late run may have been overestimated. Because some sibling relationships were marginally significant and some major age classes were estimated using median values, our confidence in this forecast is fair.

Ken Bouwens
Finfish Research Biologist
Kodiak

FORECAST AREA: **Bristol Bay**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (millions)	Forecast Range (millions)
TOTAL PRODUCTION:		
Total Run Estimate	24.3	9.7 – 38.9
Escapement Goal	7.3	
South Peninsula Harvest Quota	1.4	
Commercial Common Property Harvest (Inshore)	15.6	

Forecasted sockeye harvests for inshore Bristol Bay fishing districts are as follows:	
Naknek–Kvichak	2.6 million
Egegik	6.0 million
Ugashik	1.3 million
Nushagak	5.4 million
Togiak	0.3 million

Forecast Methods

The forecast for the sockeye salmon return to Bristol Bay in 2001 is the sum of individual predictions for nine river systems (Kvichak, Branch, Naknek, Egegik, Ugashik, Wood, Igushik, Nushagak–Mulchatna, and Togiak) and four age classes (ages 1.2, 1.3, 2.2, and 2.3). Adult escapement and return data from brood years 1972–1997 were used in the analyses. Predictions for each age class returning to a river system were calculated from simple linear regression models based on the relationship between adult returns and spawners or siblings from previous years. Also, regression models based on the relationship between returns and smolt were examined for Kvichak, Egegik, and Ugashik Rivers. We chose forecasts from models having the best fit to the data based on F tests, R^2 values, and past reliability. Forecast performance for the period 1991 to 2000 was used to estimate the standard error and 80% confidence bounds of the total run forecast.

A total of 24.3 million sockeye salmon are expected to return to Bristol Bay in 2001. This prediction is 40% lower than the previous 10-year mean (40.8 million) and 37% lower than the previous 20-year mean (38.6 million) returns. Runs are expected to exceed spawning escapement goals for all systems. A return of 24.3 million sockeye salmon can be expected to produce a total harvest of 17.0 million fish if all escapement goals are met.

The 2001 inshore harvest is expected to be 15.6 million sockeye salmon. A harvest of this size would be 43% smaller than the previous 10-year mean harvest of 27.6 million (range is 10.0 million to 44.3 million) and 38% less than the previous 20-year mean of 25.5 million (range is 10.0 million to 44.3 million). An additional 1.4 million Bristol Bay sockeye salmon can be harvested during June in the Shumagin Islands and

additional 1.4 million Bristol Bay sockeye salmon can be harvested during June in the Shumagin Islands and South Unimak fisheries under the current Alaska Board of Fisheries management plan (8.3% of the total projected Bristol Bay sockeye harvest of 17.0 million).

Forecast Discussion

Data from the 1978–2000 return years (1972–1997 brood years) were used to forecast the 2001 sockeye salmon return to Bristol Bay. While the number of returning adults produced from each spawner showed a dramatic increase across all 9 stocks beginning with the 1978 return year (≥1972 brood year), poor sockeye salmon returns in 1996 (4-year-old fish only), 1997, and 1998 suggest that we might be entering a period of lower productivity, more similar to the pre-1978 return year era. However, fish from the 1996–1998 return years reared in the ocean when temperatures were above average, whereas cooler-than-average ocean temperatures characterized the pre-1978 return year period. In addition, there has been no consistent statewide signal in salmon productivity despite recent anomalous returns. Recent ocean temperature data and the returns to Bristol Bay in 1999 and 2000 suggest that returns in 2001 may be more characteristic of the period 1977–1995.

The greatest source of uncertainty in the 2001 forecast is in predicting the returns of 2-ocean (ages 1.2 and 2.2) fish. This is due to an absence of jacks (one ocean fish, the siblings of the 1.2s and 2.2s returning in 2001) in the 2000 return. Without jacks, it is impossible to use a sibling model for predicting returns of 2-ocean fish. Therefore, we used typically less reliable models that incorporate escapement or smolt data.

Forecasting the return of age-1.3 fish to the Kvichak is also problematic. The exceptionally low number of age-1.2s returning in 2000 was outside the bounds of recent historical data, essentially invalidating the sibling model. An alternative model used escapement and return data to forecast 1.0 million age-1.3 fish to the Kvichak, nearly twice that estimated from the out of range sibling model. A similar situation occurred in the prediction of age-2.3 fish for Ugashik where the low number of age-2.2 fish returning in 2000 invalidated the sibling model. We chose a model incorporating smolt data with a resultant forecast of 0.3 million age-2.2 fish.

The greatest uncertainty is with the forecasted total returns for Kvichak (2.9 million) and Ugashik (2.2 million). We do not know why Bristol Bay sockeye salmon returns in 1996–1998 were poor and whether decreased production will persist in the near future. The 1999 and 2000 baywide returns (41 and 30 million) suggest that the poor returns in 1996–1998 were anomalies. However, we still have insufficient evidence to conclude that the 1977–1995 production will continue. We are actively working with scientists inside and outside the department to develop better techniques for forecasting sockeye salmon returns to Bristol Bay.

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FORECAST AREA: **Bristol Bay**
SPECIES: **Chinook Salmon**

No forecasts were submitted for Bristol Bay chinook salmon.

FORECAST AREA: **Alaska Peninsula, Nelson River**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	430	189–672
Escapement Goal	150	100–200
Harvest Estimate	280	

Forecast Methods

The 2001 Nelson River forecast was constructed using simple linear regressions of recent brood year sibling relationships between 1980 and 1996 and median estimators of age class returns. Standard regression diagnostics were employed including analysis of residuals and outlier points. Regression estimates were only used if the slope was significantly different from zero (P value ≤ 0.25). In cases of non-significance, the median brood year return for the age class (1980–1996) was used. Of the major age classes, regression estimates were only used for age class 2.2 (predicted from age 1.2), and the median estimator was utilized for the remainder (ages 1.2, 1.3, 2.1, and 2.3). The minor age classes (ages 0.1, 0.2, 1.1, 0.3, 0.4, 3.1, 1.4, 3.2, 1.5, 2.4, and 3.3) were estimated by summing the annual minor age class returns (1985–2000) and employing the median. The variance estimates from each individual age class estimate were summed and the collective variance used to calculate the 80% prediction intervals of the total run.

Forecast Discussion

The 2001 forecast for Nelson River is 430 thousand sockeye, which is 54 thousand more fish than the actual 2000 run. The poor predictive value of the sibling relationships for most age classes led to the use of the median estimator for a majority (61%) of the run. Therefore, the confidence in the estimate is fair. The 2000 forecast was 102 thousand fish greater than the actual run. The 2001 forecast is similar in magnitude to the recent historical mean, being 11 thousand fish less than the 5-year average (1996–2000) and 108 thousand fish less than the 10-year average (1991–2000).

The projected harvest of 280 thousand fish is based upon the achievement of the midpoint of the escapement goal range of 100–200 thousand fish. The predominant age classes, ages 2.2 (39%), 2.3 (28%), and 1.3 (19%), should constitute 86% of the run.

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FORECAST AREA: **Alaska Peninsula, Bear Lake (Late Run)**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2001 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	613	314–911
Escapement Goal	100	75–125
Harvest Estimate	513	

Forecast Methods

The 2001 Bear River late-run forecast was prepared primarily by investigating simple linear regression models utilizing available brood year (1980–1997) sibling relationships where significant regression relationships exist, and by using median values of the remaining age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Regression models were only used in cases where the slope of the regression was significantly different from zero (P value ≤ 0.25). The age-2.2 component of the run was predicted from returns of age-1.2 fish in 2000, and age-2.3 fish were predicted from age-2.2 siblings. The abundance of the remaining age classes was forecasted using the median values of the individual age classes. The total run forecast was calculated by summing individual age class estimates. When a regression relationship was used to predict an individual age class, the variance of the estimate was calculated from the error structure of the regression. When the median return by age class was used, the variance calculated from the mean distribution was used. The variances of the individual estimates were summed to calculate 80% prediction intervals for the total forecast.

Forecast Discussion

The 2001 forecast for the Bear Lake late run is about 181 thousand fish less than the 2000 forecast (794 thousand) and about 97 thousand fish less than the actual 2000 run of 710 thousand fish. This equates to a run that in 2001, if achieved, would be 175 thousand fish less than the recent (1991–2000) 10-year average and 7 thousand fish greater than the most recent (1996–2000) 5-year average.

The ages of the majority of the Bear Lake late run have historically been ages 2.2 and 2.3; these ages, on average, composed approximately 57% and 29% of the run, respectively, and were forecasted using sibling relationships. The remaining age classes, which were forecasted using historic median values, compose approximately 14% of the run. Our confidence in this forecast is fair to good.

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FORECAST AREA: **Arctic–Yukon–Kuskokwim**
SPECIES: **All Salmon**

AYK Season Outlook

The Alaska Department of Fish and Game does not produce formal run forecasts for any salmon runs in the Arctic–Yukon–Kuskokwim Region. Salmon run outlooks in the AYK Region are qualitative in nature because of the lack of adequate information with which to develop more rigorous forecasts. Consequently, the commercial harvest outlooks for the AYK region are qualitative and typically based upon available parent-year spawning escapement indicators, age composition information, and the likely level of commercial harvest that can be expected to be available from such indicators, given the fishery management plans in place. However, in some cases, the commercial harvest outlook has simply been the range of historical harvest levels. While the commercial harvest outlooks provide for a general level of expectation, the fisheries are managed based upon inseason assessments of the actual runs.

In the AYK region, as in some other areas of the state, salmon production has notably decreased for many stocks. Yukon and Kuskokwim Rivers chinook salmon stocks have been classified as stocks of concern under the guidelines established in the Sustainable Salmon Fisheries Policy for the State of Alaska. Similarly, chum salmon from the Kuskokwim, Yukon (summer and fall), and Nome Areas have also been classified as stocks of concern. Causes for the loss of productivity have been the subject of much interest and concern, but to date it is unknown whether the decline in productivity can be expected to continue or not.

The commercial harvest outlooks for the year 2001 try to qualitatively take recent decreased abundance trends into account. At this time a commercial salmon fishery in June and July appears unlikely, at least on the Yukon and Kuskokwim rivers. However, any commercial salmon fisheries will be managed on observed abundance, and not on a preseason outlook.

Additionally, declining salmon markets, particularly for chum salmon flesh since 1994 and salmon roe in 1997, have had a major impact on the commercial fisheries in the AYK Region. A continuation of these market trends in the year 2001 could further reduce harvests in some areas or lower exvessel value. In most cases, market conditions have not been accounted for in the harvest outlooks.

For the year 2001, the commercial harvest outlook can be found in Table 1. Specifically, the commercial AYK harvest outlooks, in thousands of fish, by management area, are:

Management Area	Species					
	Chinook	Sockeye	Coho	Pink	Chum	Fall Chum
Kuskokwim (Kuskokwim River and Kuskokwim Bay combined)	12–25	65–115	33–380	0–1	40–800	
Yukon	0–20		0–100		0–300	0–300
Norton Sound	3–5		30–60	0	10–25	
Kotzebue Sound					200–300	

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