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Run Forecasts and Harvest Projections for 2002 Alaska Salmon Fisheries and Review of the 2001 Season

Edited by

Douglas M. Eggers

January 2002

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

Frank Rue
Commissioner

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This report is based on information contributed by Division of Commercial Fisheries biologists located in field offices throughout the state. Hal Geiger, Brian Bue, Linda Brannian, and Patricia Nelson assembled the forecasts and season summaries for their respective regions. Individual credit for forecast material is contained in area forecast discussions in the Appendix. Area biologists throughout the state supplied reviews of the 2001fishing season.

The editor would also like to acknowledge Amy Carroll for her editorial advice and assistance with the report figures, tables and layout.

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EXECUTIVE SUMMARY

The Alaska Department of Fish and Game is expecting a drop in commercial salmon catch in 2002. This is because the pink salmon harvest is expected to return to more average levels — far below the 2001 catch for this species. In addition, the statewide sockeye salmon harvest is expected to be 22.1 million, which would be the lowest sockeye salmon harvest, observed since 1979. The 2002 commercial all-species projection of 128 million is distributed as 416 thousand chinook, 22.1 million sockeye, 4.8 million coho, 87.5 million pink, and 13.3 million chum salmon. Table 1 shows specific projection numbers by species and fishing area. 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. Alaska managers have the primary goal of maintaining spawning population sizes — not of reaching preseason catch projections.

At this time last year, department biologists were expecting an all-species commercial catch of 142 million for the 2001 season. As it turned out, the all-species catch reached 174 million. In 2001, the overall catch of pink salmon was considerably higher than expected (an actual catch of 122.4 million compared to the preseason projection of 92.7 million). Table 2 shows 2001 harvest numbers by species and fishing area, in units of fish harvested, and Table 3 provides this information in units of pounds harvested.

The exvessel value of the commercial harvest continued its long downward trend. The preliminary estimate for the total value of Alaska's 2001 harvest is $214 million down further from the low estimate of $275 million for 2001; and significantly down from the $370 million for 1999, $261 million for 1998, $297 million for 1997, $378 million for 1996, $487 million for 1995, and $489 million for 1994.

In recent years, news stories about unusual climatic and oceanographic conditions have become increasingly common. Because our forecasts are based on statistical relationships that have been observed in the recent past, we are always nervously looking for reasons to think that past conditions have changed. Global warming, strong El Niño events followed by ocean cooling, exceptional temperatures in the Bering Sea, large forecast errors in the Bristol Bay sockeye returns, and an unexplained spectacular drop in Western Alaska chum and Chinook salmon production are just some of the things that worry salmon fisheries managers.

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, 1975–1983; 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; Geiger and McNair 2001). 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 2002 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 2001 harvest.

This report contains a detailed review of Alaska's 2001 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	2000				
Chum		1999	1998	1997	
Coho		1999	1998		
Sockeye			1998	1997	1996
Chinook			1998	1997	1996

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

Common (and Vernacular) Names	Scientific Name
chinook (king)	*Oncorhynchus tshawytscha*
sockeye (red)	*Oncorhynchus nerka*
coho (silver)	*Oncorhynchus kisutch*
pink (humpy, humpback)	*Oncorhynchus gorbuscha*
chum (dog)	*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.
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 brood stock	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.
Optimum escapement goal	The number of salmon in a particular stock that should be allowed to spawn to achieve sustainable runs based on biological needs of the stock, as well as consideration of social and allocative needs.
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.

PRELIMINARY REVIEW OF THE 2001 ALASKA COMMERCIAL SALMON FISHERIES

Southeast and Yakutat

The 2001 Southeast Alaska commercial salmon harvest, including hatchery cost recovery, totaled 80.8 million fish. This was the third largest harvest in the history of the region's commercial salmon fishery, which extends back to 1878. The exvessel value totaled $85.5 million. The exvessel values by species were $5.2 million for chinook salmon, $10.4 million for sockeye salmon, $11.8 million for coho salmon, $26.4 million for pink salmon, and $31.7 million for chum salmon.

In 2001, the pink salmon return to Southeast Alaska was above the 1990s average; both harvest and escapement were large throughout the entire region in 2001. The actual region-wide harvest was 66.8 million pink salmon, with a seine harvest of 61.9 million, and with over 75% of the harvest coming from southern Southeast Alaska. Seine harvests of pink salmon throughout Southeast Alaska were above the 1990s average of 46.1 million, except in Districts 104 and 113, where harvests were near the average, and Districts 110 and 112 where harvests were below average. The 2001 harvest was above the preseason forecast for a "strong" harvest in the 31 to 51 million fish range. Generally, pink salmon escapements, by stock group, were above the 1990s average, especially in the Ketchikan and Sitka areas. However, escapements for 16 of 45 stock groups were below the 1990s average.

The 8.4 million chum harvest was the tenth highest on record. This is the lowest since 1993 when large-scale hatchery production had not yet dominated the chum salmon harvests. Chum salmon escapement indices by stock group had mixed results throughout Southeast Alaska with the overall escapement for all stock groups near the 1990s average.

The sockeye harvest totaled 2.0 million fish. This catch level was similar to the 1990s average of 2.1 million, yet it was up considerably from the 1.2 million catch from the previous year. Overall, sockeye escapements throughout Southeast Alaska varied by location, but appeared to be very good.

The 3.27 million coho harvest was near the 1990s average of 3.3 million. Escapements were generally near or above the goals. In some areas, like Berners Bay, escapements were at record high levels.

Prince William Sound

The 2001 Prince William Sound Area commercial salmon harvest of 41.14 million fish was the fourth highest on record (Figure 1). The harvest was comprised of 35.25 million pink, 2.26 million sockeye, 3.10 million chum, 494,135 coho, and 40,461 chinook salmon. The majority of the catch, 27.23 million, was common property harvest and 13.92 million were sold for hatchery cost recovery, (exclusive of post egg-take roe sales).

The estimated value of the combined commercial salmon harvest was $45.58 million, including hatchery sales. During the 2001 season, 535 drift gillnet permit holders fished. The drift gillnet catch was valued at $21.3 million, setting the average earnings at $39,731. The set gillnet catch was valued at $888,689, setting the average earnings of the 32 participating permit holders at $27,772. The seine fishery was worth $13.39 million for an average exvessel value of $88,101 for the 152 permit holders that participated this year.

Revenue generated for hatchery operations (exclusive of post egg-take roe sales) was approximately $10.04 million.

The Copper and Bering River District's sockeye salmon harvest of 1.33 million was the sixth largest on record. The harvest of 39,600 chinook salmon was also the thirteenth largest harvest for this species. The Copper and Bering River District's coho salmon harvest of 254,000 was the twelfth largest commercial harvest. The escapement of sockeye at Miles Lake sonar was 833,569 and exceeded the inriver goal of 723,000 fish (including the projected 185,000 hatchery surplus fish). While not finalized, it appears the estimated chinook salmon escapement into upper Copper River drainages will be at or slightly below the escapement objective. Sockeye salmon escapement goals in the lower Copper River were not met in 2001, although it is likely that the sockeye salmon escapement was underestimated due to poor aerial survey conditions. Lower Copper River coho salmon escapement was within escapement goal ranges. Escapements of Bering River sockeye and coho salmon were below escapement goal ranges; however escapement was likely underestimated due to poor aerial survey conditions.

Gillnet fisheries in Prince William Sound primarily targeted enhanced and wild sockeye and chum salmon. In the Coghill District, the gill net harvest was 1,142,449 chum, 87,535 sockeye and 308,707 pink salmon. In the Eshamy District, the gill net harvest was the gillnet harvest was 21,316 chum, 499,972 sockeye and 367,588 pink salmon. In the Unakwik District, 2,298 sockeye salmon were harvested. Escapements of sockeye salmon to Cognill and Eshamy lakes were above escapement goals.

The pink salmon return of 38.7 million to Prince William Sound was larger than the 32.1 million fish forecast and resulted in the fifth largest single season harvest of 35.25 million fish. The returning adults in 2001 had an average weight of approximately 3.39 pounds. An estimated 6.7 million wild stock pink salmon contributed to the commercial common property and cost recovery fisheries based on otolith recoveries. Approximately 99% of the wild stock harvest occurred in the commercial common property fishery. The ratio of enhanced pink salmon to wild pink salmon in the 2001 total commercial common property harvest is estimated to have been 2.33:1. The Prince William Sound pink salmon escapement index was 2.0 million, which was the seventh highest escapement index since 1960. Only the Coghill and Eshamy Districts failed to meet their escapement goal.

The wild and enhanced chum salmon returns to PWS were strong and the area wide chum salmon purse seine harvest for 2001 was 0.99 million fish. On a sound-wide basis, the chum salmon escapement was 55% over the goal and was the third highest escapement since 1965. Overall, wild stock chum salmon escapement exceeded the midpoint escapement goals in the Eastern, Northern, Southwestern, and Southeastern Districts. The Coghill, Northwestern, and Montague Districts did not meet the minimum threshold goal. It is possible that the chum salmon escapement in 2001 was greater in the Coghill, Northwestern, and Montague Districts, but because of poor weather, aerial surveys were not completed during the time of peak escapement. Over 350,000 wild stock chum salmon were harvested with the majority of the harvest coming from the Eastern and Southeastern Districts.

Cook Inlet

Upper Cook Inlet

The commercial harvest of just over 2.1 million salmon in Upper Cook Inlet in 2001 was the third lowest harvest in the past 20 years and the fourth lowest since 1974 when only 1.5 million salmon were harvested. The harvest was about 50 percent of the long-term average UCI harvest. The exvessel value of $7.7 million was the lowest value since 1975 and represents only about 20 percent of the recent 20-year average value.

The preseason forecast in 2001 was for a total return of 4.2 million sockeye and a commercial harvest of 2.7 million sockeye. The forecasted return to the Kenai River of 2.5 million sockeye resulted initially in an escapement goal target of 750,000 to 950,000 past the sonar counter at river-mile nineteen. The Upper Cook Inlet harvest of 1.8 million sockeye salmon was 32 percent less than the preseason forecast. Returns of sockeye salmon to all systems were below expectations, with the Kenai component being the most dramatic. The total exvessel value in Upper Cook Inlet for sockeye was $ 7.1 million, which was 93% of the total UCI exvessel value for salmon.

The Kasilof Section, targeting Kasilof River sockeye stocks, opened for regular Monday and Thursday fishing periods on Monday June 25. In all, there were six fishing periods in the Kasilof Section prior to the Kenai and East Forelands sections opening for regular periods. The Kenai and East Forelands sections opened as scheduled on Monday, July 9. The first mandated drift restriction, to the Kenai and Kasilof sections ("the Corridor") was also executed during this July 9 regular period. The regular period on July 12 was fished as scheduled with above average harvests for the return as forecast. The regular period on July 19 was fished as scheduled with relatively poor harvest of sockeye considering the timing and preseason expectation. As a result of this harvest and the projections based on the Offshore Test Fishing a very cautious management approach was established. The regular period on July 23 was closed for drifting, as was the east side set gillnet and Northern District set gillnet fisheries. A large number of sockeye salmon entered the Kenai River on July 23 with good daily escapements through July 25. Faced with the possibility of 1.5 to 2 million additional fish yet to enter the district and a mandated (by regulation) closed 24-hour period on Friday, July 27, we elected to fish the regular period on July 26 in the Upper Subdistrict, with drifters restricted to the corridor. The Northern District was again closed during this period to conserve Yentna River sockeye. The return was early and much weaker than anticipated and required closures of the Upper Subdistrict set gillnet fishery for the regular period scheduled for July 30. On July 30, the drift fleet was restricted to the west side of the inlet as directed in the Kenai River Late Run Sockeye Salmon Management Plan. This was done to prevent the harvest of Kenai sockeye, but allow for a harvest of other salmon stocks remaining in the inlet, which were at or above desired escapement levels. On August 2, the drift fleet was again restricted to the west side of the inlet and the Upper Subdistrict set gillnet fishery was closed to protect Kenai River sockeye salmon. On August 6 the drift fleet was again restricted to the west-side of the inlet and the Upper Subdistrict set gillnet fishery was closed. This restriction was in response to the uncertainty in achieving either or both of the escapement goals for Kenai River sockeye and chinook salmon, as directed in respective management plans.

This was the third year of abundance based in-river goals for the Kenai River. It was also the third year that the goal range changed late in the season. This season began with a forecasted return of 2.5 million to the Kenai, which was downgraded to less than 2-million sockeye salmon on July 27. The final in-river sonar estimate of Kenai River sockeye salmon (650,000) exceeded the lower end of the in-river goal (600,000). In-season estimates based on historical in river exploitation rates indicates that the minimum

OEG of 500,000 sockeye salmon was met, however, final estimates of in-river harvest will not be available until the SWHS is published in 2002. The Kasilof River sonar estimate was approximately 308,000 well above the upper end of the BEG range of 250,000 sockeye salmon. This was the fifth consecutive year that the upper end of the sockeye salmon BEG range was exceeded for the Kasilof River.

The Northern District set gillnet fishery opened for regular periods starting on June 25. Sockeye salmon escapement into the Yentna River progressed normally with the escapement rate building as expected through July 19, at which time rain caused the river to rise to flood levels. Accurate counting for the next five days was not possible and counts dropped rapidly. Because the escapement goal could not be projected at current passage rates, the Northern District set gillnet fishery was closed for the period scheduled on July 23. Counts started rising on July 23 because the water level was dropping to acceptable levels. However, since we could not project the escapement goal, we closed the period scheduled on July 26 for Yentna escapement. On July 30 the Northern District fished the regular period since the majority of Yentna sockeye salmon would have already been in-river. Fishing continued in the Northern District, for regular periods only, through the remainder of the season. The final Yentna River sonar count of 85,044 sockeye was approximately 15,000 fish below the escapement goal. The count was believed to be minimum count due to poor counting conditions during a 5-day flooding event that occurred during the peak run. .

The 2001 coho harvest of 113,311 was the lowest commercial coho harvest since 1973. The exvessel value of coho salmon to the commercial fishery was $286,000 or 3.7 percent of the total exvessel value However, as with pink and chum salmon, it is not a true indication of run strength due to restrictions in the drift fishery for Kenai sockeye and regulatory restrictions to allocate coho to other users. Commercial coho harvests in UCI during the 1980's and early 1990's were much higher than the long term average due to good coho production, and also due to strong sockeye salmon returns to Upper Cook Inlet, which resulted in more fishing time in the Central District. Since 1996, BOF regulations have reduced the fishing time of the drift fleet in the Central District and eliminated additional fishing time directed at coho and sockeye salmon surpluses in the Northern District and Kalgin Island subdistricts, which has resulted in marked reductions in the commercial exploitation rate.

The 2001 harvest of 72,559 pink salmon is very good for an odd year harvest. This harvest is not indicative of the run strength of pink salmon in 2001 however due to the much-reduced fishing time in the drift fishery to protect Kenai sockeye and closures in the Northern District for Yentna River Sockeye. Pink salmon escapements are not monitored in Upper Cook Inlet to an appreciable degree; however, it appears that escapements to most river systems were very good for odd year run strength. Prices paid for pink salmon were $.03 to $.10 per pound, resulting in an exvessel value for this species of $20,000.

The 2001 harvest of 84,494 chum salmon was about half of the recent 10-year average harvest. The 2001 chum return, like the 2000 return, was much improved from returns seen during the 1990's. Restrictions to the drift fleet for conservation of Kenai sockeye made substantial reductions to the commercial harvest of chum salmon. Since the flood of 1986, chum production in much of south central Alaska has been poor, with recent harvests well below the long-term average harvest of 543,000. Since 1995-1996, small improvements have occurred each year, and returns to most of Cook Inlet in 2001 were very good. The chum salmon return to Chinitna Bay has been essentially unexploited, as the local set gillnet fishery was inactive due to poor prices and no tendering service from any processor. Chum escapements to Cook Inlet are enumerated in very few locations, however the peak escapement to Chinitna Bay in 2001 was approximately 17,000, the second highest on record since statehood in 1959. Fishermen were paid $.15 to

$.40 per pound for chum salmon, producing an exvessel value of $111,000 – which is just 1.4% of the overall fishery value.

The 2001 harvest of 9,295 chinook salmon is about half of the long term average harvest. The two fisheries where chinook salmon are harvested in appreciable numbers in UCI are in the Northern District and in the Upper Subdistrict of the Central District. The 2001 chinook harvest was reduced primarily due to reduced fishing time in the Upper Subdistrict due to poor sockeye returns to the Kenai River. After experiencing a significant downturn in the early to mid 1990s, Northern District chinook salmon stocks continue to trend significantly upward and no generalized conservation issues are currently applicable. Late-run Kenai River chinook salmon returns have been relatively stable and escapement objectives have been consistently achieved or exceeded. In 2001, the exvessel value for chinook was valued at $170,000- which is approximately 2.2 percent of the total exvessel value.

Lower Cook Inlet

The preliminary 2001 Lower Cook Inlet all-species salmon harvest of 906,000 fish was the fourth lowest during the past two decades, falling well short of both the most recent 10- and 20-year averages. Additionally, the overall harvest totaled less than half of the preseason forecast, yielding an estimated exvessel value of about $1.24 million, representing approximately 70% of that for the 2000 season and the lowest since 1993.

Once again, LCI commercial salmon harvests in 2001 relied heavily on the success of hatchery and enhanced fish production. Pink salmon production from Tutka Hatchery, operated by Cook Inlet Aquaculture Association (CIAA), was significantly below expectations, yet the harvest of this species returning to the facility comprised nearly 60% of the all-species catch. The overall return of pink salmon to Tutka Hatchery, estimated at 716,000 fish, was the second lowest odd-year return for the facility during the past decade. Over 80% of the sockeye salmon harvest in numbers of fish, and 76% in terms of the sockeye exvessel value, was attributed to CIAA lake stocking and fertilization projects at Leisure and Hazel Lakes in the Southern District, Kirschner Lake in the Kamishak Bay District, and Bear and Grouse Lakes in the Eastern District. Another enhancement/rehabilitation project, undertaken by Chugach Regional Resources Commission (CRRC) and Port Graham Hatchery Corporation (PGHC) at English Bay Lakes in the Southern District, experienced a weak return that forced a season-long closure of both the commercial and subsistence set gillnet fisheries in Port Graham Subdistrict. As has been the case since hatchery programs were taken over by private non-profit agencies in LCI, a significant portion of the salmon harvest was utilized to recoup expenses incurred by the hatchery facilities and the various stocking and enhancement projects throughout the management area. Over half of the total salmon harvest was taken by CIAA to support the sockeye lake stocking programs and Tutka Hatchery operations, equating to nearly 30% of the exvessel value of the LCI salmon fishery.

The 2001 LCI sockeye salmon harvest of 216,300 fish was the third lowest during the past decade and represented just over three-fourths of the preseason forecast. Despite accounting for only about one-fourth of the LCI salmon harvest in numbers of fish, sockeyes provided about 50% of the exvessel value of the entire salmon fishery during 2001.

Returns of pink salmon, the dominant species in numbers of commercially harvested fish in LCI, fell considerably below preseason expectations in 2001, with an overall harvest of just 593,000 fish. This figure is less than half of the most recent 20-year average and represents the second lowest odd-year catch during the past two decades. Just over 90% (543,000 pinks) of the total was taken in the Southern District,

the bulk of which came as a direct result of Tutka Hatchery production. However, over three-fourths (422,000 pinks) of the Southern District total was utilized for Tutka Hatchery cost recovery. The estimated hatchery return, including escapement, brood stock, and commercially harvested fish, was 716,000 pinks, representing less than 40% of the preseason projection of 1.84 million fish.

Naturally produced pinks contributed less than 10% of the area-wide harvest for that species this season, with the majority of the catch coming from Port Dick in the Outer District. Overall, natural pink returns were mixed, with exceptionally strong returns (and escapements) to a number of Outer District systems, while returns to the remainder of the management area were relatively weak

Chum salmon were undoubtedly the bright spot in the 2001 LCI commercial salmon season. The chum harvest of almost 90,000 fish was the highest catch for the species in LCI since 1988 and also exceeded the 20-year average of 80,000. This was the second consecutive season of above average chum harvests, fueled once again by strong returns to systems in Kamishak Bay on the west side of LCI. Escapements into most Kamishak Bay chum systems were good, with the exception of McNeil River, where the escapement fell short of its established goal range of 20,000 to 40,000 fish for the tenth time in the last 12 years. Elsewhere in the management area, chum returns were considered fair to poor, with variable escapements, and no other directed harvests occurred.

The commercial harvest of 6,700 coho salmon in 2001 was the lowest catch for this species in LCI since 1992, representing only about half of the recent 10-year average. The majority of the harvest (60%) once again occurred in the Eastern District, primarily for the Seward Silver Salmon Derby and CIAA cost recovery at Bear Lake. Set gillnetters in the Southern District accounted for another 27% of the coho catch, while seiners in the Southern District took the remainder. Although coho run assessment in LCI is limited, commercial, sport, and personal use harvests provide the best indicators of run strength. Returns during 2001 were considered average to slightly above average. Two aerial surveys were flown specifically for coho salmon this season, indicating outstanding escapement into Clearwater Slough, the major index stream at the head of Kachemak Bay.

The 2001 harvest of chinook salmon, not normally a commercially important species in LCI, was the lowest catch since 1986 at 990 fish. This was less than the long-term average of 1,370 and well below the record high harvest of 2,300 fish taken in 1995 (Figure 1, Table 5). Virtually all of the catch came from the Southern District (Table 5) and can be primarily attributed to enhanced production at Halibut Cove Lagoon and Seldovia Bay. Set gillnetters accounted for 88% of the Southern District chinook catch, with purse seiners taking the remaining 12%.

Bristol Bay

The inshore run of sockeye salmon to Bristol Bay for 2001 totaled approximately 22.0 million fish and was 39% below the 20-year average of 36.9 million. It was 9% below the preseason forecast of 24.3 million fish. The Kvichak, Egegik, Ugashik and Wood River systems came in below forecast, due mainly to a failure of the 2-ocean component. The bay-wide return of age-2.2 fish, forecasted at 7.5 million, was only 670 thousand, while the age-1.2 fish, forecasted at 4.8 million, returned only 900 thousand fish. Three-ocean sockeye returned in nearly twice the number predicted; age-1.3 fish were 10 million greater than predicted, with an actual return of 17.9 million, comprising 81% of the total. Preliminary total sockeye salmon harvest for the 2001 season was 14.0 million fish, which fell 45% below the 20-year average of 25 million. Sockeye escapements fell within or above the ranges for all river systems except the Kvichak.

The calculated exvessel value of the 2001 Bristol Bay salmon fisheries totaled $38.6 million, which is the lowest exvessel value in since 1977. This exvessel value for 2001 was far below the value of the recent disaster years of 1997 and 1998 ($62.7 and $64.9 million respectively). The average price of $.40 per pound for sockeye salmon in Bristol Bay is the lowest price paid since 1975. The 6.7 lb. overall average weight of sockeye is the highest for the last 20 years and well above the 20-year average of 5.8 lbs.

Sockeye salmon runs with large 2-ocean components forecasted were most affected by the 2-ocean failure. Runs to Egegik, Kvichak, Wood, and Ugashik Rivers were well below forecast. The missing 2-ocean fish impacted the Kvichak River most, with the actual run less than half the forecast. The total inshore run to the Kvichak River was only 1.42 million; well below the minimum Biological Escapement Goal (BEG) of 2.0 million sockeye salmon. Naknek, Igushik, Nushagak, and Togiak drainages had runs much greater than expected due mainly to the unexpectedly large return of age-1.3 fish.

The Naknek-Kvichak District sockeye salmon harvest of approximately 5.2 million fish was the eighth smallest harvest for that district in the last 20 years. The Egegik District sockeye salmon harvest of 2.9 million fish was the lowest harvest since 1982 and 65% below the 20-year average of 8.4 million. Ugashik District sockeye harvest of approximately 476 thousand fish was 84% less than the 20-year average of 3.0 million and the lowest harvest in the last 20 years. The Nushagak District harvest of 4.6 million sockeye salmon was the ninth highest sockeye catch on record for that district and 15% greater than the 20-year average of 4.0 million fish. The Togiak District sockeye salmon harvest of approximately 811 thousand fish was 82% above the 20-year average of 446 thousand fish, and the second largest harvest in the last 20 years.

There was no directed commercial fishery on chinook salmon this season in Bristol Bay. Baywide, the commercial harvest of chinook salmon was approximately 24,000 fish, 69% below the recent 10-year (1991-2000) average harvest of 76,000 fish. It was the second lowest (2000 was the lowest with 23,000 harvest) recorded catch in the last twenty years. The 2001 forecasted chinook salmon run into the Nushagak River, the major chinook salmon system, was 118,000 fish. The commercial harvest for the Nushagak District of 11,000 fish was taken incidentally during the sockeye fishery. Chinook salmon escapement for the Nushagak River was 99,100 fish. In the Togiak District nearly 9,700 chinook salmon were harvested in 2001, slightly less than the 10-year average of 10,000 fish. In the eastside districts, chinook salmon harvests were approximately 1,000 fish for each district. Chinook salmon escapement indices throughout the bay were average or above except in the Egegik and Kvichak drainages.

The total Bristol Bay chum salmon harvest of 870 thousand fish was above the recent 10-year average of a 750 thousand fish. Westside districts produced harvests and escapements well above the recent 10-year averages. Chum salmon runs in eastside districts were below average.

Pink salmon return in strength to Bristol Bay only during even-numbered years. The pink salmon harvest of 549 fish is a normal odd year cycle catch. Pink salmon escapement counts were insignificant during surveys.

A lack of market for coho salmon this season resulted in only a couple processors interested in staying around to purchase this species. Both Nushagak and Togiak Districts had low preseason projections. Togiak and Nushagak Districts had low early catches incidental to the sockeye fishery. When coho salmon predominated in the catch, commercial fishing closed for the 2001 season. Coho harvests on the eastside of the Bay were low probably due to lack of interest by fishers and processors. The bay-wide coho harvest

of approximately 17,000 fish was far below the 10-year average of 105,000 fish. Coho escapement data are still being collected.

Kuskokwim Area

The total 2001 commercial salmon harvest for the Kuskokwim Area was 317 thousand fish, the second lowest since 1972. Fishing time during the season was well below average because of critically low chinook and chum salmon runs to the Kuskokwim River and limited processing capacity.

Overall, the Kuskokwim Area-wide chinook salmon harvest of 14 thousand fish was 66% below the recent 10-year (1991-2000) average of 41 thousand fish. A below average sockeye harvest of 60 thousand fish was recorded. Fishers harvested 22 thousand chum salmon, 92% below the recent 10-year average of 286 thousand fish. The coho salmon harvest was 286 thousand, 46% below the recent 10-year average of 534 thousand.

In September 2000, the Alaska Board of Fisheries classified Kuskokwim River chinook and chum salmon stocks as yield concerns based on guidelines established in the Sustainable Salmon Fisheries Policy. Because of the need to conserve chinook and chum salmon, there was no commercial fishing on the Kuskokwim River in June and July. Chinook, chum, and sockeye salmon harvests were incidental to the coho salmon commercial fishery in August. The chinook salmon harvest of 90 fish was the lowest on record. The chum salmon harvest of one thousand fish was 99% below the recent 10-year average and the lowest since 1968. The sockeye salmon harvest of 84 fish was well below average because of the reduced fishing time. The coho salmon harvest of 193 thousand fish was 57% below the recent 10-year average. During the coho fishery there were 4 half-district openings and 6 full district openings in District W-1 and no openings in District W-2.

In 2001, the State of Alaska declared the Kuskokwim River drainage an economic disaster area because of the extremely poor chinook and chum salmon runs. Overall, within the Kuskokwim drainage, the chinook salmon escapement was about 90% of the drainage-wide goal while chum salmon escapement goals were achieved. The lone Kuskokwim River coho salmon escapement goal (Kogrukluk River) was not achieved.

The Quinhagak District, within Kuskokwim Bay, opened on June 21 and commercial fishing occurred on a reduced schedule in June and July because of limited processing capacity. The chinook salmon harvest of 13 thousand fish was 37% below the recent 10-year average; the sockeye salmon harvest of 34 thousand fish was 45% below the recent 10-year average. The incidental chum salmon harvest of 17 thousand fish was 69% below the recent 10-year average. Chinook, sockeye and chum salmon escapements were adequate based on aerial surveys. Commercial fishing time in August was well below average because of limited processing capacity. The associated coho salmon harvest of 19 thousand fish was 67% below the recent 10-year average. Approximately 39,000 coho salmon were counted through the Kanektok River weir in 2001.

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 have experienced weak runs. The chinook salmon harvest of 1,500 fish was 40% below the recent 10-year average. Chinook salmon escapement, as monitored through the Middle Fork Goodnews River weir, was 5,403, 54% above the escapement goal of 3,500 salmon. The sockeye salmon harvest of 26 thousand fish was 35% below the recent 10-year average. The Middle Fork Goodnews River escapement goal of 25 thousand sockeye salmon was not achieved. The incidental chum harvest of 3 thousand fish was 77% below the recent 10-

year average while the chum salmon count through the Middle Fork Goodnews River weir was 79% above the escapement objective. The coho salmon harvest of 9 thousand fish was 55% below the recent 10-year average. Coho salmon escapement at the Middle Fork Goodnews River weir was near the historical average for comparable years. An escapement goal for coho salmon has not been established for the Middle Fork Goodness River.

Only 514 of the 832 Kuskokwim Area permit holders participated in the commercial fishery in 2001. The exvessel value of the harvest was $0.75 million, 75% below the recent 10-year average exvessel value of $3.0 million. The average exvessel earning per permit holder was $1.5 thousand, well below the most recent 10-year average value of $3.9 thousand.

Yukon Area

The 2001 Yukon River salmon runs continued to show a trend of very low productivity, particularly in view of good parent-year escapements. For the first time since 1931, commercial salmon fishing in the Alaska portion of the Yukon River drainage was closed completely. Alaska's Yukon River commercial chinook salmon harvests were first recorded in 1918. The Lower Yukon Area commercial fishery was last closed during 1925-1930 due to the presence of a large upriver subsistence fishery and considerable opposition to the commercial fishery. The recent ten-year-average, 1991-2000, commercial salmon harvest is 88,517 chinook salmon (83,096 Lower Yukon Area, 4,750 Upper Yukon Area), 339,427 summer chum salmon (128,938 Lower Yukon Area, 233,877 Upper Yukon Area), 75,000 fall chum salmon (47,800 Lower Yukon Area, 27,200 Upper Yukon Area), and 26,000 coho salmon (22,200 Lower Yukon Area, 3,800 Upper Yukon Area). The 1991-2000 average exvessel value to the Yukon Area is $5.7 million ($5.1 million Lower Yukon Area, $0.6 million Upper Yukon Area). An average of 763 permit holders commercially fished the chinook and summer chum salmon fishery from 1990 – 1999 (658 Lower Yukon Area, 105 Upper Yukon Area), and an average of 189 permit holders fished the fall chum and coho salmon fishery (171 Lower Yukon Area, 18 Upper Yukon Area).

Yukon River chinook salmon abundance in 2001 was assessed as well below average, but improved when compared to the 2000 run. This assessment is based on escapement counts and estimates from selected tributaries. Production from the 1995 and 1996 parent years appear to have been especially poor given the weak return of 5- and 6-year-old chinook salmon in 2001 and good parent year escapements particularly in 1995. Successful aerial survey observations were made in all eight Yukon River index tributaries used for escapement assessment. Minimum aerial survey sustainable escapement goals (SEG) have been established in the East and West Fork Andreafsky, Anvik, North and South Fork Nulato, and Gisasa Rivers. With the exception of the East and West Fork Andreafsky Rivers, all aerial survey goals were met. Upper ranges of the biological escapement goals (BEG) for the Chena and Salcha Rivers were exceeded. The chinook salmon spawning escapement estimate of 44,222 for the Canadian mainstem Yukon River was 85% above the recent 10-year (1991-2000) average of 23,900 and 58% above the interim escapement objective of 28,000 salmon. The Canadian chinook salmon escapement and escapement above biological escapement goals in the Chena and Salcha Rivers indicate the 2001 chinook run may have provided an Alaskan commercial harvest of 15 to 20 thousand chinook salmon. Inseason run assessment tools in the lower river did not indicate this surplus was available at the time salmon were present in the area. The precision of inseason management tools is such that relatively small harvestable surpluses beyond escapement and subsistence needs are difficult to detect. The declining trend in salmon production on the Yukon River prompted conservative management to be applied to the uncertainty inherent with inseason run assessments.

Post-season analysis of escapement data indicates the 2001 summer chum salmon run was very weak and similar to 2000. Spawning escapements to selected tributaries were slightly better than the 2000 run, with the exception of Clear Creek where the escapement was the lowest since the project began in 1995. Generally, summer chum salmon escapements were well below most other years for each project. It is unlikely that any escapements in monitored tributaries met minimum goals and none were considered adequate.

The abundance of fall chum salmon was poor in 2001. Like the 2000 season, the poor abundance of chum salmon was unexpected based on the good parent-year escapements documented throughout the drainage in 1996 and 1997. However, the department was prepared for a low run in 2001 based on recent trends in productivity. Fall chum salmon escapement goals were met in three of four monitored systems. It is unknown if the fourth monitored system met the biological escapement goal due to unacceptable survey conditions. The escapement of 38,908 fall chum salmon in the Canadian Yukon River mainstem was the lowest on record.

The coho salmon run appeared to be above average, assuming average subsistence harvests and based on the very large escapement of 46,875 fish in the Delta-Clearwater River. This was well above the minimum escapement goal of 9,000 fish.

Norton Sound

The commercial harvest in the Norton Sound Area totaled 31 thousand fish, and was comprised of 19 thousand coho, 11 thousand chum, and less than 1 thousand chinook salmon. The commercial salmon harvest was the second lowest on record. The chinook salmon harvest was the lowest on record. The chinook salmon harvest was 96% below the recent 5-year and 10-year average catches. The chum salmon harvest was 26% below the recent 5-year average and 69% below the recent 10-year average. The coho harvest was 48% below the recent 5-year average and 69% below the recent average 10-year average.

The commercial season opened in Western Norton Sound in the Golovin Subdistrict to target chum salmon on July 1. The Board of Fisheries approved management plan allowed for 15,000 chum salmon to be harvested by mid-July, but only slightly more than 7,000 were harvested. The low harvest was because of a poorer run than in recent years and fewer permits were being fished due to low salmon prices. The commercial season opened in Eastern Norton Sound on July 5, two weeks later than normal because of the late spring and the weak chinook salmon run. After the second opening in July with very poor chinook and chum catches, Eastern Norton Sound was closed until late July. The first coho commercial opening occurred on July 27 in Eastern Norton Sound and mid-August in some Western Norton Sound Subdistricts. The coho run was well below average and season ended a week or more before the regulatory closure in various Norton Sound Subdistricts.

The Norton Sound Salmon District has 201 CFEC salmon permits of which 51 actually fished during the 2001 season. The number of participating fishers this season was 38% below the recent 5-year average and was 50% below the recent 10-year average. The exvessel value of the fishery was 57 thousand dollars, the lowest value since 1967. The 2001 exvessel value of the fishery was 76% below the recent 5-year average and 84% below the recent 10-year average. The average price paid for chinook salmon was $1.00 per pound, $0.25 per pound for coho and $0.19 per pound for chum salmon. The average income for Norton Sound fishers that participated in the 2001 commercial fishery was $1.1 thousand.

Escapement estimates of chum salmon spawning streams that flow into Norton Sound was hampered by poor survey conditions. Of the 11 streams that have established chum salmon BEG's there were 5 streams that achieved the BEG, 3 streams that did not achieve the BEG, and for 3 streams it was unknown whether the BEG was achieved because of poor survey conditions.

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

Kotzebue

The commercial harvest in the Kotzebue Area was 212 thousand chum salmon. The chum salmon harvest was 83% above the previous 5-year average and 30% above the previous 10-year average. During 2001, 66 out of 203 permits fished or made at least one delivery. The recent 5-year average was 58 permits fished, but the recent 10-year average was 90 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 was lower in the 1990s.

Two buyers operated in Kotzebue during the 2001 season. The season opened on July 10, by regulation, and closed after August 24 when the last buyer ceased operations. During the 2001 fishing season, 366 hours of commercial fishing time were allowed. This is approximately 24% above the recent 5-year average, but 32% below average commercial fishing time in the 1980s. The average weight of chum salmon was 8.7 pounds, and the price paid was $0.17 per pound. The exvessel value of the fishery was $323 thousand. The average income for Kotzebue commercial fishers that participated in the 2001 commercial fishery was $4.9 thousand. Although the exvessel value was 218% above the recent 5-year average it was 78% below the average exvessel value of $1.5 million in the 1980s. Because of low salmon prices, fishers concentrated their effort near Kotzebue to minimize fuel costs. Continued low participation in the fishery can be expected in the future because of increasing costs of gear and fuel unless prices paid to fishers improve.

The only escapement project in the Kotzebue District is the Kobuk River test fish project. The test fish project had above average catches and aerial surveys in the Kobuk River drainages confirmed that escapement was met. No aerial surveys were possible in the Noatak River drainage because of weather and a lack of aircraft in mid-September.

Kodiak

The 2001 Kodiak Management Area (KMA) commercial salmon fishery began on June 9 and the last landing occurred on September 29. Commercial fishing effort was down for the fourth consecutive year. Of the 608 eligible permit holders, only 354 participated. By gear type, 172 set gillnet, 0 beach seine, and 182 purse seine permit holders fished; this is the lowest seine activity since limited entry in 1975. The estimated exvessel value of the 2001 salmon fishery was $18.9 million; less than 56% of the previous 10-year average (1991-2000) of $33.8 million. This does not include post-season bonuses for dock or refrigerated deliveries. These bonuses may add an additional $3.0 to $3.5 million dollars to the 2001 KMA salmon fishery exvessel value. The final KMA exvessel value will be available after processors file end-of-season reports in the spring of 2002.

Harvest levels of chinook, sockeye, pink, chum, and coho salmon were all better than expected. The 2001 chinook harvest (23,800) was above the previous 10-year (1991-2000) average (21,000). The sockeye harvest (2.66 million) was above forecast (2.15 million) but substantially below the 1991-2000 10-year average (4.03 million). Sockeye run timing was very early in 2001. For example, the Ayakulik sockeye run normally extends from late May to mid-August, with 60% of the run occurring prior to July 16; in 2001 over 95% of the Ayakulik run occurred prior to July 16. Early sockeye runs were very strong in early June; at Karluk, the June-to-July 15 early-run escapement goal was exceeded by June 12. Most early runs came in above forecast, except the Frazer sockeye run, which was slightly below forecast. Overall minor system production, while variable between systems, was much less than expected. Late-run sockeye were generally much weaker than expected, except at the Karluk where the run was much stronger than anticipated. Sockeye harvests from supplemental production, while significant to the total harvest (247,300), were also less than forecast (310,800). The total KMA pink salmon harvest (19.6 million) was well above the forecast (12.0 million) and above the 1991-2000 average (16.3 million). Wild stock pink salmon harvests were below expectations except in Westside Kodiak fisheries, mainly due to low fishing effort. The Kitoi Bay Hatchery contributed over 13.1 million pink salmon to the common property harvest, well above forecast (4.0 million). Chum salmon runs were excellent, for the third consecutive year. The Kodiak chum harvest (1.05 million) was above forecast (752,000) and above the 10-year average (805,000). The Kitoi Bay Hatchery contributed 216,000 chum salmon, well above forecast (63,000). The coho harvest (408,000) was above forecast (348,000) and above the 10-year average (316,000). The Kitoi Bay Hatchery contribution was 152, 000 coho, again above forecast (109,000).

Two management plans allow for the harvest of sockeye salmon considered to be of non-local origin. Fisheries in the Cape Igvak Section from June through July 25 target sockeye considered to be Chignik-bound, with up to 15% of the total Chignik sockeye harvest allocated to Kodiak fishers. The pre-July 26 Cape Igvak fishery harvest of 269,000 total sockeye salmon represents 14.95% of the total harvest of sockeye considered to be Chignik-bound. Fisheries in the North Shelikof Strait from July 6 to 25 are constrained to limit the harvest of sockeye considered to be Cook Inlet-bound. The July 6 to 25 North Shelikof fisheries harvest included 53,400 sockeye salmon. Fisheries along the north Mainland and northwest Afognak Districts were restricted on July 16, with the offshore Seaward Zone closed through July 25. No fishery restrictions were necessary in the Southwest Afognak Section.

Chinook escapements (18,800) were above established goals (11,000 to 18,000) but below the previous 10-year (1991-2000) average (25,300). Chinook escapement into the Karluk (4,500) was weak, while Ayakulik chinook escapement (13,900) was strong. Sockeye escapement goals were met in most major and minor systems. The overall sockeye escapement (1.58 million) was within established goals (1.34 to 2.01 million), but below the 1991-2000 average (1.92 million). Overall, pink escapement (3.39 million) was above established goals (1.01 to 3.02 million), and but below the 1991-1999 odd-year average (5.28 million). Escapement goals were met or exceeded for each district. The overall chum salmon escapement (558,000) was within the established goals (273,000 to 819,000) and near the 10-year average (573,000). Escapement goals were met or exceeded in all districts, with the exception of the Southwest Kodiak District (the Sturgeon River chum escapement was weak for the second consecutive year). Coho escapements were good (244,000), exceeding escapement goals (90,500 to 150,000) and the previous 10-year average (205,000).

Chignik

The 2001 Chignik Management Area (CMA) salmon fishing season was characterized by a weak early run of sockeye salmon to the Black Lake system and an average late run to the Chignik Lake system. The first commercial salmon fishery opened on June 14. The Chignik Seiners Association enacted a strike against the two local processors for higher prices until July 2. The total number of sockeye salmon harvested in the CMA during the 2001 season was 1,511,997. The forgone harvest during the price dispute was estimated at 400,736 sockeye salmon worth approximately $1.97 million. Due to deteriorating market conditions, local processors stopped purchasing salmon during the last week of August. Overall, the 2001 season provided ample fishing opportunities with total of 80 days open to commercial salmon fishing within the CMA. Fifty percent of the sockeye salmon harvest within the CMA occurred from June 14 through July 25.

The Chignik weir was operational from May 25 until August 19. The weir washed out on August 20 because of high winds and an associated debris load that significantly increased the water pressure on the structure. Because sections of the weir washed out so late in the season, the department decided not to reinstall the missing sections of the weir.

The 2001 CMA chinook salmon harvest was approximately 2,800 fish. This was below the forecast (3,700) and substantially less than the 10-year (1991-2000) average of approximately 5,900 fish. The 2001 harvest of sockeye salmon was 1.51 million fish, which was above the preseason forecast (1.03 million) and below the 10-year average harvest was 1.69 million sockeye salmon. The coho salmon harvest was about 131,000 fish, which was less than the forecast (185,000) and the 10-year average harvest of approximately 185,000 fish. Approximately 1.28 million pink salmon were harvested in 2001, which is slightly above both the preseason forecast of 1.10 million and the 10-year average of about 1.08 million. The chum salmon harvest in 2001 was approximately 199,000 fish, compared to the preseason forecast of 186,000 fish and the 10-year average of about 186,000 fish.

The exvessel value of the 2001 fishery was approximately $8.3 million, about $3 million below the 1991-2000 annual average. Ninety-two out of 98 salmon permits were fished with an estimated exvessel value per permit holder of $89,322.

Escapements were estimated by video weir counts on the Chignik River and by aerial surveys for all other streams. When the weir was not fish tight, the majority of the sockeye escapement was estimated using catch per unit of effort (CPUE) ratios from the commercial fishery. Aerial stream surveys of the CMA indicated that the chum and pink salmon escapements were above average through early September. The overall pink salmon run in the CMA was strong which provided opportunities for harvest.

The 2001 CMA chinook, sockeye, pink, and chum salmon escapements met established goals. Sockeye salmon escapement to the Chignik lakes system from May 25 through August 31 was 1,136,918 with postseason analysis apportioning 744,013 to the Black Lake run (goal = 400,000) and 392,905 to the Chignik Lake run (goal = 250,000). Other species enumerated through the Chignik River weir included 3,028 chinook, 103 coho, 1,464 pink, and 66 chum salmon.

The timing of the 2001 pink salmon runs appears to have been similar to historical averages in the Chignik Management Area. Overall, the pink runs in the CMA were strong with new fish being observed entering some streams through September 14, when the last aerial survey was conducted.

Alaska Peninsula-Aleutian Islands

South Peninsula

The 2001 commercial salmon fishery began on June 10, when a fishing period for set gillnet gear only, was announced. A fishing period for all legal gear was allowed on June 11. Due to a price dispute, fishing effort was not present. Initial fishing effort occurred on June 13 when four purse seine deliveries were made to one processor. Price disputes continued for the majority of the fleet and many permit holders did not record landings in June. The last landing occurred on September 24. Of the 396 eligible permit holders, only 241 participated during the 2001 season. The total South Peninsula harvest of approximately 2 thousand chinook in 2001 was 3 thousand less than the forecast of 5 thousand fish. The sockeye salmon catch was 607 thousand, which was about 1.4 million less than the forecast of 2 million fish. The coho salmon catch of about 209 thousand was 9 thousand more than the forecast of 200 thousand fish. The pink salmon harvest of approximately 3.78 million was about 2.2 million less than the forecast of 6 million fish. The total South Peninsula chum salmon catch was 875 thousand, 125 thousand less than the forecast of 1 million fish. The total exvessel value of the South Peninsula fishery, including the $0.5 million derived from the June fishery, was $4.1 million. This compares to an exvessel value of $13.1 million in 2000, of which $10.5 million was attributed to the sockeye salmon harvest. In 2001, sockeye salmon contributed $1.98 million, pink salmon $1.26 million, chum salmon $0.67 million, coho salmon $0.21 million, and chinook salmon $0.01 million.

South Peninsula June Fishery. The total June salmon harvests in numbers of fish for the South Unimak and Shumagin Islands fisheries were approximately 0.35 thousand chinook, 151 thousand sockeye, 0.002 thousand coho, 39 thousand pink, and 49 thousand chum salmon. The South Unimak harvest was approximately 0.013 thousand chinook, 122 thousand sockeye, 0.002 thousand coho, 32 thousand pink, and 36 thousand chum salmon. The Shumagin Islands harvest was approximately 0.02 thousand chinook, 29 thousand sockeye, 0 coho, 8 thousand pink, and 13 thousand chum salmon.

Southeastern District Mainland Fishery. In 2001, commercial salmon fleet price negotiations with local processors drastically reduced salmon harvest during June and July. Further, price negotiations in the Chignik Management Area (CMA) and in the Southeastern District Mainland (SEDM) of the Alaska Peninsula Management Area required the department to estimate foregone harvest in both areas to adhere to allocative guidelines for sockeye salmon considered Chignik bound by regulation.

Based on CMA estimated foregone and community harvest, the SEDM opened to commercial salmon fishing for 42 hours at 6:00 AM on June 24. Due to ongoing price negotiations commercial fishing effort was absent during the June 24-25 fishing period with the exception of one permit holder who delivered outside the area without reporting. The estimated SEDM foregone sockeye salmon harvest considered Chignik bound through June 25 was about 28 thousand fish.

Only a few landings were made in the SEDM fishery prior to the termination of price negotiations. The majority of the fleet began fishing on July 8 and harvested approximately 105 thousand sockeye salmon through July 25. The fleet fished outside the Northwest Stepovak Section (NWSS) during two 48-hour periods. Sockeye salmon harvest considered Chignik bound by regulation totaled approximately 51 thousand fish. The sum of the actual (51 thousand) and foregone (28 thousand) harvest of sockeye salmon considered Chignik bound by regulation was approximately 79 thousand fish. This constituted 5.5% toward the 6.0% allocation of the total Chignik bound sockeye salmon harvest through July 25.

Beginning July 1, the NWSS of the SEDM was managed on the basis of a strong Orzinski Lake sockeye salmon escapement since the Chignik runs appeared to be as strong as forecasted. Twelve fishing days (four days per week) were allowed in the NWSS through July 25. Orzinski Bay was extended for an additional six days through July 25. Sockeye salmon harvest in the NWSS from July 1-25 was about 42 thousand fish. Orzinski Lake sockeye salmon escapement reached interim escapement goals throughout the season and surpassed the 20 thousand adult salmon escapement goal with 21.8 thousand adult sockeye salmon counted through the weir through August 1 (when the weir was removed).

Landings were reported during 14 days from July 26 through August 14 for the entire SEDM. To ensure that pink and chum salmon escapements were achieved the commercial salmon fishery was closed during August 15-31. The fall fishery opened on September 1 with set gillnet landings reported during 15 days through September 24. Purse seine fishing effort was absent.

Overall, approximately 0.7 thousand chinook, 274 thousand sockeye, 31 thousand coho, 980 thousand pink, and 188 thousand chum salmon were harvested in the SEDM in 2001. These catches were less than the most recent 10-year averages (1991-2000) for sockeye, coho, and pink salmon, slightly above the 10-year average for chinook, and almost double the 10-year average for chum salmon.

South Peninsula Post June Fishery. During the 2001 season, department test fish results on July 5 indicated an abundance of immature salmon slightly below the regulatory threshold of 98 immature salmon per set. The Shumagin Islands fishery was opened without restrictions on July 6, but fishing effort was absent due to continuing industry price negotiations. Test fishing continued on July 7 and 8 with immature salmon abundance exceeding the regulatory threshold. The department closed the Shumagin Islands to purse seine gear during the commercial fishing period beginning July 8 due to the high number of immature salmon observed in the test fisheries. As indicated by July 10-16 test fishery results, immature salmon remained in the Shumagin Islands at levels exceeding the regulatory threshold until July 16. Seine vessels were permitted to fish in the Shumagin Islands on July 17.

The South Peninsula post June chinook salmon harvest of 2.4 thousand equaled the 1991-2000 average of 2.4 thousand fish. The sockeye salmon harvest of 454 thousand was 61% of the 1991-2000 average of 739 thousand fish. The coho salmon harvest of 209 thousand was 86% of the 1991-2000 average of 243 thousand fish; during the period July 22-31, a total of 60 thousand coho salmon were harvested in non-terminal areas and applied to the 60 thousand fish cap. The pink salmon harvest of 3.7 million was 50% of the 1991-2000 average of 7.4 million fish. The chum salmon harvest of 826 thousand exceeded the 1991-2000 average of 750 thousand by approximately 76 thousand fish. The last day a market was available for fishermen targeting pink salmon was August 21. The last August delivery was on August 30.

South Peninsula Escapements. The South Peninsula sockeye salmon escapement of 162 thousand fish was above the escapement goal range of 67 thousand to 124 thousand fish. A total of 82,000 coho salmon were documented in 50 South Peninsula streams. Some of the major coho salmon systems were not surveyed or surveyed during off-peak times due to inclement fall weather. The South Peninsula indexed total pink salmon escapement of 2.97 million was near the upper end of the odd year goal range of approximately 2 million to 3.3 million fish. The South Peninsula indexed total chum salmon escapement of 751 thousand was above the goal range of 347 thousand to 693 thousand fish.

North Peninsula

In 2001, 172 permit holders (5 of which were Area T permit holders) participated in commercial salmon fisheries along the North Peninsula which began on June 4. The last landing of 2001 was made on September 18. The North Peninsula fishery is predominantly a sockeye salmon fishery, although depending on market conditions directed chinook, chum, and coho fisheries occur in some locations. During even-numbered years, pink salmon are targeted in select locations if abundance is high and market conditions are favorable.

The chinook salmon harvest of about 4 thousand was approximately 20% below the 5 thousand fish forecast. The sockeye salmon harvest of 1.15 million fish was below the harvest projection of 1.5 million fish. The pink salmon harvest of 12 thousand was close to the forecast of 15 thousand fish. Due to poor market conditions, the coho harvest was only 22 thousand fish, which was well below the 100 thousand fish projection. Because of at least moderately strong runs and interest by buyers, the North Peninsula chum salmon harvest was 168 thousand fish, over three times the preseason projected harvest of 50 thousand fish.

In 2001, chum salmon was the only species with a harvest above the previous 10-year average (123 thousand) on the North Peninsula. The chinook salmon harvest was slightly higher than in 2000 but was well below the previous 10-year average of 10,100 fish. The sockeye salmon harvest was only 46% of the 1991-2000 average. The coho salmon harvest was the lowest since 1974. The pink salmon harvest was slightly below the 1991-1999 odd-numbered year average of 15,400. The total exvessel value of the 2001 North Peninsula fishery was $3.6 million. This compares to an exvessel value of $9.8 million in 2000.

North Peninsula Escapement. The North Peninsula indexed total chinook salmon escapement was 13.3 thousand fish, which exceeded the lower escapement goal range of 7.4 thousand fish.

The North Peninsula sockeye salmon escapement was estimated to be 875 thousand fish. Systems with weirs (Bear, Nelson, and Ilnik) accounted for 64% of North Peninsula sockeye salmon escapement. The total North Peninsula escapement goal range is approximately 631 thousand to 872 thousand sockeye salmon. All major sockeye salmon system escapement goals were met or exceeded.

The North Peninsula coho salmon run was at least moderately strong. The bulk of the run escaped due to low exvessel prices and a lack of processor interest in purchasing coho salmon. Approximately 285,000 coho salmon were documented in 31 North Peninsula streams during 2001. This escapement figure is lower than the actual total because some streams were not surveyed.

The North Peninsula pink salmon escapement was at least 30 thousand fish. The North Peninsula is normally a minor pink salmon producer.

The North Peninsula indexed total chum salmon escapement was 693 thousand fish, which was near the upper end of the 347 thousand to 723 thousand goal. Due to low prices, there was only light fishing effort directed toward North Peninsula chum salmon.

Aleutian Islands and Atka–Amlia Islands Areas

In 2001, commercial salmon harvest was absent in the Aleutian Islands and Atka–Amlia Islands Areas.

The pink salmon runs on Unalaska Island were unusually strong for an odd-numbered year, especially in Unalaska Bay. An August 11 aerial survey showed a very strong escapement into Nateekin River and strong pink salmon escapements were seen entering smaller Unalaska Bay streams. There was no interest in fishing at Unalaska until the pink and chum salmon runs in the Alaska Peninsula Area were nearly over. On August 17 a fishing vessel traveled to Unalaska with a tender, but was unable to harvest salmon because the run was over.

An unusually strong sockeye salmon run occurred at McLees Lake. A total of 45,866 sockeye were counted through a US Fish and Wildlife Service weir that operated from June 15 through July 30. A substantial number of additional fish probably escaped prior to completion of weir installation at 8:00 PM on June 15. The June 16 count was 2,652 sockeye salmon. An aerial survey on August 11 accounted for 34 thousand sockeye salmon. An additional 4 thousand or more sockeye salmon were estimated upstream of surveyed waters. This was by far the highest recorded aerial survey sockeye salmon count for McLees Lake.

PRELIMINARY FORECASTS OF 2000 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 2002 fishing year, forecast fisheries are as follows:

Southeast	—	pink salmon
Prince William Sound	—	pink, chum, sockeye, and coho salmon
Copper River	—	sockeye and chinook salmon
Copper and Bering Rivers	—	coho salmon
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 and chinook salmon
Alaska Peninsula, Bear Lake	—	sockeye salmon
Alaska Peninsula, Nelson River	—	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. Projections of 2002 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	237 [a]	1,630 [a]	2,710 [a]	36,500 [b]	7,900 [d]	49,000
Prince William Sound						
Common Property	49	1,517	568	16,700	1,850	20,700
Cost Recovery		272	16	11,400	380	12,100
Upper Cook Inlet	10 [a]	2,200	160 [a]	170 [a]	120 [a]	2,700
Lower Cook Inlet	1 [a]	215	14 [a]	3,583	21 [a]	3,830
Bristol Bay	50	9,657	150 [c]	50 [c]	530	10,400
Central Region Total	110	13,900	910	31,900	2,900	49,700
Kodiak Area	20	2,230	367	11,000	778	14,400
Chignik	4	1,210	182	1,090	178	2,700
South Peninsula	5	1,500	250	6,000	1,100	8,900
North Peninsula	10	1,500	100	100	100	1,800
Aleutian Islands	0	0	0	500	0	500
Westward Region Total	39	6,440	900	18,700	2,160	28,300
AYK Region Total	30	90	300	200	380	1,000
Statewide Total	416	22,100	4,820	87,300	13,300	128,000

Columns and rows may not total exactly due to rounding.

[a] Average harvest for the five-year, 1997-2001, period.

[b] Mid point of the 57 - 87 million predicted return minus the 27.5 million escapement goal.

[c] 5-year average of even-year harvests

[d] Projection of southeast Alaska hatchery chum salmon return, 5.942 million from McNair (2002), less broodstock (0.8 million) expanded based on proportion of wild fish (0.65) in 2002 catch

Table 2. Preliminary 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	240 [a]	2,030	3,270	66,800	8,400	80,800
Prince William Sound	40	2,260	494	35,200	3,100	41,100
Upper Cook Inlet	9	1,830	113	72	84	2,100
Lower Cook Inlet	1	216	7	593	89	900
Bristol Bay	24	14,000	17	1	870	14,900
Central Region Total	74	18,300	600	35,900	4,100	59,000
Kodiak Area	24	2,660	408	19,600	1,050	23,700
Chignik	3	1,510	131	1,280	199	3,120
South Peninsula & Aleutia	2	607	209	3,780	875	5,470
North Peninsula	4	1,150	22	12	168	1,360
Westward Region Total	33	5,930	770	24,700	2,290	33,700
AYK Region Total	14	60	241	0	245	560
Total Alaska	361	26,300	4,880	127,400	15,000	174,000

Missing data indicates 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, 2000 to September 30, 2001 catch accounting period.

Table 3. Preliminary 2001 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	4,070	12,600	22,000	219,700	74,800	333,000
Prince William Sound	855	13,881	4,253	119,456	23,499	162,000
Upper Cook Inlet	170	10,978	743	254	584	12,700
Lower Cook Inlet	13	1,057	50	1,823	834	3,800
Bristol Bay	436	94,244	123	2	6,424	101,000
Central Region Total	1,470	120,000	5,170	122,000	31,300	280,000
Kodiak Area	331	14,700	3,180	67,400	8,600	94,200
Chignik	39	11,100	1,010	4,080	1,610	17,800
South Peninsula & Aleutians	24	3,920	1,400	13,900	6,690	25,900
North Peninsula	71	6,610	188	41	1,320	8,200
Westward Region Total	500	36,300	5,780	85,400	18,200	146,000
AYK Region Total	292	451	1,857	0	2,090	4,690
Total Alaska	6,330	169,000	34,800	427,000	126,000	763,000

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

Columns may not total exactly due to rounding.

Table 4. Preliminary 2001 Southeast Region commercial salmon harvests, by fishing area and species, in thousands of fish.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Tree Point Gillnet	1	80	36	518	220	860
Prince of Wales Island Gillnet	1	164	188	825	283	1,460
Stikine River Gillnet	0	1	11	11	6	30
Seine - Southern Districts	4	842	426	48,612	2,155	52,040
Southern S.E. Alaska Total	6	1,087	661	50,000	2,700	54,500
Taku-Snettisham Gillnet	2	290	23	123	237	680
Lynn Canal Gillnet	1	125	34	45	341	550
Yakutat Setnet	3	141	205	32	0	380
Seine - Northern Districts	1	162	110	12,799	882	13,950
Northern S.E. Alaska Total	7	718	372	13,000	1,460	15,600
Winter Troll [a]	23	0	0	0	0	20
Experimental Troll	95	3	3	125	8	230
Hatchery Terminal Area Troll	7	0	2	0	193	200
Summer Troll	28	1	1,840	1	1	1,870
Troll Fishery Harvest Total	153	4	1,840	127	201	2,300
Hatchery Terminal Area Gillnet	7	28	3	46	478	560
Hatchery Terminal Area Seine	17	10	6	539	1,395	1,970
Hatchery Cost Recovery	46	138	331	1,188	2,066	3,770
Annette Island	4	41	57	1,955	126	2,180
S.E. Alaska - Other Total	74	217	397	3,700	4,100	8,500
Southeast Region Total	240	2,030	3,270	66,800	8,400	80,800

[a] Includes salmon caught by troll gear from October 11, 2000 through April 14, 2001.
Columns may not total exactly due to rounding.

Table 5. Preliminary 2001 Central Region commercial salmon harvests, by fishing area and species, in thousands of fish.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Purse Seine						
Eastern	0	20	175	16,050	259	16,500
Northern	0	0	0	405	10	420
Coghill	0	2	0	648	4	650
Southwestern [b]	0	96	7	3,073	230	3,410
Montague [a]	0	4	15	807	442	1,270
Southeastern	0	1	1	535	45	581
Drift Gillnet						
Bering River [b]	0	6	3	0	0	8
Copper River [a, b]	40	1,324	252	9	3	1,630
Unakwik	0	2	0	0	0	2
Coghill	0	88	3	309	1,142	1,540
Eshamy	0	500	10	368	21	899
Set Gillnet						
Eshamy	0	176	1	128	7	312
Hatchery [c]	0	43	22	12,914	936	13,900
Misc. PWS [d]		0	5	1	2	0
Prince William Sound Total	40	2,260	494	35,200	3,100	41,100
Southern District	1	155	3	543	4	710
Kamishak District	0	40	0	1	85	126
Outer District	0	7	0	49	0	56
Eastern District	0	14	4	0	0	18
Lower Cook Inlet Total	1	216	7	590	89	910
Central District	7	1,776	67	68	82	2,000
Northern District	2	51	46	4	2	105
Upper Cook Inlet Total	9	1,830	113	72	84	2,110
Naknek-Kvichak District	1	5,245	0	0	40	5,286
Nushagak District	11	4,610	3	0	537	5,161
Egegik District	1	2,862	13	0	31	2,907
Ugashik District	1	476	1	0	50	528
Togiak District	10	811	0	0	212	1,033
Bristol Bay Total	24	14,000	17	1	870	14,900
Central Region Total	74	18,300	600	35,900	4,100	59,000

[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

Table 6. Preliminary 2001 Westward Region commercial salmon harvests, by fishing area and species, in thousands of fish.

	Species					
Fishing Area	Chinook	Sockeye	Coho	Pink	Chum	Total
Kodiak	24	2,660	408	19,600	1,050	23,700
Chignik	3	1,510	131	1,280	199	3,100
South Peninsula and Aleutian Islands	2	607	209	3,780	875	5,500
North Peninsula	4	1,150	22	12	168	1,360
Alaska Peninsula Total	6	1,760	231	3,790	1,040	6,830
Aleutian Islands [a]						
Westward Region Total	33	5,930	770	24,670	2,290	33,700

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

Columns may not total exactly due to rounding

[a] Harvest data are presently confidential.

Table 7. Preliminary 2001 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	0	193	0	1	194
Kuskokwim Bay	14	60	28	0	21	122
Kuskokwim Area Total	14	60	221	0	22	316
Lower Yukon River	0	0	0	0	0	0
Upper Yukon River [a]	0	0	0	0	0	0
Yukon River Total [a]	0	0	0	0	0	0
Norton Sound	0	0	20	0	11	31
Kotzebue Area	0				212	212
AYK Region Total	14	60	241	0	245	559

[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

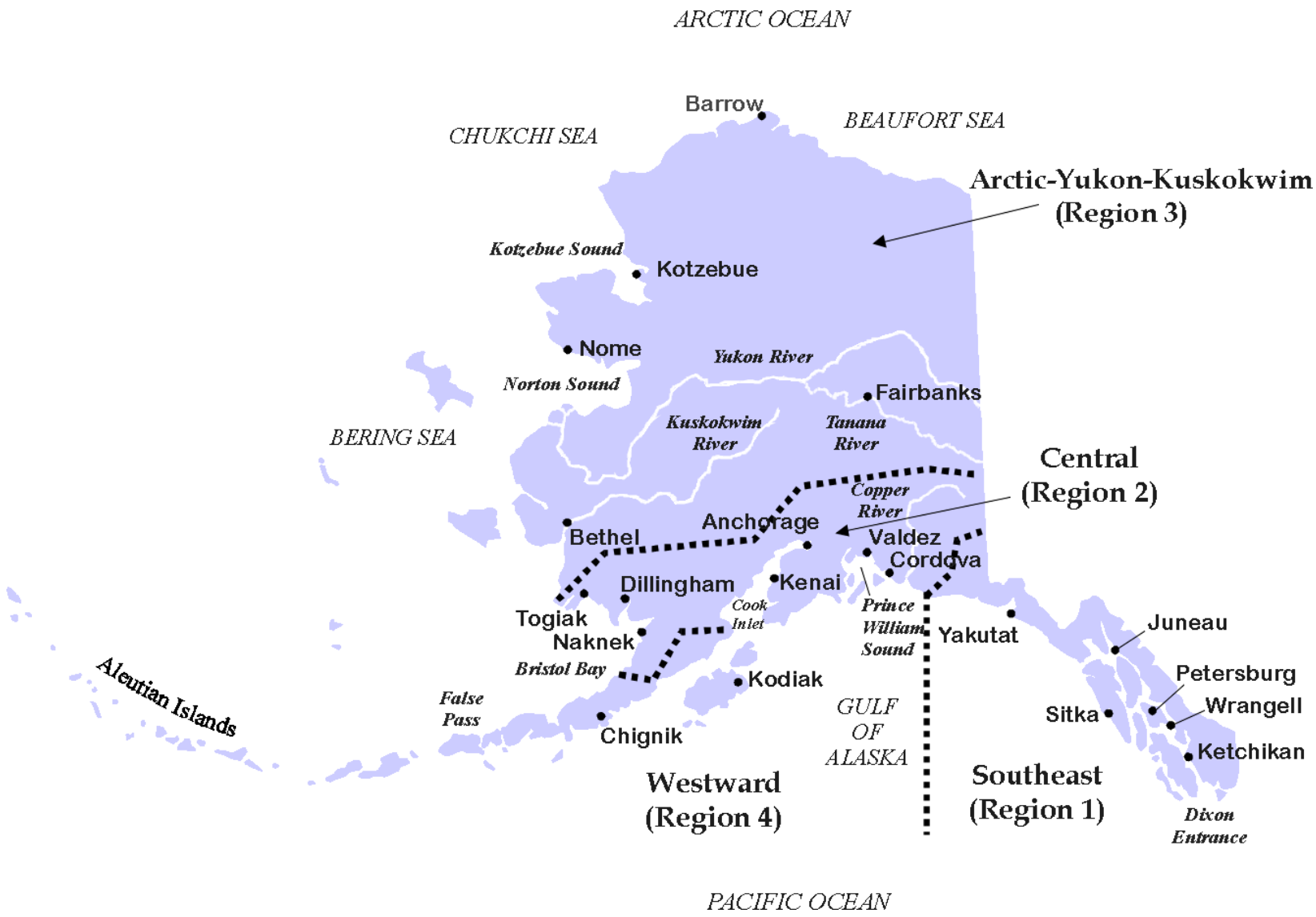

Figure 1. The four fishery management regions (Southeast, Central, Arctic-Yukon-Kuskokwim, and Westward) of the Alaska Department of Fish and Game, Division of Commercial Fisheries.

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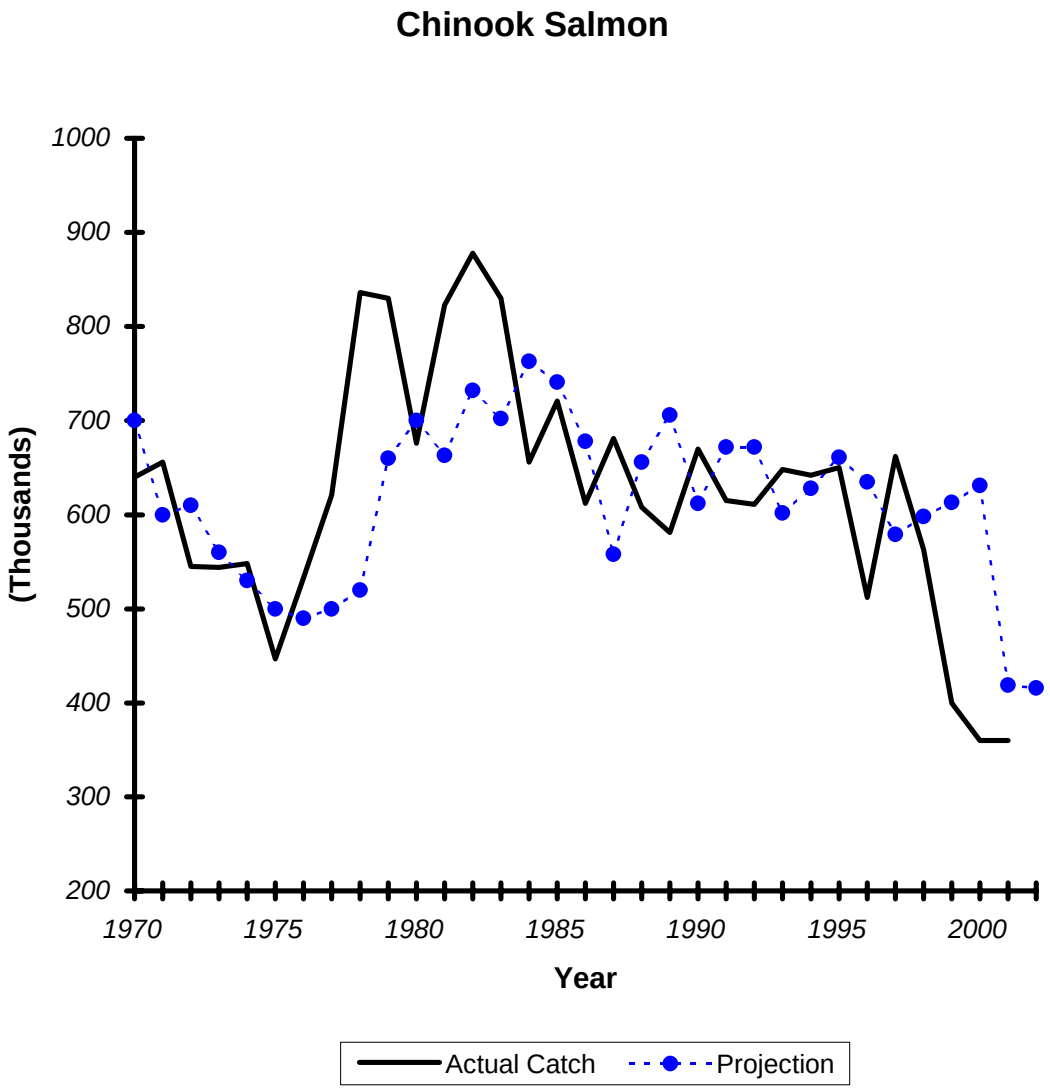

Figure 2. Relationship between actual catch and projected catch in thousands, for Alaskan chinook salmon fisheries from 1970-2001, with the 2002 projection.

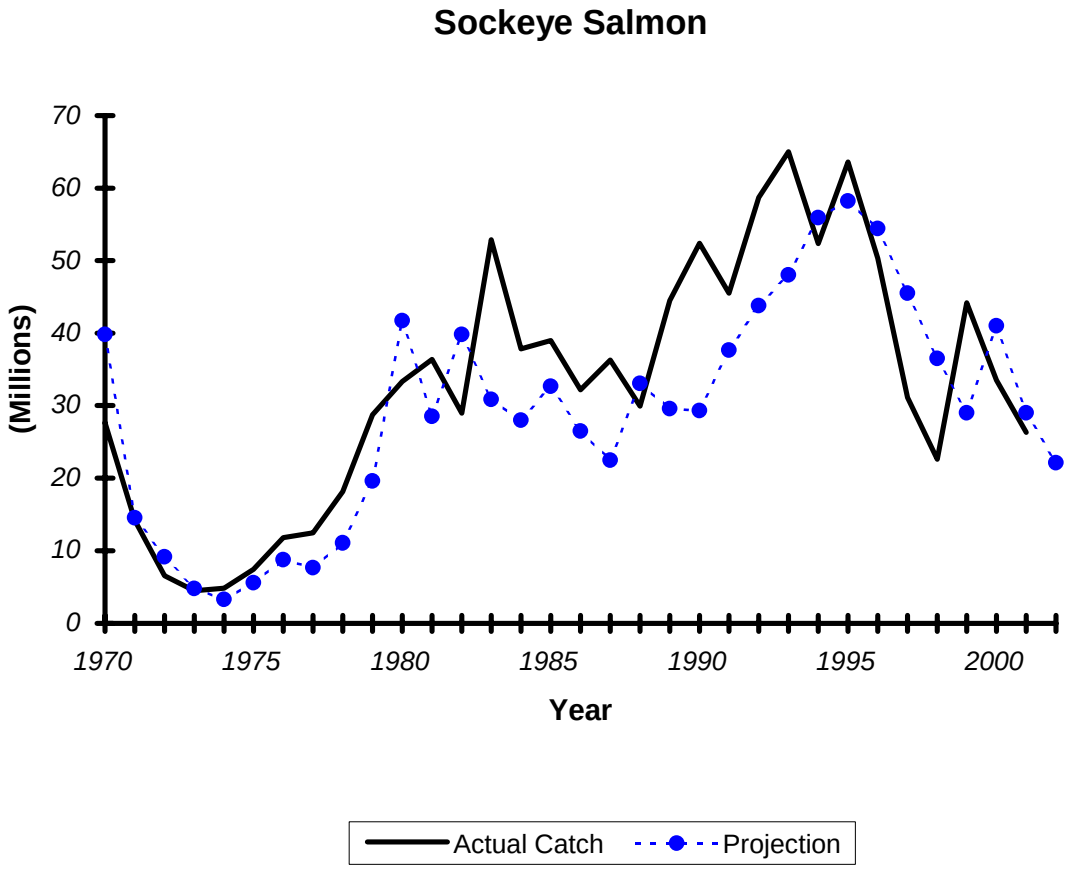

Figure 3. Relationship between actual catch and projected catch in millions, for Alaskan sockeye salmon fisheries from 1970-2001, with the 2002 projection.

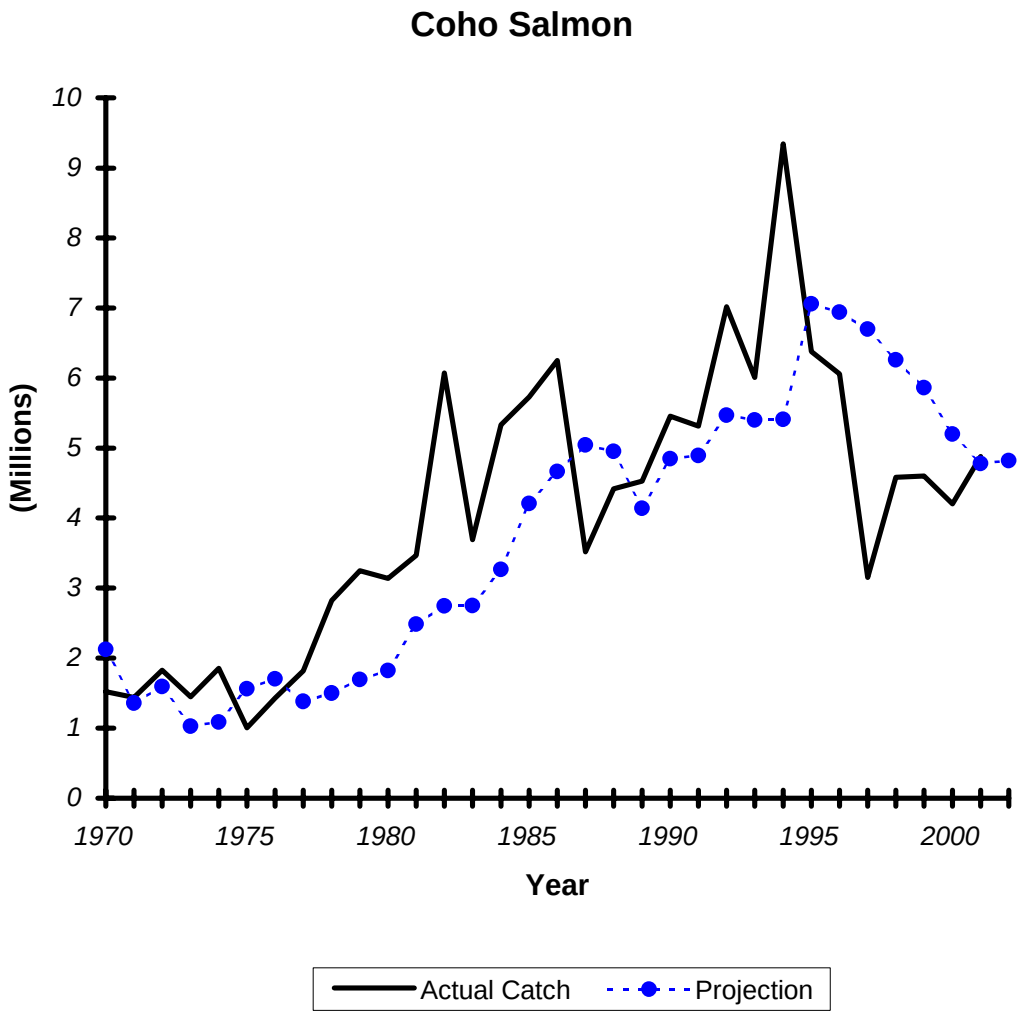

Figure 4. Relationship between actual catch (millions) and projected catch (millions) for Alaskan coho salmon fisheries from 1970-2001, with the 2002 projection.

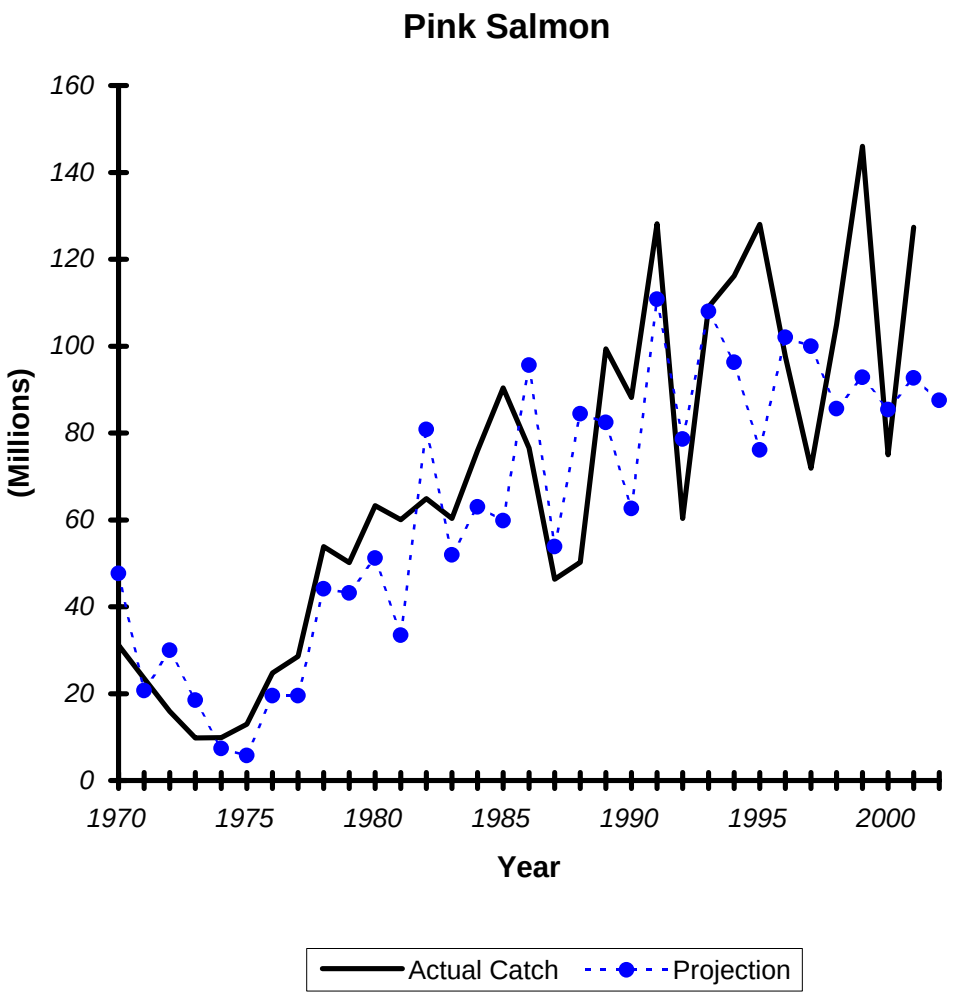

Figure 5. Relationship between actual catch and projected catch in millions, for Alaska pink salmon fisheries from 1970-2001, with the 2002 projection.

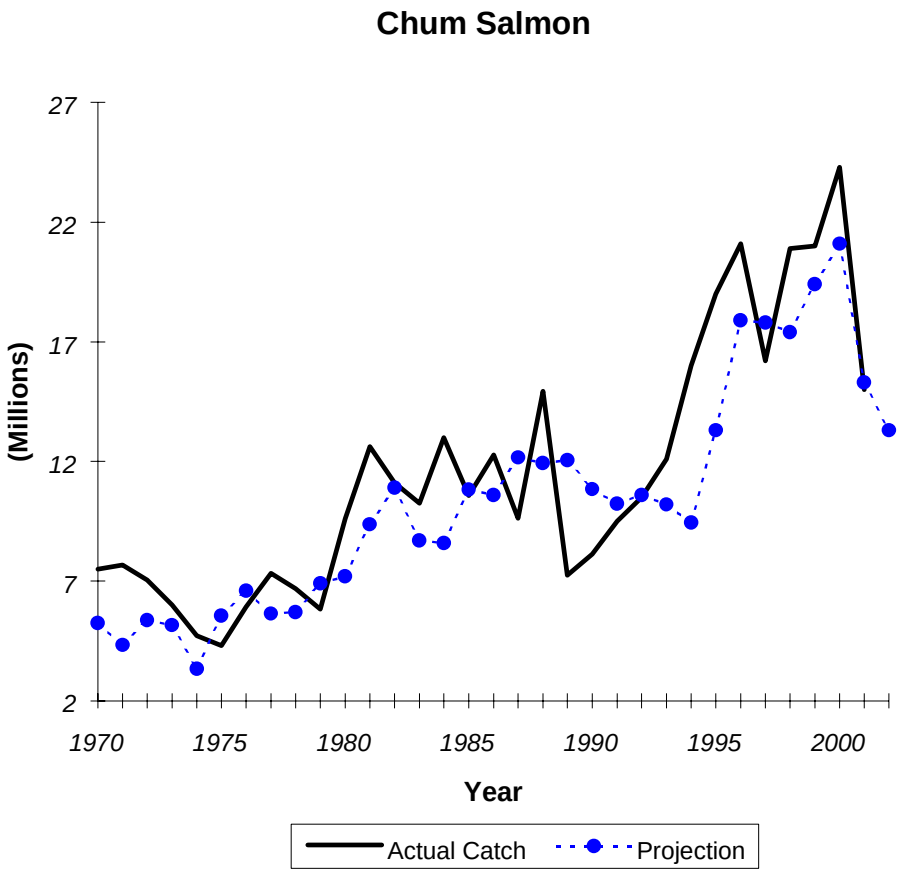

Figure 6. Relationship between actual catch and projected catch in millions, for Alaska chum salmon fisheries from 1970-2001, with the 2002 projection.

APPENDIX

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (millions)	Forecast Range (millions)
NATURAL PRODUCTION:		
Total Run	64.0	57–87
Escapement Goal	27.4	
Harvest Estimate	36.5	30-52
HATCHERY AND SUPPLEMENTAL PRODUCTION:		
Hatchery Run	0.05	0.035-0.065
Broodstock Needs	0.05	
Cost Recovery Needs		
Limited Entry Harvest		
TOTAL PRODUCTION:		
Run Estimate	69.5	57-87
Natural Escapement Goal	27.5	
Broodstock Needs	0.05	
Cost Recovery Needs	0	
Limited Entry Harvest	36.5	30-52

Forecast Methods

This preseason prediction of the total return of pink salmon to Southeast Alaska in 2000 is based on selecting one of five different return magnitude categories. These categories for TOTAL ADULT RETURN were obtained by calculating the 20th, 40th, 60th, and 80th percentile of Southeast Alaska's pink salmon returns (harvest + escapement) during the 1967 through 1998 time period.

These categories are:

Category	Range	Percentile
Disaster	Less than 18 million	Less than 20th
Weak	18 to 35 million	21st to 40th
Average	35 to 57 million	41st to 60th
Strong	57 to 87 million	61st to 80th
Excellent	More than 87 million	Greater than 80th

The pink salmon return in 2000 is predicted to be STRONG with estimated total returns in the 57 to 87 million fish range. We considered the spawner-recruit relationship, winter incubation temperatures, and anecdotal spring fry observations to be the most important indicators making this forecast. These three sources suggest an overall *strong* return for the region. The 2000 parent year was average, but this escapement level is in the range where some of the highest variation (1979 and 1996) in returns per spawner has occurred in the past. Winter temperatures were again slightly above average for the region and should not have any detrimental effect on the incubation period. Anecdotal early marine fry observations were mundane with no poor or phenomenal densities observed. Again if all life cycle phases encounter optimum conditions we could see excellent returns again in 2002

Tim Zadina
SSE Salmon Research Program Manager / Pink and Chum Research Biologist - Ketchikan

FORECAST AREA: **Prince William Sound**
SPECIES: **Pink Salmon**

Preliminary Forecast of the 2002 Run:	Forecast Estimate (millions)	Forecast Range (millions)
NATURAL PRODUCTION:		
Prince William Sound General Districts		
Total Run	4.6	1.4 - 7.9
Escapement Goal	1.4	
Harvest Estimate	3.2	0.0 - 6.5
HATCHERY AND SUPPLEMENTAL PRODUCTION:		
Valdez Fisheries Development Association – Solomon Gulch Hatchery		
Hatchery Run	8.4	5.8 - 10.9
Broodstock Needs	0.5	
Cost Recovery Needs	5.1	4.3 - 6.4
Limited Entry Harvest	2.8	1.0 - 4.0
Historic Survival for Even Years: Range 1.7% - 9.0%, Mean = 4.1%		
Prince William Sound Aquaculture Corporation – Cannery Creek Hatchery		
Hatchery Run	4.4	3.3 - 5.5
Broodstock Needs	0.3	
Cost Recovery Needs	1.5	1.0 - 1.9
Limited Entry Harvest	2.6	2.0 - 3.3
Historic Survival for Even Years: Range = 0.5% – 6.9%, Mean = 4.0%		
Prince William Sound Aquaculture Corporation – A. F. Koernig Hatchery		
Hatchery Run	7.1	5.1-9.1
Broodstock Needs	0.3	
Cost Recovery Needs	2.5	1.7-3.3
Limited Entry Harvest	4.3	3.1 - 5.5
Historic Survival for Even Years: Range = 1.5% – 13.3%, Mean = 4.7%		
Prince William Sound Aquaculture Corporation – W. H. Noerenberg Hatchery		
Hatchery Run	6.4	4.6 - 8.3
Broodstock Needs	0.3	
Cost Recovery Needs	2.3	1.5 - 3.0
Limited Entry Harvest	3.8	2.8 - 5.0
Historic Survival for Even Years: Range = 1.0% – 8.5%, Mean = 5.0%		
TOTAL PRODUCTION:		
Run Estimate	30.9	20.2 - 41.7
Natural Escapement Goal	1.4	
Broodstock Needs	1.4	
Cost Recovery Needs	11.4	8.5 - 14.6
Limited Entry Harvest	16.7	8.9 - 24.3

Forecast Methods

The predicted natural run of pink salmon is the average total run of natural production for the even years 1992-2000. The forecast range is the 80% confidence interval about the mean. This differs markedly from predictions through 1999 that used linear regressions of adult production on brood year escapement for indicator spawning streams.

The forecast for the total hatchery run is the sum of individual hatchery forecasts. The forecast for each hatchery is the product of the number of fry released and historic mean marine survival rate at each hatchery. The 80% confidence interval around the forecast is derived from the confidence interval around the mean of the marine survival data.

Projected brood stock needs will not change unless State permitted changes occur in hatchery programs. Projected brood stock needs for each facility are based on the expected number of eggs from each female and the expected percentage of females in the brood stock.

All cost recovery harvest estimates are preliminary. Cost recovery harvests for the Prince William Sound Aquaculture Corporation (PWSAC) are based on 40% of the total run for brood and cost recovery at each facility. Actual PWSAC cost recovery harvests will depend on the run to each facility and a revenue goal to be determined. The Valdez Fisheries Development Association (VFDA) projected cost recovery harvest is based on a revenue goal of $2.7 million. The VFDA cost recovery harvest was calculated using a pink salmon weight of 3.5 pounds and a base price of $0.15/lb. The range was calculated using $0.12/lb as the lower bound and $0.18/lb as the upper prince bound.

Forecast Discussion

Previous forecasts employed surveys of preemergent eggs and juveniles, or linear regressions of adult production on brood year escapement for indicator spawning streams. Surveys of preemergent eggs and juveniles are no longer conducted. This method was discontinued because the linear regressions were not significant and produced estimates no better than the average harvest. The 1992-2000 even years average return was chosen, because reliable estimates of natural and hatchery contributions are available for that period.

The release of 621 million pink salmon from hatcheries in Prince William Sound in 2001 was about 60 million higher than the 1991-2000 mean. Marine survival estimates for each hatchery were calculated using coded-wire tag recoveries from 1987 through 1997. These survival estimates have most likely underestimated hatchery production. Since 1998, hatchery contributions have been calculated from recoveries of thermal marked otoliths. Mean even-year survival was used to calculate the estimated run size. All of the fry released at WNH were relatively large (>0.5 g); however, the average size of juveniles collected in the Southwestern District was the lowest in the 1997-2001 time series. This indicates that survival will probably be below average.

Effects of predators are extremely difficult to quantify and can greatly affect the survival of pink salmon juveniles. This forecast does not explicitly account for predation. Future enhancements to forecasting accuracy may come from work nearing completion on a number of *Exxon Valdez* oil spill (EVOS) Trustee Council funded projects. Most promising are project components within the Sound Ecosystem Assessment (SEA) study, which incorporate smolt size, ocean temperatures, plankton abundance, and growth rate in bioenergetic models to estimate pink salmon ocean survival.

The midpoint forecast for a 2002 hatchery return of 26.3 million pink salmon to Prince William Sound would be the sixth largest hatchery run achieved.

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FORECAST AREA: **Prince William Sound**
SPECIES: **Chum Salmon**

Preliminary Forecast of the 2002 Run:	Forecast Estimate (millions)	Forecast Range (millions)
NATURAL PRODUCTION:		
Prince William Sound General Districts		
Total Run	0.92	0.69 - 1.15
Escapement Goal	0.23	
Harvest Estimate	0.69	0.46 - 0.92
HATCHERY AND SUPPLEMENTAL PRODUCTION:		
Prince William Sound Aquaculture Corporation – W. H. Noerenberg Hatchery (Onsite Returns)		
Hatchery Run	1.29	0.59 - 1.99
Broodstock Needs	0.14	
Cost Recovery Needs[a]	0.38	0.20 - 0.53
Limited Entry Harvest	0.77	0.07 - 1.47
Prince William Sound Aquaculture Corporation – W. H. Noerenberg Hatchery (Port Chalmers Remote Returns)		
Hatchery Run	0.26	0.22 - 0.48
Broodstock Needs	0.0	
Cost Recovery Needs[a]	0.0	
Limited Entry Harvest	0.36	0.22 - 0.48
Prince William Sound Aquaculture Corporation – A. F. Koernig Hatchery (Onsite Returns)		
Hatchery Run	0.03	0.02 - 0.04
Broodstock Needs	0.0	
Cost Recovery Needs[a]	0.00	
Limited Entry Harvest	0.03	0.02 - 0.04
TOTAL PRODUCTION		
Run Estimate	2.50	1.52 - 3.7
Escapement Goal	0.23	
Broodstock Needs	0.14	
Cost Recovery Needs	0.38	0.20 - 0.53
Limited Entry Harvest	1.85	0.77 - 2.95

[a] Chum salmon cost recovery was estimated as 40% of the total run for cost recovery and brood.

Forecast Methods

The forecast of the total natural chum salmon run was calculated as the average of all natural runs from 1992 – 2001. Estimated wild contributions to the Coghill and Eshamy Districts were calculated using the average of all natural runs from 1970 – 1986. The forecast range is the 80% confidence interval about the mean return.

The forecast of the total-hatchery chum salmon run is the sum of individual hatchery forecasts. The forecast for each hatchery was the product of the number of fry released and the historical mean marine survival rate and age composition. Hatchery runs for all age classes were calculated from fry releases made during 1995-1999 multiplied by a mean marine survival of 1.34% (range: 0.85-1.86%). Mean survival for all released fry was based on 10 years of fry release and adult return data from Wally Noerenberg Hatchery (WNH). The average age composition for previous chum salmon returns during 1983-2001 was used in the calculation. However, hatchery-rearing practices were altered in 1995, and this resulted in released fry about 2.5 times larger than those from earlier years. An adjustment to the total forecast was made based upon differences between the actual and forecasted chum returns from 1998 – 2001. This approach was used to account for changes in age at maturity and marine survival that may have resulted from releasing fry at a larger size. The 80% confidence interval around the forecast was derived from the confidence interval around the mean accuracy of the forecast in the previous 11 years.

The Armin F. Koernig Hatchery (AFK) run is expected to be composed of five and six year old chum salmon returning from releases in 1996 and 1997, but no historical survival data are available for releases at this site. The Port Chalmers chum salmon run is expected to be comprised of all adult age classes in 2002, but no historic survival by age class data are available for releases at this site. The WNH historical survivals were used to forecast AFK and Port Chalmers runs, and associated confidence intervals. The forecast for the WNH run was based on sibling relationships. A record four-year-old component returned to the WNH in 2000 from fry that were released at over twice the average size of historical releases. Large size at release could shift adult returns to earlier age classes, as well as significantly increase overall survival.

Projected brood stock needs for WNH were based on the expected number of eggs produced from each female and expected proportion of females in the brood stock. All cost recovery harvest estimates are preliminary. PWSAC cost recovery needs for chum salmon are based on taking 40% of the total run for brood stock and cost recovery.

Forecast Discussion

Our ability to accurately forecast natural chum salmon is limited by the small amount of data available. Accurate estimates of wild stock contributions to harvests are not available for recent years due to elimination of the coded-wire tag recovery program for this species. Age data from escapements and harvests are unavailable for most areas of PWS. If actual run size is close to the forecasted run for 2002, it would be about half of the 2001 run.

Our ability to accurately forecast hatchery chum salmon runs is limited, because recent changes in hatchery practices appear to have altered survival and possibly age at maturity. The six-year-old chum salmon forecast was calculated at 1.5 times the mean survival rate for that year class. Siblings of that brood year produced runs approximately 2-3 times greater than the model forecast in previous years. The strong returns from this brood year were probably due to releases of larger fry, favorable environmental conditions, and a possible increase in the proportion of this year class returning at younger ages. Age-5 chum salmon generally contribute about 40% to the run, but previous returns of age-3 and -4 siblings in 2000 and 2001

produced runs that were near the long-term average. Therefore, we are expecting a normal return for the age-5 year class. The four-year-old component, which generally contributes about 53% of the return, is expected to produce a sizeable return for 2002. This forecast is based on the number of three-year-old siblings that returned in 2001. As a result, the midpoint forecast for the four-year old age class was increased to 1.5 times the model prediction to compensate for the strength of the brood year. The three-year old component typically contributes about 4% to the run. Returns of age-3 chum salmon from the 1999 brood year are expected to be near the long-term average. Returns from Port Chalmers remote releases of chum salmon fry from WNH are expected to be back to levels expected prior to 2000. Together, the WNH onsite and Port Chalmers remote returns are expected to produce over 1.56 million adult chum salmon.

Chum salmon released at AFK Hatchery in 1997 and 1998 were also reared to a large size. Returns in 2000 were about 3 times greater than predicted. The AFK Hatchery five-year-old component was reduced by 50% in 2002 because of the reduced survivals of this brood year at other locations in PWS. All of the AFK run in 2002 will be harvested by the commercial common property fleet inside the special harvest area.

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FORECAST AREA: **Prince William Sound**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
NATURAL PRODUCTION:		
Prince William Sound – Coghill Lake		
Total Run	95.6	37.9 - 249.0
Escapement Goal	25.0	
Harvest Estimate	70.6	12.9 - 224.0
Prince William Sound – Eshamy Lake		
Total Run	41.0	29.0 - 52.9
Escapement Goal	35.0	
Harvest Estimate	6.0	0.0 - 17.9
Prince William Sound – Unakwik District		
Harvest Estimate	10.1	7.8 - 12.5
HATCHERY AND SUPPLEMENTAL PRODUCTION:		
Prince William Sound Aquaculture Corporation – Main Bay Hatchery (Eyak Stock Onsite Returns)		
Hatchery Run	36.1	34.6 - 37.6
Broodstock Needs[a]	0.0	
Cost Recovery Needs[b]	14.4	13.8 - 15.0
Limited Entry Harvest	21.7	20.8 - 22.6
Prince William Sound Aquaculture Corporation – Main Bay Hatchery (Coghill Stock Onsite Returns)		
Hatchery Run	661.4	608.0 - 628.6
Broodstock Needs	8.0	
Cost Recovery Needs[b]	256.6	252.0 - 260.8
Limited Entry Harvest	396.8	390.1 - 403.3
Prince William Sound Aquaculture Corporation – Main Bay Hatchery (Eshamy Stock Onsite Returns)		
Hatchery Run	3.4	
Broodstock Needs[a]	0.0	
Cost Recovery Needs[b]	1.4	
Limited Entry Harvest	2.0	
TOTAL PRODUCTION		
Run Estimate	847.6	709.5 - 980.6
Natural Escapement Goal	60.0	
Broodstock Needs	8.0	
Cost Recovery Needs[b]	272.4	258.0 - 258.5
Limited Entry Harvest	507.2	383.5 - 654.1

[a] The Eyak and Eshamy stocks are being phased out and no brood will be required.
[b] The Main Bay Hatchery cost recovery was estimated as 40% of the total run for cost recovery and brood stock combined.

Forecast Methods

The forecast of the natural sockeye salmon run to Coghill Lake is the total of estimates for five age classes. Linear regression models using logarithm-transformed data were used to predict runs for two age classes: age-1.2 and -1.3 sockeye salmon. The run of each of these two age classes was predicted from the relationship between returns of that age class and returns of the age class one year younger from the same brood year. For example, the model used to predict the run of age-1.2 sockeye salmon in 2002 used the run of age-1.1 sockeye salmon in 2001 as the input parameter. The predicted runs of age-1.1, -2.2, and -2.3 sockeye salmon were calculated as the mean return of that age class in past years. Although catch and escapement numbers, as well as age composition data, are available for Coghill sockeye salmon runs since 1962, escapement numbers prior to installation of a full weir in 1974 are considered unreliable. Therefore, only data collected since 1974 were used to estimate model parameters, calculate individual age class forecasts, and generate 80% confidence intervals. The predicted total run to Coghill Lake was the sum of predictions for individual ages. The 80% confidence intervals were calculated from a regression of historical forecasts versus actual returns.

The forecast of the natural run to Eshamy Lake is the mean of the runs from the second year after the peak in the four-year cycle. Eshamy Lake escapements have been enumerated at a weir since 1950 for all but two years: 1987 and 1998. Commercial catches are available for the same period, but age composition data are available only for some years since 1962. Escapement numbers and age composition data were not collected in 1987 and 1998. Only available data collected since 1970, excluding 1987 and 1998, were used to calculate the mean run used for the forecast and the 80% confidence interval.

Only a harvest projection for wild stocks is made for Unakwik District. This projection is the mean of purse seine and gillnet catches made in that district since 1968. The 80% confidence interval is the interval around the mean harvest.

Main Bay Hatchery, operated by Prince William Sound Aquaculture Corporation (PWSAC), is the only facility producing sockeye salmon within Prince William Sound. Three sockeye salmon stocks (Coghill, Eshamy, and Eyak Lake stocks) are used, and forecasts are made for each stock returning to the facility (onsite returns). The predicted total run for each hatchery stock and the associated 80% confidence interval is the sum of predictions and 80% confidence intervals for individual ages.

The forecast of the Eyak Lake sockeye salmon onsite return is based on age specific marine survivals (0.41% for three-year-old, 3.53% for four-year-old and 1.29% for five-year-old sockeye salmon) for hatchery releases in brood years 1990, 1991, 1993, and 1994 through 1997. Survival estimates are based on fry releases, catch contribution estimates from coded-wire tag recoveries, and brood stock data. Marine survival estimates were calculated from adults returning from releases of age-0 sockeye salmon, but adults returning from brood year 1995 and later are from age-1 smolt releases. This stock is being phased out of hatchery production.

The forecast of the Coghill sockeye salmon stock onsite return is based on age-specific mean marine survival of hatchery returns from brood years 1986 through 1995 (0.58% for three-year-old, 7.56% for four-year-old, and 3.04% for five-year-old sockeye salmon). Survival estimates are based on fry releases, catch contribution estimates from coded-wire tag recoveries, and brood stock data. The 2002 run will consist of three- and four-year-old sockeye salmon from a release of 8.1 million smolt in 1998 and 1999. Less than 5,000 sockeye are expected to return to Solf Lake in 2002 from a fry releases in 1998 and 1999.

The forecast of the late-run Eshamy stock sockeye salmon onsite return is based on age-specific mean marine survival from brood years 1989 through 1997 (0.14% for three-year-old, and 14.67% for four-year-old, and 0.08% for five-year-old sockeye salmon). The available data were not sufficient to estimate confidence intervals for the Eshamy stock run.

Projected brood stock needs were based on the expected number of eggs produced from each female and the expected percentage of females in the brood stock. Brood stock needs will not change unless hatchery program changes occur. PWSAC cost recovery needs for sockeye salmon are based on taking 40% of the total run for brood stock and cost recovery. All cost recovery harvest estimates are preliminary.

Forecast Discussion

The natural Coghill sockeye salmon run is recovering after a period of poor runs in the first half of the 1990s, due to limnological conditions in the lake. The biological escapement goal for this system was lowered to allow plankton populations to recover, and fertilizers were added to the lake (1993-1996) in a cooperative project with the U.S. Forest Service to improve the forage base for rearing sockeye salmon juveniles. Returns in 1996 - 2001 may mark the resumption of higher production levels; however, freshwater growth on age-4 returns in 2000 showed reduced growth compared to the last 3 years. The biological escapement goal for Coghill Lake natural run was met in 2001, and has been met every year since 1995. The forecast for the run to Coghill Lake in 2002, approximately 96 thousand sockeye salmon, would be well below the 1968 - 2001 average of 186,600.

The Eshamy Lake natural stock appears to exhibit a four-year cycle of peak abundance, and the 2002 run should be the second year after the peak in the cycle. The spawning escapement goal was met in 2001 with 55,187 sockeye salmon past the Eshamy weir. Mean run size for this point in the cycle for the period 1970 - 1998 is 41 thousand sockeye salmon.

The Eshamy Lake natural stock is the largest natural stock contributor to commercial harvests of sockeye salmon in Prince William Sound outside of the Coghill District. The Eshamy Lake natural run has historically contributed to a substantial incidental harvest by the purse seine fishery in the Southwestern District. Although escapements into Eshamy River have been counted at a weir for 50 years, collection of age, sex, and size data has only been recently instituted for the escapement, the Eshamy District directed harvest, and the Southwestern District incidental harvest. These data were used to construct brood tables for this run, which, in turn, were used to calculate the 1997 and 1998 forecasts. Contributions to commercial harvests in western PWS of sockeye salmon produced by the Main Bay Hatchery have been estimated by recovery of coded-wire tags. However, not all harvests can be adequately estimated, increasing uncertainty of total run estimates for all wild and enhanced sockeye salmon stocks in western PWS. Age composition data and weir counts were not collected in 1987 and 1998 due to budget reductions. The return of the Eshamy weir and the start of thermal marking of Main Bay Hatchery sockeye salmon should allow much better estimates of Eshamy wild runs in the future.

The Main Bay Hatchery onsite run of Eyak stock will consist of five-year-old sockeye salmon from brood year 1997, released as age-1 smolt. Age-specific marine survivals of age-0 Eyak stock smolt were used to forecast the return in 2002. Actual returns may be greater than forecast if these older smolt survived better than age-0 smolt.

The onsite hatchery return of Coghill stock in 2002 is expected to be much greater than the 2001 run. The run will be composed of three- and four-year old sockeye salmon from a smolt releases in 2000 and 2001. No Coghill stock smolts were released from Main Bay Hatchery in 1998 and 1999. This stock is being reintroduced to the Main Bay Hatchery and will replace all other stocks currently at that facility.

The onsite hatchery run of Eshamy stock is expected to be composed entirely of five-year-old sockeye salmon. The forecast is based on expected survival of smolt released in 1999.

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FORECAST AREA: **Prince William Sound**
SPECIES: **Coho Salmon**

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
HATCHERY AND SUPPLEMENTAL PRODUCTION:		
Valdez Fisheries Development Association – Solomon Gulch Hatchery (Onsite Releases)		
Hatchery Run	138.6	107.9 - 169.2
Broodstock Needs	1.5	
Cost Recovery Needs	0.0	
Common Property Harvest	137.1	106.4 - 167.7
Historic Survival: Range = 0.9% – 25.4% , Mean = 9.2%		
Valdez Fisheries Development Association – Solomon Gulch Hatchery (Remote Releases)[a]		
Hatchery Run	1.2	0.93 - 1.5
Broodstock Needs	0.0	
Cost Recovery Needs	0.0	
Common Property Harvest	1.2	0.93 - 1.5
Prince William Sound Aquaculture Corporation – W. H. Noerenberg Hatchery (Onsite Releases)		
Hatchery Run	3.3	2.5 - 4.0
Broodstock Needs	1.0	
Cost Recovery Needs	0.0	
Common Property Harvest	2.3	1.5 - 3.0
Historic Survival: Range = 0.1% – 14.3%, Mean = 6.9%		
Prince William Sound Aquaculture Corporation – W. H. Noerenberg Hatchery (Remote Releases)[b]		
Hatchery Run	13.7	10.6 - 16.7
Broodstock Needs	0.0	
Cost Recovery Needs	0.0	
Common Property Harvest	13.7	10.6 - 16.7
TOTAL HATCHERY PRODUCTION:		
Run Estimate	156.8	122.0 - 191.3
Broodstock Needs	2.5	
Cost Recovery Needs	16.0	
Common Property Harvest	154.3	119.4 - 188.8

[a] Includes a remote release at Boulder Bay, near Tatitlek.
[b] Includes remote releases at Cordova, Whittier and Chenega.

Forecast Methods

Harvest projections for natural coho salmon in Prince William Sound have typically been estimated from the mean of historic annual harvests of this species. In recent years, commercial harvests have targeted primarily hatchery returns, and no stock contribution estimates are available to assess natural production. Estimates of sport harvests, which do target natural coho salmon runs, are not available until the following winter. For these reasons, no projection is estimated for natural production of this species for 2002.

The forecast for each hatchery return is the product of the number of smolt released from each facility in 2001 and mean marine survival achieved for each facility (9.2% for Solomon Gulch Hatchery (VFDA) and 6.9% for W. Noerenberg Hatchery). Forecast ranges are based on 80% confidence intervals about mean survivals.

Projected brood stock needs were based on the expected number of eggs produced from each female and the expected percentage of females in the brood stock. All brood stock estimates are preliminary.

Forecast Discussion

Coho smolt releases (47,861) from the W. Noerenberg Hatchery (WNH) in 2001 were much less than the 1996-2000 average (303,189). Marine survival estimates for coho salmon hatchery stocks are based on the assumption that all harvest taken near each hatchery is comprised of production from that hatchery. Survival estimates could be overly optimistic if hatchery and natural runs mix in harvest areas. Return estimates to remote stocking locations are based on hatchery survival estimates since little information is available on actual sport harvest of these stockings. No direct cost recovery harvest is anticipated at either WNH or VFDA Hatcheries. However, some revenue could be generated from coho salmon incidentally captured during the pink salmon cost recovery harvest.

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FORECAST AREA: **Copper River**
SPECIES: **Sockeye Salmon**

Preliminary Forecast of the 2002 Run:	Forecast Estimate (millions)	Forecast Range (millions)
NATURAL PRODUCTION:		
Natural Run	1.19	0.68 - 1.90
Escapement Goal	0.48	
Common Property Harvest[a]	0.71	0.16 - 1.26
HATCHERY AND SUPPLEMENTAL PRODUCTION:		
Prince William Sound Aquaculture Corporation – Gulkana Hatchery		
Hatchery Run	0.42	0.16 - 0.69
Broodstock Needs	0.02	
Supplemental Escapement[a]	0.10	
Common Property Harvest[a]	0.30	0.05 - 0.56
TOTAL PRODUCTION:		
Run Estimate	1.61	0.84 - 2.59
Natural Escapement Goal	0.48	
Broodstock Needs	0.02	
Supplemental Escapement[a]	0.10	
Common Property Harvest[b]	1.01	0.16 - 1.88

[a] Includes harvests from commercial, subsistence, personal use and sport fisheries.
[b] Hatchery production that will not be harvested to ensure that natural escapement into the Upper Copper River is achieved, since natural stocks cannot sustain the higher exploitation levels of hatchery stocks.

Forecast Methods

The forecast of the natural run of sockeye salmon to the Copper River is the total of estimates for six age classes. Linear regression models using logarithm-transformed data were used to predict runs for four age classes: age-1.2, -0.3 -1.3, -2.2 sockeye salmon. The run of each of these four age classes was predicted from the relationship between returns of that age class and returns of the age class one year younger from the same brood year. For example, the model used to predict the run of age-2.2 sockeye salmon in 2002 used the run of age-1.2 sockeye salmon in 2001 as the input parameter. Finally, predicted runs of age-1.1 and -2.3 sockeye salmon were calculated as the mean return of those age classes in past years. The 80% confidence bounds for the total forecast of natural production is the sum of 80% confidence bounds for each age class. The 80% confidence intervals were estimated using either a cross validation technique for predictions based on regression models or the confidence interval around the mean. Forecast methods for 2002 are similar to forecast methods used after 1998, but differ substantially from earlier methods. Prior to 1998, forecasts were calculated as the product of historical mean return-per-spawner and parent year escapements weighted by age class (four-, five-, and six-year-old sockeye salmon). Mean return-per-spawner values were estimated from linear regressions of adult production on brood year escapements.

Supplemental production from Gulkana Hatchery remote releases to Crosswind and Summit Lakes was predicted using age specific smolt-to-adult survival estimates from brood years 1994-1997. The survival estimates were calculated using coded-wire tag recoveries in harvests and enumerated adult escapements. Survival of juveniles released into Paxson Lake was assumed to lie between values estimated for Crosswind and Summit Lake. Average proportion of the 1996-2001 runs harvested (72%) was used to project total harvest of Gulkana Hatchery stocks in 2002. The 80% confidence interval for the forecast of supplemental production was calculated using mean square error estimates calculated for total runs.

Forecast Discussion

Forecasts prior to 1998 relied on the relationship between number of spawners and subsequent returns, using return-per-spawner values for parent year abundance similar to that of the dominant age class (age-5) of the year for which the forecast was developed. Recent Copper River sockeye salmon runs have exceeded all previously documented runs, although escapements have generally been only slightly above average. High return-per-spawner values for the three most successful brood years on record (1991-1993) reflect this apparent increased productivity. Because average return-per-spawner values do not reflect recent increased production, and because returns are still incomplete from the most recent brood years, linear regressions of brood-year sibling returns were used to produce the 1998-2002 forecasts. Linear regressions of sibling returns were not used prior to these years because age composition data for some escapements and harvests were not available. Additionally, reliable estimates of survival and contributions from supplemental production for individual brood years have only recently become available through coded wire tag recoveries in harvest and escapements. Although historic estimates of Gulkana Hatchery production are thought to be inaccurate, improved contribution estimates for 1997-2001 indicated large contributions from supplemental production and provided smolt-to-adult survival estimates for Crosswind Lake releases that exceeded 30% for three brood years.

The 2002 run will be composed primarily of returns from the 1997 and 1998 brood years. Five-year-old sockeye salmon from the 1997 brood year are expected to dominate Copper River delta and Upper Copper River runs. Recent record large runs suggest that conditions have been unusually favorable for these stocks; however, the 2002 run may be more typical of historical production levels for this system. If realized, the forecast for the 2002 total run will be slightly above the 1966-2001 average. The 1.19 million natural run would be average for runs documented prior to substantial supplemental production, and a 0.42 million Gulkana Hatchery run would be about 20% below the 1997-2001 average.

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FORECAST AREA: **Copper River**
SPECIES: **Chinook Salmon**

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
HARVEST PROJECTION FOR NATURAL RUN:		
Copper River District	49.1	29.8 - 68.5

Forecast Methods

The harvest projection for the 2002 chinook salmon run to the Copper River area is the average limited entry commercial harvest for 1992–2001. The range is the 80% confidence interval about the mean harvest.

Forecast Discussion

During the past 20 years, chinook salmon runs to the Copper River have been above the 1966-1980 average of 18,900 chinook salmon, and several catch records have been set since 1981. Total harvests in all Copper River fisheries (commercial, subsistence, personal use, and sport) between 1995 and 1999 exceeded all documented annual harvests since 1890. Mark-recapture estimates of total chinook spawning escapement in 1999 and 2000 provided reason for concern about recent escapement levels. Because aerial surveys to estimate escapement were not conducted in the Upper Copper River in 1993, and surveys in 1992 and 1995 were made under poor conditions, it is no longer possible to forecast chinook total run abundance using previous methods requiring spawning escapements to approximate total run size. However, forecasting performance based on this method was poor, and, all but two of the predictions made during 1985-1997 were less than actual runs.

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FORECAST AREA: **Copper and Bering Rivers**
SPECIES: **Coho Salmon**

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
HARVEST PROJECTION FOR NATURAL RUN:		
Copper River District	302.0	86.7 - 517.3
Bering River District	111.2	0.0 - 252.6

Forecast Methods

The harvest projection for the 2002 run of coho salmon to the Copper and Bering River areas is the average limited entry commercial harvest for 1981-2001. The forecast range is the 80% confidence interval about the mean harvest.

Forecast Discussion

The 1997-1999 runs of coho salmon to the Copper and Bering River areas were well below the 1980-1996 average, and commercial fishery harvests were restricted in each year. The 2001 Copper River harvest was slightly below the 1980-2000 average of 304,000 coho salmon. The 2001 Bering River harvest was also below the 1996–2000 average of 19,600 coho salmon. Winters with extremely low temperatures and little snow cover, and summers with either near-drought or high water conditions have occurred regularly since 1990. The occurrence of extremely high and low brood year returns during this period may help identify environmental factors affecting freshwater survival of coho salmon juveniles, which may be used to improve forecast accuracy. Forecasting accuracy may also improve with information obtained jointly, since 1994, by the department and U.S. Forest Service on climatological factors and coho salmon survival from eggs deposited in spawning channels.

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (millions)	Forecast Range (millions)
NATURAL PRODUCTION:		
Total Run:	3.7	0.3 - 7.0
Escapement Goal:	1.5	
Harvest Estimate:	2.2	

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, fry, and smolt data, if available, were examined for each system. Three models were used to forecast the return of sockeye salmon to UCI in 2002: (1) the relationship between adult returns and spawners, (2) the relationship between adult returns and smolts, and (3) the relationship between adult returns and siblings. In most cases, sibling relationships were used. The return of age 1.3 sockeye salmon to the Kenai River in 2002 was forecast using the sibling model. The sibling-model prediction was based on the return of age 1.2 sockeye salmon to Kenai River in 2001. The abundance of smolts emigrating from Tustemena Lake was used to forecast returns of age 1.2 and 2.2 sockeye salmon to the Kasilof River in 2002. This is the first time this model has been used. An approximate eighty percent 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 2001 was 3.5 million sockeye salmon, while the preseason forecast was 4.2 million. The Kenai River sockeye salmon return of 1.8 million fish was approximately 619 thousand fish weaker than forecast due to weak returns of primarily 5 year old sockeye. The Kasilof River sockeye salmon return was estimated at 791 thousand fish, as contrasted with the preseason forecast of 688 thousand. The Susitna River return was 144 thousand fish less than the forecast of 425 thousand sockeye salmon. While the sockeye salmon return to Crescent River was 39 thousand fish greater than the forecast of 63 thousand, the sockeye return to Fish Creek was 58 thousand greater than the forecast of 20 thousand.

A run of 3.7 million sockeye salmon is forecasted to return to Upper Cook Inlet in 2002 with a harvest of 2.2 million sockeye salmon. The forecasted harvest in 2002 is about 1.8 million fish below the 20-year average harvest. A sibling model was used to forecast the return of age 1.3 sockeye salmon to the Kenai River. The abundance of fry rearing in Skilak Lake was not used in the forecast, because the fry that will produce the return of age 1.3 sockeye salmon in 2002 were the smallest ever observed in Skilak Lake. The 2002 return will provide more information regarding the survival of these very small fry, but it is expected to be poor. The sibling model predicted a return of 907 thousand age 1.3 sockeye salmon to the Kenai River, which is about one half of the 20-year average return for this age class. The forecast return to the Kasilof River is slightly below the 20-year average return of 885 thousand. A sibling model was used to forecast the return of age 1.3 sockeye salmon to the Kasilof River. This component of the return is expected to be stronger than

average, because of strong returns of age 1.2 sockeye salmon to Kasilof River in 2001. A smolt model was used to forecast the returns of age 1.2 and 2.2 sockeye salmon to Kasilof River. The smolt populations that will produce the returns of these two age classes in 2002 were slightly below average.

Forecast runs to individual freshwater systems are as follows:

System	Run	In River Goal
Crescent River	141,000	25,000 – 50,000
Fish Creek	95,000	50,000
Kasilof River	787,000	150,000 – 250,000
Kenai River	1,713,000	600,000 – 850,000
Susitna River	451,000	90,000 – 160,000
Minor System	478,000	N/A

Mark Willette
Research Project Leader
Upper Cook Inlet

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
NATURAL PRODUCTION:		
Total Run	1,265	368-4,886
Escapement	370	136-604
Commercial Harvest	910	244-4,282
SUPPLEMENTAL PRODUCTION:		
Total Run	3049	2,084-4,015
Broodstock and Escapement	376	370-381
Commercial Harvest	2,673	1,714-3,634
TOTAL AREA PRODUCTION:		
Total Run	4,314	2,452-8,901
Broodstock and Escapement	746	494-985
Commercial Harvest	3,583	1,958-7,916

Notes:
Escapement and Harvest summed do not equal total run because the return to Humpy Creek is projected to be 15 thousand less than the goal.
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 34 to 41 years of observations. An 80 percent 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 marine survival rates of 2.2 and 3.2 percent, respectively. Projected harvest from supplemental production was obtained by subtracting brood-stock goals from the supplemental production forecast.

Forecast Discussion

The natural production forecast model was tested using cross-validation methods. The model correctly predicted 35 out of 40 changes in direction of annual run size. Accordingly, we have some confidence that the 2002 total return will continue the recent trend of more fish returning in even numbered years. In 2000, the last even numbered year, all 11 of the systems for which a forecast was made had runs within the forecast range. The 2002 forecast for natural production of 1.27 million pink salmon has an 80 percent

confidence interval of 368 thousand to 4.89 million fish. Given the lower than expected parent-year escapement in 10 of the 11 index areas 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 1.27 million pink salmon would be nearly 2.3 times the median run size of 553 thousand fish for even-year returns between 1960 and 2000. The pink salmon escapement goal is 370 thousand fish for systems with a forecast, but an escapement shortfall of 15 thousand fish is expected for Humpy Creek. The resulting escapement forecast is 355 thousand pink salmon.

The harvest of naturally produced pink salmon in the Southern District is projected to be 41.7 thousand fish, 80% of which is expected to come from Seldovia Bay. No harvest is projected for Humpy Creek where an escapement shortfall of 15 thousand fish is expected. 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 99.3 million fry in 2001. Assuming an average even-year ocean survival rate of 2.2%, about 2.19 million pink salmon are expected to return to Tutka Bay and Lagoon in 2002 (pers. comm. with G. Fandrei, Cook Inlet Aquaculture Association). The Port Graham Hatchery released 27.3 million fry in 2001. Assuming a marine survival rate of 3.2%, about 864 thousand pink salmon are expected to return to Port Graham Bay in 2002 (pers. comm. with P. McCollum, Port Graham Hatchery). The 2002 brood stock goals for the Tutka and Port Graham hatcheries are 178 thousand and 186 thousand fish, respectively. Because cost recovery requirements are dependent upon in-season 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, the harvest of naturally produced pink salmon is projected to be 715.6 thousand fish, with almost 79% of the harvest expected to occur in the Port Dick subdistrict. If realized, the Port Dick harvest would be the highest in an even year since 1962. Harvests ranging from 12.2 to 79.3 thousand fish are anticipated from Nuka Island, Windy Bay, Rocky Bay, and Port Chatham.

In the Eastern District, a harvestable surplus of 53.4 thousand pink salmon is projected for Resurrection Bay. This would be the largest even-year harvest in the Eastern District since 1986. 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 99.2 thousand fish is projected for Bruin Bay and Ursus and Rocky Coves. If realized, it would be the largest pink salmon harvest from these index areas since 1986. 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	Lee F. Hammarstrom
LCI Research Biologist	Area Finfish Management Biologist
Homer	Homer

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

Preliminary Forecast of the 2002 Run:	**Harvest Forecast (millions)**
Wild Stock Production: **AVERAGE**	6 – 10
Kitoi Bay Hatchery Production:	3 – 6
Wild Stock Production by District:	
AFOGNAK	0.5 – 0.9
WESTSIDE	4.0 – 6.5
ALITAK	0.6 – 1.0
EASTSIDE	0.5 – 1.0
MAINLAND	0.4 – 0.6

Forecast Methods

Previous forecasts for Kodiak Management Area (KMA) wild pink salmon production utilized preemergent fry over-winter survival data in regression analysis. Budget reductions eliminated the preemergent fry sampling program. 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 2002 total return of wild stock pink salmon to the KMA was made by qualitative methods, using environmental conditions, spawner-recruit models, and the relationship of Karluk and Ayakulik pink salmon escapements to total KMA pink salmon return.

The 2002 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:

2000 and 2001 climatological data for the spawning period, the egg to fry over-winter period, the fry outmigration and nearshore period, and the early-ocean growth period for pink salmon.
The total 2000 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.
Ricker spawner-recruit models based on 1970-2000 even-numbered brood year escapements from the Karluk and Ayakulik Rivers versus total return.

The Kitoi Bay Hatchery pink salmon forecast was developed using the average survival rate of "40-day" reared fry (over 0.5 grams on release) from the 1978 through 2001 returns. Range estimates were calculated by using the average survival rate of the past three even-year returns. That range was further narrowed based on qualitative assessment of condition of the fry upon release.

Forecast Discussion

Environmental conditions affecting the 2002 pink salmon return were varied. The effect on pink salmon spawning, egg-to-fry survival, out-migration, and near-shore survival is not quantifiable. However, it is suspected that the detrimental effects of negative environmental conditions during the fall and winter of 2000/2001 will likely reduce the 2002 pink salmon run.

During the spawning period, in the fall of 2000, from early August through early October, Kodiak weather was warm and sunny with little rainfall. While large systems and streams fed by lakes continued to flow at low levels, many smaller streams went dry. Mean monthly temperatures and precipitation were much higher than normal from October through January. Most of the precipitation came in the form of rain. Though the snow-pack for January and March was above average, overall the winter snowfall was about half of the long-term average.

Nearshore ocean temperatures, as noted by fishers and ADF&G during the April 2001 Kodiak herring fishery, were much warmer than normal and herring aggregation and spawning was significantly early. Temperatures were lower and snowfall was high in May. The Kitoi Bay Hatchery manager reported that plankton production near the hatchery was fairly good and very early. The months of June through August were warmer than normal and fishermen reported that ocean temperature rose to greater than normal levels from June through September.

Pink salmon returns during the last two years have been below the 20-year average return, for even-numbered years and all years. KMA pink salmon exhibit odd versus even-numbered year dominance (i.e., even-year runs tending to be larger than odd-year runs). Currently there is an even-year dominance.

The 2000 KMA pink salmon escapement was approximately 4.5 million fish. This was within established goals (2.39 million to 5.99 million), but below the 1990-1998 even-year average (4.8 million). Escapement goals were met for each district and component objectives were met for most major and minor systems. A notable exception was the Ayakulik pink salmon escapement (316,000; used in the spawner-recruit estimate), which did not achieve the desired level (400,000 to 800,000).

After accounting for 2002 escapement requirements, the expected 2002 wild stock pink salmon harvest could range from 7.0 million to 10.6 million fish. Because negative environmental conditions during the fall and winter of 2000/2001 the expected wild stock pink salmon harvest may only approach the lower end of this range. The expected harvest from the Kitoi Bay Hatchery could range from 3.0 million to 6.4 million, and should be near the midpoint projection, or approximately 4.5 million pink salmon. Statistical modeling suggests that the combined hatchery and wild pink salmon harvest should fall within the STRONG category (10 million to 14 million pink salmon).

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

AFOGNAK: Afognak systems are typically even-year dominant. Brood year escapement (329,000) was lower than the previous five and ten even-year averages (415,000). The Afognak District typically accounts for approximately 8% to 9% of the overall KMA harvest. The 2002 projected harvest range is 0.5 million to 0.9 million pink salmon.

AFOGNAK SUPPLEMENTAL: Approximately 135 million fed fry were released from the Kitoi Bay Hatchery. The average fry size upon release was larger than ever before. The Kitoi Bay Hatchery manager anticipates the hatchery contribution to the common property fishery should be near the midpoint projection,

approximately 4.5 million pink salmon, based on recent even-year survivals and good condition of fry upon release.

WESTSIDE (Southwest and Northwest Kodiak Districts combined): Westside systems are typically even-year dominant. Brood year escapement (2.5 million) was near the previous five and ten even-year average (2.6 million to 2.7 million). The Westside typically accounts for over 65% of the overall KMA harvest. The projected harvest range is 4.0 million to 6.5 million pink salmon.

ALITAK: Major pink salmon systems in the Alitak Bay District are odd-year dominant. Brood year escapement (387,000) was below both the previous five even-year average (518,000) and the ten even-year average (450,000). The Alitak Bay District typically accounts for 8% to 10% of the overall KMA harvest. The projected harvest range is 0.6 million to 1.0 million pink salmon.

EASTSIDE (Eastside and Northeast Kodiak Districts combined): Major pink salmon systems in these districts are even-year dominant. Brood year escapement (587,000) was below the previous five and ten even-year averages (650,000 and 675,000 respectively). The Eastside typically accounts for approximately 7% to 10% of the overall KMA harvest. The projected harvest range is 0.5 million to 1.0 million pink salmon.

MAINLAND: Some Mainland District pink salmon systems are even-year dominant, but most show neither even nor odd-year dominance. Brood year escapement (687,000) was above the previous five and ten even-year averages (548,000 and 578,000 respectively). The Mainland District typically accounts for approximately 5% to 6% of the overall KMA harvest. The projected harvest range is 0.4 million to 0.6 million pink salmon.

Nicholas H. Sagalkin	Jeff Wadle	Kevin Brennan	Drew Aro
Finfish Research Biologist	Assistant Area Management Biologist,	Area Management Biologist	Kitoi Bay Hatchery Manager
Kodiak	Kodiak	Kodiak	Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:		
Total Run Estimate	89	18 – 160
Escapement Goal	25	25 – 75
Harvest Estimate	64	

Forecast Methods

The 2002 Upper Station early-run forecast was prepared primarily by investigating simple linear regression models employing recent brood year (1981-1997) sibling or parent escapement relationships for five major age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Age classes 1.3 and 2.3 were predicted from 1.2 and 2.2 siblings respectively. Age 1.2 fish were predicted from their parent year escapement level. Age classes 0.3 and 2.2 sibling relationships were not significant (P>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 using the median value (1985-2001). The variances for the median forecasts were calculated from the mean distribution. 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 2002 forecast is approximately 22 thousand fish less than the 2001 forecast (111 thousand) and about 70 thousand fish less than the actual 2001 run of 159 thousand fish. The 2001 run fell within the 80% prediction intervals of the forecast and individual age class predictions were fair; therefore, our confidence in this forecast is fair. The 2002 run should be composed of approximately 10% four-year-old fish and 65% five-year-old fish. If this run is realized, it will be 33 thousand fish less than the recent 10-year average run of 122 thousand fish.

The Upper Station early run sustainable escapement goal (SEG) range is 50 thousand to 75 thousand; however, the Alaska Board of Fisheries has adopted a 25 thousand optimum escapement goal (OEG) in the Alitak Bay District Salmon Management Plan. The projected harvest of 64 thousand fish is based on achievement of the 25 thousand OEG. Similar to the 2000 and 2001 runs, the predominant age class in the 2002 run should be 2.2 (56%).

Nicholas H. Sagalkin
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:		
Total Run Estimate	352	72 – 632
Escapement Goal	150	150 – 200
Harvest Estimate	202	

Forecast Methods

The 2002 Upper Station late-run forecast was prepared primarily by investigating simple linear regression models employing recent brood year (1981-1997) sibling or parent escapement relationships for six major age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Age 1.2 fish were predicted from their parent year escapement level. Age 1.3 fish were predicted from age 1.2 siblings. Age 2.2 and 2.3 sibling relationships were not significant ($P>0.25$); therefore, the median return was used as the forecast estimate. In previous years age 0.2 fish were predicted from median returns and 0.3 fish were predicted 0.2 fish; however, in 2001 all age 0. Fish returned at levels far below the median return estimates. Therefore, the 2002 forecast estimates for both age 0.2 and 0.3 fish were based on their lowest previously observed return. The variances of these estimates were determined from the coefficients 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 using the median value (1985-2001). The variances for the median forecasts were calculated from the mean distribution. 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 minor age classes were summed to calculate 80% prediction intervals.

Forecast Discussion

The 2002 forecast is about 26 thousand fish less than the 2001 forecast (378 thousand) and about 217 thousand fish greater than the actual 2001 run of 135 thousand fish. While the 2001 run fell within the 80% prediction intervals of the forecast, the 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 2002 run should be composed of approximately 20% four-year-old fish and 71% five-year-old fish. If this run is realized it will be below the recent 10-year average run of 470 thousand fish.

The projected harvest of 202 thousand fish is based on achievement of the lower bound of the escapement goal range of 150 thousand to 200 thousand. The major age classes in the run should be 2.2 (65%) and 1.2 (20%).

Nicholas H. Sagalkin
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:		
Total Run Estimate	522	125 – 919
Escapement Goal	140	140 – 200
Harvest Estimate	382	

Forecast Methods

The 2002 Frazer Lake (Dog Salmon River) forecast was prepared primarily by investigating simple linear regression models employing recent brood year (1981-1997) sibling relationships for three major age classes. In constructing and evaluating each of the regression models, standard regression diagnostic procedures were used. Ages 1.3, 2.3, and 3.2 were predicted from 1.2, 2.2, and 3.1 siblings respectively. Similar to last year's forecast, the age 1.2 versus age 1.1 sibling relationship was not significant ($P>0.25$); therefore, the median return was used as the forecast estimate. Age 2.2 fish were predicted by using a simple linear regression model employing age 2 smolt emigration estimates. Minor age classes (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 using the median value (1985-2001). 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 2002 forecast is about 22 thousand fish greater than the 2001 forecast (500 thousand) and about 119 thousand fish greater than the actual 2001 run of 403 thousand fish. While the 2001 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 2002 run should be composed of approximately 71% five-year-old fish and 19% six-year-old fish. If this run is realized, it will be 43 thousand fish less than the recent 10-year average run of 565 thousand fish.

The projected harvest of 382 thousand fish is based on achievement of the lower bound of the escapement goal range of 140 thousand to 200 thousand. The major age classes in the run should be 2.2 (68%) and 2.3 (19%).

Nicholas H. Sagalkin
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:		
Total Run Estimate	604	226 – 981
Escapement Goal	300	200 – 300
Harvest Estimate	304	

Forecast Methods

The 2002 Ayakulik (Red River) sockeye salmon 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 ($P \leq 0.25$). Major age classes 1.2, 1.3, 2.2, and 2.3 were predicted from the age 1.1, 1.2, 2.1, and 2.2 siblings respectively. The minor age classes (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) were estimated by summing the annual minor age classes (1992-2001) and employing the median. The major and minor age class estimates were summed to estimate the total run and the collective variance was used to calculate 80% prediction intervals.

Forecast Discussion

The 2002 forecast is similar to the 2001 forecast (603 thousand) and about 18 thousand fish greater than the actual 2001 run estimate of 586 thousand fish. Methods used to estimate the 2002 Ayakulik are similar to those used to estimate the 2001 forecast. Consequently our confidence in this forecast is good due to the proximity of the 2001 forecast to the actual run. The 2002 run should be composed of approximately 49% five-year-old fish and 24% six-year-old fish. If realized, this run will be 179 thousand fish less than the recent 10-year average (1992-2001) run of 783 thousand fish.

The projected harvest of 304 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 (38%).

M. B. Foster
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:		
Total Run Estimate	222	144 – 299
Escapement Goal	0	0
Harvest Estimate	222	144 – 299

Forecast Methods

The 2002 Spiridon Lake forecast was estimated based on: 1) 1999-2001 smolt estimates, 2) average adult age of returns from 1991-1994, and 1996 stocking years (Upper Station broodstock) and the 1995 stocking year (Saltery broodstock), and 3) low, average, and high observed smolt-to-adult survival estimates from 1991-1996 stocking years. The 1999 smolt 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, and 1.1 million age 1 and 441 thousand age 2 smolt emigrated in 2001. Smolt to adult survival estimates averaged 29%, ranging from 18% to 43%, for fry stocking years 1991-1994, and 1996 and averaged 37% for the 1995 fry stocking year. Age 1 smolt had about a 10% higher survival rate than age 2 smolt for the years (1991-1994 and 1996) when Upper Station fry were stocked. In addition, both age 1 and age 2 smolt survival estimates were similar for the year (1995) Saltery fry were stocked. A 20% smolt to adult survival (a lower limit of 13% and upper limit of 27%) was used to forecast the 2002 run. This represents a reduction of about 10%, from survival estimates used to determine previous forecasts. This value was chosen due to the consistent overestimate of the return in recent years. The age compositions of the sockeye salmon returns were averaged for 1991-1994 and 1996 stocking years (Upper Station broodstock) and the actual age compositions were used for the 1995 stocking year (Saltery Lake broodstock) to provide a technique for estimating both the Upper Station and Saltery Lake components of the 2002 run. These proportions were applied to the total return estimates from the 1999-2001 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 2002.

Forecast Discussion

A barrier falls prevents escapement into Spiridon Lake; thus, sockeye salmon fry stocking is intended to provide harvest of all returning adults. The forecast for 2002 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, are predominantly 3-ocean in some years. The predicted 2002 run of 222 thousand is about 10% less than average (1994-2001 average run was 241 thousand sockeye salmon), but about 75 thousand fish more than what actually returned in 2001 (147 thousand). The predominant age classes in the run are expected to be 1.2 (40%), 2.2 (25%), and 1.3 (25%) as a result of Saltery Lake stock fry releases. Returning age 2.3 fish (about 1% of the run) will be from Upper Station stock releases. The majority of the remaining fish (age 1.1 and age 2.1) will return as a result of Saltery Lake fry releases. The run timing should be

similar to the 1998-2001 runs, approximately three weeks earlier then in 1994-1997. The run is expected to begin in late June to early July, peaking in mid to late July and end by late August or early September.

Steven G. Honnold
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:		
Total Run Estimate	473	310 – 636
Escapement Goal	200	150 – 250
Harvest Estimate	273	

Forecast Methods

The 2002 Karluk Lake early-run sockeye salmon forecast was prepared primarily by investigating simple linear regression models utilizing recent brood year (1979-1997) 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 ($P \leq 0.25$). 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 (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 (1992-2001) 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 2002 forecast is about 87 thousand fish more than the 2001 forecast (386 thousand) and about 169 thousand fish less than the actual 2001 run estimate of 642 thousand fish. Our confidence in this forecast is fair. The 2002 run should be composed of approximately 44% five-year-old fish and 41% six-year-old fish. If realized, this run will be 56 thousand fish less than the recent 10-year average (1992-2001) run of 529 thousand fish.

The projected harvest of 273 thousand fish is based on achievement of the mid-point of the escapement goal range (200 thousand fish). The predominant age classes in the run should be 2.2 (43%) and 2.3 (31%).

Mark Witteveen
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:		
Total Run Estimate	635	248 – 1,020
Escapement Goal	400	400 – 550
Harvest Estimate	235	

Forecast Methods

The 2002 Karluk Lake late-run sockeye salmon forecast was prepared primarily by investigating simple linear regression models utilizing recent brood year (1979-1997) 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 ($P \leq 0.25$). A significant sibling regression model was employed to estimate the age 1.3, 2.2, 2.3, 3.2, and 3.3 component of the run from sibling returns of age 1.2, 1.2, 2.2, 2.2, and 3.2 sockeye salmon 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 12 minor age class run estimates (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 (1992-2001) 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 2002 forecast is about 15 thousand fish less than the 2001 forecast (650 thousand) and about 238 thousand fish less than the actual 2001 run estimate of 873 thousand fish. Regression estimates were used for sibling relationships for most age classes despite a relatively poor predictive value. Therefore, our confidence in this forecast is fair. The 2002 run should be composed of approximately 46% five-year-old fish and 45% six-year-old fish. If realized, this run will be 107 thousand fish less than the recent 10-year average (1992-2001) of 742 thousand fish.

The projected harvest of 235 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 2.2 (45%) and 2.3 (24%).

Mark Witteveen
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:		Forecast Estimate (thousands)	Forecast Range (thousands)
Total Production:			
Early Run (Black Lake)	Total Run Estimate	1,030	618-1,430
	Escapement Goal	400	350-400
	Harvest Estimate	630	
Late Run (Chignik Lake)	Total Run Estimate	1,090	505-1,670
	Escapement Goal	250	200-250
	Harvest Estimate	840	
Total Chignik System	Total Run Estimate	2,120	1,430-2,800
	Escapement Goal	650	550-650
	Harvest Estimate	1,470	

These figures include harvests of Chignik-bound sockeye salmon in the Southeastern District Mainland and the Cape Igvak fisheries; approximately 1,210 thousand sockeye salmon are projected to be harvested in the Chignik Management Area.

Forecast Methods

The forecasts for Black and Chignik Lakes 2002 runs were based on simple linear regressions between sibling relationships, between escapements and subsequent year-class returns, 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 ($P \leq 0.25$). Black Lake age 0.3, 1.2, 1.3 and 2.3 components of the run and Chignik Lake age 1.2, 2.2, and 2.4 components of the run were estimated based on the abundance of their sibling returns in 2001. The Chignik Lake age 1.3 and 2.3 returns were predicted based upon regression relationships with the abundance of spawners in their parent years. 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 estimate 80% prediction intervals for each individual run and for the total Chignik system run.

Forecast Discussion

The 2002 sockeye salmon run to the Chignik River is expected to be 2.12 million fish, which is approximately 800 thousand fish less than the run of 2001. The early run is expected to be about 280 thousand fish less than the early run in 2001. The late run is expected to be approximately 517 thousand fish less than the late run in 2001 run. The 2002 sockeye salmon run to the Chignik River system is expected to

be approximately 726 thousand fish less than the recent 10-year average return.

Approximately 92% of the 2002 early run was predicted using sibling relationships. The 2001 early run, using similar methods, was under forecast by approximately 23%. The majority of the 2001 late run was predicted using median values because there were no significant sibling relationships apparent for the major age class of the late run (age 2.3). The 2001 late run was under forecast by approximately 43%. The age 1.3 sibling relationship was not significant for the 2002 late run forecast. However, significant regression relationships were used between parent escapement and the age 1.3 and 2.3 returns for the late run for the 2002 forecast. Available smolt data were analyzed and although significant regression relationships were not found, the abundance of the smolt that emigrated in 1999 was average to above average. The majority of these fish will return in 2002 as 3-ocean fish. The smolt that emigrated in 1999, however, were large and were extremely healthy, which may indicate better than average marine survival. Both runs were also predicted together as one run as an alternative method, and the resultant 2002 forecast was approximately 246 thousand sockeye salmon higher than when both runs were predicted separately and then combined. This method more accurately forecast the total 2001 run (6% under forecast) than each run predicted separately and then combined. It was not used to forecast the 2002 run, however, because of the loss of information of the relative magnitude of the two individual runs.

The tendency to under forecast using the current methods, available smolt data, and the larger combined total Chignik River system forecast suggests the actual return may be between the point estimate and the higher 80% prediction interval. Given these ancillary data, our confidence in this forecast is fair.

Kenneth A. Bouwens
Finfish Research Biologist
Kodiak

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

Forecast of the 2002 Return:	Forecast Estimate (millions)	Forecast Range (millions)
TOTAL PRODUCTION:		
Total Run	16.8	4.9 – 28.6
Escapement Goal	7.3	
Commercial Common Property Harvest)[a]	9.7	

[a] The Escapement Goal and Harvest summed do not equal 16.8 million because the Kvichak return is projected to be 0.2 million less than the escapement goal.

Forecasted sockeye harvests for inshore Bristol Bay fishing districts are as follows:	
Naknek-Kvichak	1.2 million
Egegik	3.5 million
Ugashik	1.5 million
Nushagak	3.3million
Togiak	0.2 million

Forecast Methods And Results

The forecast for the sockeye salmon return to Bristol Bay in 2002 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, plus ages 0.3 and 1.4 for Nushagak). Adult escapement and return data from brood years 1972-1998 were used in the analyses.

Predictions for each age class returning to a river system were calculated from models based on the relationship between adult returns and spawners or siblings from previous years. Also, models based on the relationship between returns and smolt were examined for Kvichak, Egegik, and Ugashik Rivers. Tested models included simple linear regression, multiple regression, and 5-year averages. In addition, univariate and multivariate time series analysis models were examined. The models chosen were those with statistically significant parameters having the greatest past reliability based on mean absolute deviation and mean absolute percent error between forecasts and actual returns for the years 1999 through 2001.

The forecast range was the upper and lower values of the 80% confidence bounds for the total run forecast. The confidence bounds were calculated using deviations of actual runs from published run predictions for the 1992 through 2001 returns. Run predictions for the period 1992 to 2001 were based on slightly different methodology, but nevertheless, should sufficiently approximate forecast error for 2002.

A total of 16.8 million sockeye salmon are expected to return to Bristol Bay in 2002. This prediction is 57 percent lower than the previous 10- and 20-year mean (approximately 38 million) of returns. With the exception of Kvichak, runs are expected to exceed spawning escapement goals for all systems. A return of 16.8 million sockeye salmon can be expected to produce a total harvest of 9.7 million fish if all escapement

goals are met. A harvest of this size would be 63% smaller than the previous 10-year mean harvest of 26.3 million (range is 10.0 million to 44.3 million) and 61% less than the previous 20-year mean of 24.9 million (range is 10.0 million to 44.3 million).

Forecast Discussion

We excluded some historical escapement and return data to prepare the 2002 forecast. Beginning with the 1972 brood year (≥1978 return year), the number of returning adults produced from each spawner in Bristol Bay showed a dramatic increase across all nine stocks. As a result, recent Bristol Bay sockeye salmon forecasts have been based on data from this more productive period in order to more accurately predict returns. Poor sockeye salmon returns to Bristol Bay in 1996 (4 year-old fish only), 1997, and 1998 (offspring from brood years 1992-94) suggested we might be entering a period of productivity more similar to the pre-1977 period. However, the 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 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 to 2001 suggest that returns in 2002 may be more characteristic of the period 1977-1995. Hence, we used these data to prepare our forecast.

The greatest source of uncertainty in the 2002 forecast is in predicting the returns of 2-ocean (ages 1.2 and 2.2) fish. This is caused by an absence of jacks in the 2001 return (1-ocean fish, the siblings of the 1.2s and 2.2s returning in 2002). With few or no jacks, sibling models are less reliable for predicting returns of 2-ocean fish, and may therefore require the use of typically less reliable models that incorporate escapement or smolt data. In regards to actual numbers of fish, the greatest sources of potential error are the forecasts of 2.2s for Kvichak and the 1.2s for Egegik and Wood Rivers.

In general, the source of the relatively low forecast in 2002 is the exceptionally poor returns of 2-ocean fish in 2001, suggesting a weak 3-ocean return for 2002. Similarly, the low numbers of jacks in 2001 suggest that few 2-ocean fish will return in 2002. We do not know why the Bristol Bay sockeye salmon returns in 1996-1998 were poor or whether decreased production will persist. The 1999 and 2000 returns to Bristol Bay (41 and 30 million) suggest the poor returns in 1996-1998 were anomalies. However, we still have insufficient evidence to conclude that the high production of 1977-95 will continue. We are actively working with scientists inside and outside the department to better understand the reasons for these population trends and develop better techniques for forecasting sockeye salmon returns to Bristol Bay.

Lowell Fair
Research Project Leader
Anchorage

FORECAST AREA: **Bristol Bay, Nushagak District**
SPECIES: **Chinook Salmon**

Forecast of the 2002 Run	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run	130	53 - 206
Inriver Run Goal[a]	75	
Harvest	55	

[a] The Nushagak inriver run goal is 75,000 chinook salmon, which provides for a biological escapement goal of 65,000 spawners and an additional harvest of 10,000 chinook salmon by upriver subsistence and sport fisheries.

Forecast Methods

The 2002 Nushagak District chinook salmon forecast is the sum of individual predictions of five age classes (age-1.1, -1.2, -1.3, -1.4, and -1.5). For each age class, up to 12 models were evaluated for use in forecasting abundance. Predictions for each age class were calculated from models based on the relationship between adult returns and spawners or siblings from previous years. Tested models included simple linear regression, multiple regression, and 5-year averages. In addition, univariate and multivariate time series analysis models were examined. The models chosen were those with statistically significant parameters having the greatest past reliability based on mean absolute deviation and mean absolute percent error between forecasts and actual returns for the years 1999 through 2001. Data sets in the analyses included adult escapement and return data from brood years 1966-1998 and a truncated series using 1986-1998 information.

The forecast range is the upper and lower values of the 80% confidence bounds for the total run forecast. The confidence bounds were calculated using deviations of actual runs from published run predictions for the 1992 through 2001 returns. Run predictions for the period 1992 to 2001 were based on slightly different methodology, but nevertheless, should sufficiently approximate forecast error for 2002.

A univariate time series model was used to predict age-1.1 returns. The best age-1.2, -1.3, and -1.4 models were based on the relationships between sibling returns in succeeding years (e.g., age-1.2 returns for 2002 based on age-1.1 returns in 2001). The models for age-1.3 and -1.4 included time series parameters. Lastly, a Ricker stock-recruitment time series model using spawning escapements and total returns was used to forecast age-1.5 abundance.

Forecast Discussion

Age composition of the forecasted total run is <1% (1 thousand) age-1.1, 19% (24 thousand) age-1.2, 37% (48 thousand) age-1.3, 43% (55 thousand) age-1.4, and 1% (2 thousand) age-1.5. The 2002 forecasted total run of 130 thousand chinook salmon is 81% of the previous 20-year mean total run of 161 thousand and 85% of the most recent 10-year mean total run of 153 thousand. The projected harvest of 55 thousand chinook salmon is 70% of the previous 10- and 20-year mean harvest of 79 thousand.

Lowell Fair
Research Project Leader
Anchorage

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	703	405 – 1,000
Escapement Goal	100	75–125
Harvest Estimate	603	

Forecast Methods

The 2002 Bear River late-run sockeye salmon forecast was prepared primarily by using simple linear regression models utilizing available brood year (1980-1998) sibling relationships where significant regression relationships existed, 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 used in cases where the slope of the regression was significantly different from zero ($P \leq 0.25$). Although a significant regression relationship existed between the age 0.2 and 0.3 components of the run, this sibling relationship was not used to forecast the 2002 age 0.3 returns because the 2001 age 0.2 return was much larger than previous 0.2 returns on record. The point estimate would have been outside the range of the available data. Major age classes 2.2 and 2.3 were predicted from the age 2.1 and 2.2 siblings respectively. Similarly, the 2002 age 1.4, 2.4, and 3.3 components of the run were predicted from age 1.3, 2.4 and 3.2 siblings. The abundance of the remaining age classes was predicted 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 was calculated from the mean distribution. The variances of the individual estimates were summed to calculate 80% prediction intervals for the total forecast.

Forecast Discussion

The 2002 forecast for the Bear Lake late run is about 90 thousand fish more than the 2001 forecast (613 thousand), and about 227 thousand fish more than the actual 2001 run of 476 thousand fish. This equates to a run that in 2002, if achieved, would be 52 thousand fish less than the recent (1992-2001) 10-year average and 106 thousand fish greater than the most recent (1997-2001) 5-year average.

The dominant age classes of the Bear Lake late run have historically been ages 2.2 and 2.3; these ages, on average (brood years 1983-1994), have composed approximately 58% and 29% of the run. The remaining age classes composed approximately 13% of the run. Because the majority of the run was predicted using sibling relationships, our confidence in this forecast is fair to good.

Kenneth A. Bouwens
Finfish Research Biologist
Kodiak

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

Preliminary Forecast of the 2002 Run:	Forecast Estimate (thousands)	Forecast Range (thousands)
TOTAL PRODUCTION:		
Total Run Estimate	413	217 – 609
Escapement Goal	150	100 – 200
Harvest Estimate	263	

Forecast Methods

The 2002 Nelson River sockeye salmon forecast was constructed using simple linear regressions of recent brood year (1980-1998) sibling relationships 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 ($P \leq 0.25$). 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 of sibling relationships were used for age classes 1.3 (predicted from 1.2), 2.2 (predicted from 2.1), and 2.3 (predicted from 2.2), while the median was used to estimate age class 1.2. The minor age classes (0.1, 0.2, 2.1, 1.1, 0.3, 0.4, 3.1, 1.4, 3.2, 1.5, 2.4, and 3.3) were predicted by summing the annual minor age class runs (1985-2001) and employing the median. The major and minor age class estimates were summed to estimate the total run and the collective variance was used to calculate 80% prediction intervals.

Forecast Discussion

The 2002 forecast for Nelson River is 413 thousand sockeye, which is 37 thousand more fish than the actual 2001 run of 376 thousand. The 2001 forecast was 54 thousand fish greater than the actual run. The 2002 forecast is similar in magnitude to the recent historical mean, being 33 thousand fish more than the 5-year average (1997-2001) and 107 thousand fish less than the 10-year average (1992-2001). Our confidence in this forecast is good to fair due to the proximity of the 2001 forecast to the actual run and the similar methods used for the 2001 forecast. An alternative forecast method using ocean age class relationships with auxiliary length data over the last six years produced an estimate that was less (340 thousand fish). This suggests that the run may fall in the lower half of the forecast range.

The projected harvest of 263 thousand fish is based upon the achievement of the midpoint of the escapement goal range of 100–200 thousand fish. The predominant age classes, 2.2 (50%), 2.3 (18%) and 1.3 (17%), should constitute 84% of the run

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Kodiak

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

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, recent year trends and the likely level of commercial harvest that can be expected to be available from such indicators, given the fishery management plans in place. 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 concerns 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 2002 try to qualitatively take recent decreased abundance trends into account. 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 2002 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.

The commercial harvest outlook for the year 2002 can be found in the following Table.

Commercial salmon harvest outlook for the AYK Region, year 2002, in thousands of fish:

	SPECIES					
Management Area	Chinook	Sockeye	Coho	Pink	Chum	Fall Chum
Kuskokwim	0-1	0-20	100-300	0-1	0-100	
Kuskokwim Bay	11-28	50-110	17-70	0-1	18-55	
Kuskokwim Total	11-29	50-130	117-370	0-2	18-155	
Yukon	0-20		0-50		0-150	0-150
Norton Sound	0-1		20-40	150-250	10-25	
Kotzebue Sound					150-200	

Revisions Note:

This document contains corrections (due to revised projections) not found in the original January 2002 distributed online and hard copy versions.

These revisions included:

Executive Summary.
Paragraph 1, line 5 -- "2002 commercial all-species
projection of 128 million”

Executive Summary.
Paragraph 1, line 6 -- "13.3 million chum salmon"

Literature Cited section. Added the following citation:
McNair, Marianne. 2002. Alaska Salmon Enhancement Program 2001 Annual Report, Commercial Fisheries Division, RIR 5J02-04, Juneau.

Table 1 and Figure 6 were revised to reflect changes in projected catch of chum salmon.

We apologize for any inconvenience caused by these original errors.

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