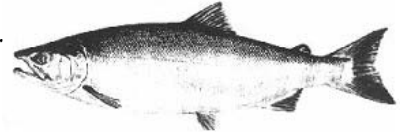


**ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES
NEWS RELEASE**



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2010 NORTON SOUND SALMON SEASON SUMMARY

Commercial Fishery

Highlights of the 2010 Norton Sound District commercial salmon fishery included the largest commercial chum salmon harvest since 1986, record coho salmon harvests in the Golovnin Bay (Subdistrict 2) and Elim (Subdistrict 3) Subdistricts, and record exvessel value and record average value of salmon catch per permit holder without adjusting for inflation. In contrast to the strong chum and coho salmon run performance, the poorest run of Chinook salmon on record to Norton Sound precluded commercial fishing directed on Chinook salmon for the fifth consecutive season; restrictions and early closures to the Chinook salmon subsistence and sport fisheries in Shaktoolik (Subdistrict 5) and Unalakleet (Subdistrict 6) were also implemented to meet escapement needs. Similarly, another poor run of sockeye salmon to Salmon Lake resulted in no commercial fishing being allowed in Port Clarence District and an early closure to the Pilgrim River subsistence fishery for the second year in row. On a tragic note, Thomas Sagoonick of Shaktoolik, lost his life while commercial salmon fishing in the Shaktoolik Subdistrict during a storm on Friday, July 16, 2010.

In northern Norton Sound (Subdistricts 2–3), commercial salmon fishing began with a 48-hour opening on June 30 directed at chum salmon. Catches of chum salmon were well above average during this period, but the next period was not scheduled until July 5 at the request of the buyer because of limited tendering capacity. Despite similar early chum salmon run strength indications in southern Norton Sound (Subdistricts 4–6), the Unalakleet and Shaktoolik Subdistricts commercial chum salmon fishery was delayed until July 2 and 3, respectively. Norton Bay Subdistrict (Subdistrict 4) was also not opened to commercial salmon fishing until July 4 because all available tenders were committed to supporting Subdistricts 2, 3, and 5 in early July. At the onset, department staff cautiously managed the Subdistricts 5 and 6 directed chum salmon fishery beginning with 24-hour openings in each subdistrict. These brief openings provided the department with indices of the Chinook salmon incidental catch in the directed chum salmon fishery while minimizing the impact to the Chinook salmon subsistence fishery and escapements. As a further precautionary measure, the northern half of the Unalakleet

Subdistrict was closed to commercial salmon fishing until July 10 in order to protect Chinook salmon migrating through the Unalakleet Subdistrict.

By July 12, the majority of Chinook salmon run was in river in southern Norton Sound and tendering capacity had increased to handle increased harvests of chum salmon. Strong commercial catches and above average to record-setting escapement counts of chum salmon were also observed throughout Norton Sound by this time. Consequently, the department placed Subdistricts 2–6 on a commercial fishing schedule of two 48-hour periods per week until July 24 in order to exploit the large surpluses of chum salmon. In Shaktoolik Subdistrict, the July 22 opening was delayed until July 23 and modified from a 48-hour opening to a 54-hour opening in order to allow fishermen and NSSP (Norton Sound Seafood Products) staff to attend the funeral of Thomas Sagoonick on July 22.

In early August, the department switched to coho salmon management. At this time, escapement counts of coho salmon were average to above average in northern Norton Sound, but below the recent 5- and 10-year average escapements in southern Norton Sound. However, if the record breaking coho salmon runs from 2005–2009 were excluded from long-term average catches and escapement indices, the coho salmon run to southern Norton Sound was showing average run strength for early August. Stock assessment data indicated that there were coho salmon surpluses available for commercial harvest and commercial fishing schedules of two 48-hour periods per week continued in Subdistricts 2–6.

Beginning August 13, Subdistricts 2–4 were placed on a schedule of two 72-hour periods per week in order to maximize harvests from the strong run of coho salmon to Subdistricts 2–3. Despite having no assessment of escapement in Subdistrict 4, there were no conservation concerns with including Norton Bay Subdistrict on the same schedule because of very little commercial fishing effort. Above average catches of coho salmon continued in the Golovnin Bay and Elim Subdistricts throughout August, which ultimately resulted in the season being extended beyond the regulatory closure date of August 31 to September 7. Fishing time was also increased to 72 hours in the Shaktoolik and Unalakleet Subdistricts for the August 5 opener in an attempt maximize commercial harvests during the historical “peak week” of the commercial fishery. Unlike the above average coho salmon abundance indicators observed in northern Norton Sound, catch per unit of effort indices for coho salmon in southern Norton Sound remained below recent 10-year averages for early August. Throughout mid-August, the department was prepared to increase fishing time if coho salmon abundance increased. However, catch and escapement indices continued to track below recent 10-year averages and a more aggressive fishing schedule was therefore not warranted. Similarly, average coho salmon run strength was not sufficient to warrant an extension to the commercial fishing season as had been done in three of the previous 4 years.

Strong chum salmon runs to Norton Sound, significantly increased fishing effort in Golovnin Bay and Elim Subdistricts, and record exvessel prices were the big story in 2010. Record percentages of age-0.2 chum salmon were observed in 2009 samples from Unalakleet Subdistrict north to Kotzebue Sound. As expected, the 2010 chum salmon run had a very strong age-0.3 chum salmon contribution throughout northwest Alaska. Fortunately, this strong chum salmon run combined with improved wild salmon market conditions and commercial chum salmon harvests were the highest observed since the mid-1980s in most Norton Sound Subdistricts. Effort in Golovnin Bay Subdistrict doubled from effort during the previous two seasons directly due to the strong chum salmon run. In contrast to northern Norton Sound, coho salmon runs to

Subdistricts 5 and 6 in 2010 were well below the record breaking runs of coho salmon that occurred from 2005–2009. However, Shaktoolik and Unalakleet Subdistricts harvests of coho salmon fell just short of being in the top ten all time. The high grounds price paid for coho salmon also increased 50–80% from the previous year and monetarily made up for the average coho salmon run in southern Norton Sound.

There was no commercial salmon fishery in Port Clarence for the second consecutive season because of another poor sockeye salmon run and opposition to the fishery by local subsistence users. Additionally, only 1,654 sockeye salmon were enumerated through the Pilgrim River weir, which was well short of the required 30,000 sockeye salmon inriver run goal for Pilgrim River to allow for commercial fishing.

Table 1 lists the Norton Sound District salmon historical and current year commercial harvests relative to the recent 5-year (2005–2009) and long-term average harvests. Norton Sound District combined commercial harvest of all salmon species ranked second in the last ten seasons. Chum salmon harvest in the Norton Sound District was 117,743 fish, which was 615% above the recent 5-year average harvest of 19,140 chum salmon and 24% above the long-term (1961–2009) average harvest of 88,946 chum salmon (Figure 1). Coho salmon harvest totaled out at 62,079 fish, and was nearly 44% below the recent 5-year average harvest of 109,902 coho salmon, but 68% above the long-term (1961–2009) average harvest of 36,878 coho salmon (Figure 2). Despite there being harvestable surpluses of pink salmon, there were no directed openings on pink salmon in 2010. Lack of effort directed on pink salmon was largely the result of the strong chum salmon run and improved market interest in chum salmon which contributed heavily to the lucrative salmon fishery in Norton Sound. Chinook salmon runs to Norton Sound were well below average and directed Chinook salmon openings were not allowed for the fifth consecutive season. Incidental Norton Sound pink and Chinook salmon harvests were 31,557 fish and 140 fish, respectively. In contrast to 2009, the seafood buyer elected to purchase the Chinook salmon caught in the directed chum salmon fishery rather than force fishermen to retain them for subsistence purposes. There were 22 Chinook salmon retained for personal use in 2010.

Table 2 shows 2010 commercial salmon harvests and the number of unique permits fished for each subdistrict. Table 3 compares historical coho and chum salmon harvests by subdistrict from 1961–2010, as well as the number of permits fished by subdistrict from 1970–2010. Commercial comparative catch statistics are only presented for chum and coho salmon as they were the only species targeted commercially in 2010. Ten permit holders in Golovnin Bay Subdistrict harvested 17,212 chum salmon and 5,586 coho salmon; the chum salmon harvest was the highest since 1988 and the coho harvest was record-setting. In Elim Subdistrict, the 23,453 chum salmon harvested by 19 fishermen was the best since 1985 and the 10,180 coho salmon harvested was the second consecutive record breaking harvest. Norton Bay Subdistrict had a harvest of 6,007 chum salmon, the highest since 1988, and a coho salmon harvest of 1,606 fish, which was the fourth highest in 16 seasons of commercial coho salmon fishing. Commercial chum salmon catches in Shaktoolik (40,483 fish) and Unalakleet (30,588 fish) were the best since 1983 and 1992, respectively. Shaktoolik Subdistrict coho salmon harvest (11,868 fish) ranked twelfth highest in 48 years of commercial salmon fishing and the Unalakleet Subdistrict coho salmon harvest (32,839 fish) ranked fifteenth in 50 years of commercial salmon fishing.

For the Norton Sound District overall, there were 115 unique permit holders that participated in the 2010 commercial salmon fishery (Table 4). Norton Sound District commercial salmon fishing effort in 2010 increased 64% from the previous 5-year (2005–2009) average of 70

permits fished and was slightly above the long-term (1977–2009) average was 112 permits fished (Table 4). Fishing effort in 2010 also increased 31% from the 88 permits fished in 2009. The number of commercial permits fished was the highest since 1994, and ranked seventeenth out of 34 years in which the number of permits fished is available for historical comparisons (Table 4). The largest increases in fishery participation occurred in the Golovnin Bay and Shaktoolik Subdistricts as the number of permits fished in the Golovnin Bay Subdistrict (10 permits) doubled from 2009 and the 35 permits fished in Shaktoolik in 2010 was a 67% increase from the 21 permits fished in 2009. Additionally, there were 59 permits fished in the Unalakleet Subdistrict in 2010, which represented a 20% increase from effort during the 2009 season (49 permits fished). Improved market conditions and a tremendous chum salmon run accounted for increased fishery participation in Golovnin Bay Subdistrict. However, increased effort in the Shaktoolik Subdistrict is largely the result of Unalakleet-based commercial fishermen fishing in the Shaktoolik Subdistrict during closures in the Unalakleet Subdistrict. Conversely, Norton Bay Subdistrict showed a reduction in the number of permit holders with 5 permits fished in 2010; 7 permit holders participated in the fishery in 2009. However, the drop in Norton Bay Subdistrict is most likely attributed to an increase in commercial openings in the Elim Subdistrict. In 2009, a small number of Elim-based fishermen traveled to Norton Bay early in the season because of a lack of commercial salmon openings in the Elim Subdistrict due to a poor run of chum salmon.

The 2010 Norton Sound salmon commercial fishery exvessel value of \$1,220,487 was record setting without adjusting for inflation and was 123% above the recent 5-year (2005–2009) average exvessel value of \$547,935 (Table 4; Figure 3). Additionally, the 2010 average value per permit holder of \$10,613 also established a new record in the fishery (Table 4). This summary should be considered preliminary and will be updated with additions and corrections in subsequent reports.

Only one salmon buyer operated in Norton Sound during the 2010 season. The Unalakleet fish plant operated by Norton Sound Seafood Products was the base of commercial fisheries operations. The majority of all salmon, including those tendered from Subdistricts 2–5, were delivered to the Unalakleet dock. The only exceptions were a few deliveries of chum salmon made to the Nome NSSP plant from the Golovin Subdistrict early in the season.

Average grounds price paid by species in 2010 was \$2.25/lb for Chinook salmon, \$.63/lb for sockeye salmon, \$1.47/lb for coho salmon, \$.32/lb for pink salmon, and \$.62/lb for chum salmon (Table 5). From the 2009 season, price per pound increased 85% for sockeye salmon, 58% for coho salmon, 78% for pink salmon, and 88% for chum salmon during the 2010 season. These improved market conditions across species, coupled with the strong chum salmon run in 2010, led to increased participation and the relatively high value of the Norton Sound salmon fishery in 2010.

Subsistence Fishery

For the seventh consecutive year, subsistence salmon users in the Port Clarence District and Subdistricts 1–3 (Nome, Golovnin Bay, and Elim) were required to possess a subsistence salmon permit for each household that fished in these locations. Subsistence permits list the bag limit by species which are specific to each body of water. In addition, the permit contains a catch calendar where the permit holder records catches in numbers for each species of fish for each day fished. If subsistence fishermen have filled their harvest limit in one river, they can fish in another river.

The only place there are limits on subsistence salmon harvest is in Nome Subdistrict, and in Pilgrim River, Kuzitrin River and Salmon Lake in Port Clarence District. Subsistence permits are important to management because they identify users and harvests, but the actual catch information cannot be compiled in most circumstances until well after the season when the permits are returned. In southern Norton Sound, the villages of Koyuk, Shaktoolik, and Unalakleet are surveyed to estimate the subsistence harvest. Subsistence harvest information presented in this report should be considered preliminary for Nome, Port Clarence, Pilgrim River and northern Norton Sound villages as not all permit data have been entered. However, subsistence data collected from surveys conducted in Koyuk, Shaktoolik and Unalakleet have been expanded and is complete at the time of this writing.

An average to above-average chum salmon run was forecasted for Nome Subdistrict for the 2010 season. The 2010 projected abundance of chum salmon was anticipated to easily exceed the Nome Subdistrict ANS (Amount Necessary for Subsistence) range of 3,430–5,716 chum salmon, and therefore there was no need for a Tier II fishery. From 1991–2005, Nome Subdistrict would close to subsistence salmon fishing in mid-June in order to determine the strength of the chum salmon run before allowing subsistence salmon fishing. Sport fishing for all salmon would also be closed when subsistence salmon fishing was closed. However, since 2005, Nome Subdistrict has not closed to subsistence salmon fishing in mid-June because the chum salmon forecast has been projected to meet or exceed the ANS.

In recent years, subsistence fishermen have depended more on pink and coho salmon for their subsistence needs. Fishermen are also more reluctant to deploy set gillnet gear in July to avoid their nets becoming saturated with prodigious numbers of pink salmon, particularly during even-numbered years. Since 2001, hook and line has been the predominant subsistence gear used to harvest salmon in the Nome Subdistrict and nets are used to harvest the majority of salmon elsewhere in the Norton Sound-Port Clarence Area. However, the Nome Subdistrict pink salmon run was below average for even-numbered years and pink salmon were less reluctant to bite in 2010 based on subsistence fishermen reports. Consequently, set gillnet gear and beach seines were used more heavily in the 2010 subsistence fishery. Nome Subdistrict permit catch data indicates that subsistence users took advantage of the large chum salmon surpluses. Elim and Shaktoolik Subdistricts and Port Clarence District also show significant increases in subsistence chum salmon harvests from previous seasons.

SEASON SUMMARY BY SUBDISTRICT

Nome - Subdistrict 1

At the onset of the 2010 season, the chum salmon run was anticipated to exceed the lower end of the ANS range. Initially, area managers placed the Nome Subdistrict on the regular gillnet fishing schedule of 72 hours in the marine waters, and two 48-hour fishing periods a week in the freshwater subsistence areas from mid-June until mid-July.

Despite the late-timing of salmon runs to the Nome Subdistrict, it was apparent by late June that chum salmon were showing early run strength. On June 30, department biologists conducted aerial surveys of lower reaches of Nome Subdistrict drainages. Thousands of pink and chum salmon were observed and on July 1 the department opened up beach seining during the gillnet subsistence fishing schedule in the Eldorado, Flambeau, and Sinuk Rivers, and in Safety Sound west of the Safety Sound bridge. By July 5, cumulative chum salmon escapement at the

Eldorado River weir was above the historical average for that date and subsistence fishermen reported very good catches of chum salmon, even in large mesh gear aimed at Chinook salmon. Additionally, area biologists observed large schools of chum salmon in the lower reaches of all Nome Subdistrict drainages by this date. As a result on July 6, subsistence fishing time was increased in the marine waters from 72 hours per week to 120 hours per week to provide additional opportunity for subsistence uses of chum salmon and let users take advantage of good drying weather. By mid-July, chum salmon escapement at the Eldorado River weir had surpassed the upper end of the sustainable escapement goal (SEG) range of 6,000–9,200 chum salmon. Chum salmon escapement goals were also nearly reached at the Snake River weir and on pace to easily be reached at the Nome River weir. Taken collectively, chum salmon assessment data showed that the Nome Subdistrict biological escapement goal (BEG) range of 23,000–35,000 chum salmon would easily be surpassed and additional harvest opportunity for chum salmon was warranted. Also, the pink salmon escapement goal was attained by July 11. In response to the abundance of salmon, area managers further liberalized the subsistence fishery to allow a more efficient harvest of chum and pink salmon surpluses. On July 12, all subsistence catch limits for pink and chum salmon were waived, subsistence gillnet fishing in the marine waters was increased from 120 hours per week to 144 hours per week, and beach seining for salmon during marine and freshwater subsistence schedules was permitted until July 26. An estimated 97,721 chum salmon escaped to reach spawning areas in 2010 despite the aggressive subsistence fishing schedule and use of seines. The 2010 Nome Subdistrict escapement of chum salmon is a new record and is 180% above the upper bounds of the BEG range of 23,000–35,000 fish. Similarly, escapement counts of chum salmon exceeded upper bounds of SEG ranges for the Eldorado (6,000–9,200), Nome (2,600–4,300), and Snake (1,600–2,500) rivers by 31%, 79%, and 37%, respectively. Eldorado River chum passage was grossly underestimated due to breaches in the weir that allowed several thousand chum salmon to escape without being enumerated in early July; mid-July aerial survey counts of chum salmon were substantially higher than cumulative weir passage estimates for mid-July.

Effective July 26, the department switched to coho salmon management and returned the marine waters to the subsistence fishing schedule of five days per week and freshwater areas to two 48-hour periods per week by regulation. Beginning August 15, subsistence fishing was allowed seven days a week per regulation in the marine waters. By August 20, Nome River coho salmon cumulative passage (867 cohos) was below the recent 5-year average count of 1,063 coho salmon, but above the recent 9-year (2000–2009) average count of 664 coho salmon. At Snake River weir, only 177 coho salmon had been counted by August 20, which was well below the recent 5- and 9-year average counts for that date. However, aerial surveys showed several hundred coho salmon in the lower reaches of these systems as well as other Nome Subdistrict drainages around this time. With coho salmon escapement needs expected to be met, the department did not anticipate any restrictions or early closures to the subsistence fishery in 2010. By regulation on September 1, subsistence fishing time was extended to seven days a week in freshwater subsistence areas in the Nome Subdistrict. Catch limits for coho salmon were also waived at this time in order to provide additional harvest opportunity of late run coho salmon; the majority of coho salmon were upstream from designated subsistence areas by this time.

Subsistence salmon permits have been required for Nome Subdistrict since 1975. A record 494 permits were issued during the 2010 season, a 16% increase from the 426 permits issued in 2009 and slightly above the previous record 491 permits issued in 2004. However, it is likely that high number issued in 2004 was in part due to sport fishing being closed for over a week early in

the pink salmon run while subsistence hook and line fishing was open at that time. Also, in 2004 some fishermen obtained both Tier I and Tier II permits because Tier II permits expired after chum salmon season ended in late July. Therefore, the 491 permits issued in 2004 include both Tier I and Tier II permits issued. While Nome Subdistrict subsistence fishing effort has increased since 2009, the number of Pilgrim River permits has decreased significantly, in large part due to the downturn in sockeye salmon runs to Salmon Lake. In 2010, the number of Pilgrim River subsistence salmon permits issued was 146, which is 44 less than the number issued in 2009 and 109 permits fewer than the record 255 permits issued in 2008, the year prior to the collapse of the Pilgrim River sockeye salmon run. At the time of this writing, only data from 429 permits has been entered. Preliminary subsistence harvest by species for the Nome Subdistrict is 21 Chinook, 2,903 chum, 5,420 pink, 1,824 coho, and 76 sockeye salmon (Table 6; Figure 4). Preliminary chum salmon harvest is 150% above the 2005–2009 average harvest of 1,161 chum salmon, and 15% below the long-term (1975–2009) average harvest of 3,426 chum salmon (Table 6; Figure 4). Pink salmon harvest in 2010 is 96% of the 2005–2009 average pink salmon harvest of 5,667 fish and will probably exceed the average when remaining permits are entered (Table 6; Figure 4). Preliminary harvest of coho salmon is 15% below the 2005–2009 average harvest of 2,151 coho salmon, but is 58% above the long-term (1975–2009) average harvest of 1,157 fish (Table 6; Figure 4).

Golovin Bay and Moses Point Subdistricts - Subdistricts 2 & 3

Commercial Fishery

Improved market interest in conjunction with above average runs of coho salmon beginning in the mid-2000s resulted in a resurgence in commercial salmon fishing in 2007 in Subdistrict 3. A year later, commercial salmon fishing also returned to Subdistrict 2, albeit with limited effort. Commercial fishing did not occur in Subdistricts 2 and 3 from 2002–2006 due to a combination of poor chum salmon runs (2002–2005) or a lack of buyer interest (2006).

The Norton Sound Subdistricts 2 and 3 Salmon Management Plan limits commercial harvest to a maximum of 15,000 chum salmon in Subdistrict 2 before mid-July in an attempt to protect chum salmon stocks and allow for some harvest while flesh quality is at its best. By that date, the chum salmon run usually can be assessed using commercial catch indices and escapements observed at a counting tower located on the Niukluk River, a major salmon spawning tributary of the Fish River drainage. The management plan further directs the department to allow commercial chum and pink salmon fishing only if chum salmon escapement goals are projected to be reached in both Subdistricts 2 and 3. For chum salmon, Niukluk River has an SEG threshold of $\geq 23,000$ fish used to evaluate escapement in Subdistrict 2, and Kwiniuk River has an optimal escapement goal (OEG) range of 11,500–23,000 chum salmon used to evaluate escapement to Subdistrict 3.

At the 2010 BOF meeting, two major changes were adopted that affected commercial salmon fisheries in Subdistricts 2 and 3. First, the boundaries of Subdistrict 3 were expanded eastward from the previous marker of the terminus of the Kwik River to Bald Head and westward from the previous marker of Elim Point to Carson Creek near Cape Darby. Enlarging Elim Subdistrict in this manner provided opportunity to harvest salmon from other nearshore areas in close proximity to the village of Elim and spread out fishing effort that had historically been concentrated near the mouths of the Kwiniuk and Tubutulik Rivers. Additionally, fishing further west away from the major freshwater influence of the Kwiniuk, Tubutulik, and Kwik Rivers may

reduce the number of watermarked salmon harvested in the Subdistrict 3 fishery, thereby improving the marketable quality of the salmon harvest. The other major regulatory change was a modification to the Subdistricts 2 and 3 Management Plan so that a pink salmon commercial fishery could be prosecuted even during years of low chum salmon abundance. Specifically, the plan was changed so that pink salmon directed fisheries could occur after July 6 in Subdistrict 3 and after July 14 in Subdistrict 2 even if chum salmon escapement goals are not projected to be reached. July 6 and 14 correspond to the long-term average historical midpoint passage dates for chum salmon runs at the Kwiniuk and Niukluk River towers, respectively. By these dates, the bulk of chum salmon runs are in river and will either contribute to the escapement or provide for subsistence uses of chum salmon. Thus, commercial fishing for pink salmon with small (4 ½ inches) mesh gillnet gear after these dates would allow commercial harvest of pink salmon while not jeopardizing escapements or subsistence uses of chum salmon.

In 2010, the chum salmon run to northern Norton Sound showed early run strength despite a very late break up and cool spring temperatures. On June 28, over 5,600 chum salmon were counted at Kwiniuk River tower; the previous day's count was 2,703 chum salmon. Cumulative passage as of June 28 was 8,415 chum salmon, which was 240% above the long-term average passage estimate of 2,463 chum salmon for that date. A similar index of Subdistrict 2 chum salmon abundance was not available because Niukluk River tower did not become operational until July 1. However, subsistence fisherman in Golovnin Bay and near Moses Point (Subdistrict 3) were reporting large catches of chum salmon, even when using large-mesh (8 ¼-inch) gillnets aimed at catching Chinook salmon. Near-record chum salmon passage at Kwiniuk River tower in conjunction with strong subsistence catches of chum salmon indicated that large surpluses of chum salmon were available for commercial harvest in Subdistricts 2 and 3.

After consultation with the buyer, a commercial fishery directed on chum salmon commenced on June 30 in Subdistricts 2 and 3 with a single 48-hour period in order to gauge run strength before committing to a commercial fishing schedule. Harvests during the first opener were 5,701 chum salmon, 2,562 pink salmon, and 1 Chinook salmon by 14 fishermen in Elim Subdistrict. Catch statistics for the June 30 period in Golovnin Bay Subdistrict were confidential due to low effort but catch per unit of effort (CPUE) was well above average for late June. Elim chum salmon harvest was 80% above the historical average catch and CPUE was the fourth highest on record for late June. As of July 2, the Kwiniuk River chum salmon escapement goal had already been surpassed and the cumulative passage estimate of 18,183 chum salmon was the fourth highest count for July 2. Chum salmon abundance warranted an early July commercial fishing schedule for Subdistricts 2 and 3 of two 48-hour periods per week, but the next period was delayed until July 5 because the buyer had limited tendering capacity. Another strong catch of chum salmon occurred during the July 5 opener; there were 2,842 chum salmon harvested by 4 permit holders in Subdistrict 2 and 5,383 chum salmon harvested by 16 permit holders in Subdistrict 3. On July 11, Kwiniuk River chum salmon escapement (51,360 fish) was record-setting and run-timing models indicated that Niukluk River chum salmon escapement was projected to range between 30,000–48,000 fish, well above the SEG threshold of 23,000 fish. Tendering capacity was sufficient by this time to support a schedule in both subdistricts and the department set a commercial fishing schedule of two 48-hour periods per week until July 24. The July 22 opening was rescheduled to commence on July 23 and extended 8 hours in order to allow individuals to observe the funeral of Thomas Sagoonick.

On July 25, the department switched into coho salmon management. The previous chum salmon fishing schedule of two 48-hour periods per week was extended for another week in order to gauge coho salmon run strength. However, chum salmon catches continued to exceed coho salmon harvests until July 31 due to an unprecedented level of late-season chum salmon abundance. By August 2, coho salmon catch rates finally surpassed chum salmon catch rates in the Subdistricts 2 and 3 commercial salmon fishery. Additionally, coho salmon passage at the Niukluk River tower (561 fish) was 65% above the recent 10-year average count of 340 coho salmon, and Kwiniuk River tower passage (717 fish) was near the recent 9-year average passage estimate of 759 coho salmon if the record 2006 run was excluded. A schedule of two 48-hour periods per week continued until August 11. By August 12, coho salmon escapement needs were projected to easily be reached as coho salmon counts were third best at both the Niukluk and Kwiniuk River towers and well above their respective long-term average counts for mid-August. Beginning August 13, a more aggressive commercial fishing schedule of two 72-hour periods per week was implemented for the remainder of August in order to maximize harvests and catch quality during the peak of the coho salmon run. The season was slated to close by regulation on August 31, but good late-August commercial coho salmon catches in conjunction with average (Kwiniuk River) to above average (Niukluk River) escapement counts of coho salmon in late August led to an extension of the Subdistricts 2 and 3 commercial salmon season. The August 29 opening was increased from 48 hours to 72 hours and the season ended with a 120-hour period from September 2 to September 7.

Table 7 shows commercial salmon harvest and CPUE by period for the Golovnin Bay Subdistrict during the 2010 season. The season harvest was 3 Chinook salmon, 2 sockeye salmon, 5,586 coho salmon, 2,039 pink salmon, and 17,212 chum salmon by 10 permit holders. Chum salmon harvest was the best since 1988, but only 26th best in 40 years of commercial salmon fishing in Subdistrict 2. However, it should be noted that effort in 2010 was a mere vestige of historical commercial fishing effort in Subdistrict 2. For example, while 10 permits were fished throughout the season, the greatest amount of effort during a single period was 6 permits. In contrast, in 1988, 21 permit holders fished (Table 3) during the season and during a single period in that season. If effort had been similar to levels prior to the downturn in the chum salmon fishery of the early 1990s, the chum salmon catch would have been much higher in 2010 and perhaps comparable to catches during the 1980s. Coho salmon harvest was record-setting and 30% above the previous record harvest that occurred in 1982. Comparative catch statistics for Chinook, sockeye and pink salmon cannot be made since there were no fisheries directed on these species. Chum salmon passage at the Niukluk River tower was 48,110, which was the fifth highest escapement since the project's inception in 1995 and more than double the SEG threshold of 23,000 chum salmon. The tower count of 433,529 pink salmon easily exceeded the SEG threshold of 10,500 fish, but was the lowest even-year count in 8 years of enumerating pink salmon escapement in even-numbered years. The 8,922 coho salmon counted at the Niukluk River tower ranked fifth best and was 24% above the upper bound of the SEG range of 2,400–7,200 coho salmon. An estimated 42 Chinook salmon were counted at the tower, which was the seventh lowest in the project's history.

Commercial salmon harvest statistics by period for Elim Subdistrict are summarized in Table 8. In Elim Subdistrict, 19 permit holders harvested 9 Chinook, 5 sockeye, 10,180 coho, 11,658 pink and 23,453 chum salmon. Chum salmon harvest ranked nineteenth in 45 years of commercial chum salmon fishing, but was the biggest chum salmon harvest since 1985 when 34 permit holders caught 24,446 chum salmon. However, effort peaked at 16 fishermen in 2010 compared

to 31 permits fished in early July of 1985 (Table 3). Considering the greatly reduced effort, chum salmon harvest was more impressive in 2010. The sheer size of the Elim Subdistrict chum salmon run would have easily supported a much greater harvest had there been ample fishing power available. Coho salmon harvest was record-setting for the second consecutive season. The Kwiniuk River tower count of 71,388 chum salmon eclipsed the previous record count of 66,604 chum salmon in 1970. Pink salmon escapement (634,220) at Kwiniuk River was eleventh best, but 15% below the long-term (1966–2008) even-year average pink salmon escapement of 726,610 fish. Regardless, the pink salmon run easily provided for subsistence uses of pink salmon and escapement needs. An estimated 8,049 coho salmon were enumerated at Kwiniuk River tower, which ranked eighth in 10 years of coho counts and was below the 2001–2009 average count of 10,771 coho salmon. However, the average escapement includes several years (2001–2006) in which no commercial salmon fishing occurred in Subdistrict 3. Had there not been a directed coho salmon fishery and a record harvest of coho salmon, the escapement would most likely have been above average. Chinook salmon escapement (135 fish) was 55% below the lower bound of the tower-based SEG range of 300–550 Chinook salmon and was the second lowest count since Chinook salmon counts were expanded beginning in 1985. The Kwiniuk River Chinook salmon SEG has only been met once in the last 5 years, and has only been reached in 5 out of 12 years since goals were established in 1999.

Subsistence Fishery

This was the seventh year that subsistence salmon permits were required in Subdistricts 2 and 3. There were 159 Golovnin Bay Subdistrict permits issued in 2010, only two less than the 161 permits issued for Subdistrict 2 in 2009. The number of Subdistrict 2 permits issued to Nome residents has dropped by 25% since 2004 while the number of permits issued to Golovin and White Mountain residents has been similar each year. In Elim Subdistrict, there were 63 permits issued, which is down from the record 73 permits issued in 2009.

Table 9 and Figure 6 compare the preliminary 2010 subsistence salmon harvest with historical subsistence harvests in the Golovnin Bay Subdistrict. Elim Subdistrict subsistence salmon harvests are summarized in Table 10 and illustrated in Figure 7.

At the time of this writing, 118 Golovnin Bay Subdistrict permits have been returned and 57 permits from Elim Subdistrict have been returned. In Golovnin Bay Subdistrict, 2010 preliminary harvests are 4 Chinook, 278 chum, 4,880 pink, 1,531 coho, and 12 sockeye salmon. It appears that chum salmon were not targeted heavily in Golovnin Bay Subdistrict despite the large surpluses available for subsistence as the 2010 preliminary harvest is only 16% and 10% of the 2005–2009 and 1994–2009 average harvests, respectively. Pink salmon preliminary harvest is the lowest on record for an even-numbered year and is 53% of the 1994–2009 average harvest of 9,251 pink salmon. In contrast to pink and chum salmon, coho salmon harvest is 4% and 12% above the 2005–2009 and 1994–2009 average harvests, respectively. Elim Subdistrict shows a much different pattern of harvests. Preliminary harvest by species for Elim Subdistrict is 93 Chinook, 3,669 chum, 7,347 pink, 1,419 coho, and 2 sockeye salmon. Elim Subdistrict shows a much different pattern than Golovnin Bay Subdistrict, as chum salmon harvest is already 183% above the long-term (1994–2009) average harvest of 1,298 chum salmon, and is the highest since survey methodologies were standardized in 1994. Similarly, the preliminary pink salmon harvest is 54% above the long-term average harvest of 4,785 pinks. Coho salmon subsistence harvests from Elim are 78% of the average of 1,811 cohos. Elim Subdistrict Chinook salmon harvest in

2010 is only 24% of the 1994–2009 average of 392 Chinook salmon and is the lowest since surveys began in 1994.

The greatly reduced utilization of pink and chum salmon in 2010 is not consistent with abundance of these species indexed by the commercial fishery and Niukluk River tower counts. Further, above-average harvests of chum and pink salmon in the neighboring Elim Subdistrict raise more questions about the reported Golovnin Bay Subdistrict harvests. It is unclear at this time why harvests were so reduced for these species, yet coho salmon harvests increased from 2009. Perhaps there are other unknown socioeconomic, logistical, or other factors that contributed to the below average harvest of pink and chum salmon in Subdistrict 2.

Norton Bay - Subdistrict 4

Commercial Fishery

The Norton Bay Subdistrict typically has difficulty attracting a buyer due to its remoteness and its reputation for watermarked fish. However, in recent years NSEDC has taken measures to rebuild the fishery by helping to reinstate outstanding limited entry permits and by finding markets for watermarked salmon such as a “marinade program” in which fillets removed from watermarked salmon are sold in vacuum sealed packages containing marinade. Timely salmon escapement information is lacking in the Norton Bay Subdistrict due to a lack of counting projects and limited aerial surveys. Currently, Subdistrict 4 is typically managed using escapement and catch information from the Shaktoolik and Unalakleet Subdistricts because they are believed to exhibit similar trends in salmon run strength and timing. In 2008, a small scale commercial salmon fishery occurred in Norton Bay Subdistrict for the first time since 1997. The department again opened the commercial salmon fishery in 2009 and 7 permit holders participated at some time during the season compared to 5 permit holders in 2010. The fishery was very limited again in 2010 due to a combination of limited tendering capacity in early July, mechanical breakdowns on tender vessels in August, and limited fishery participation due to concurrent fisheries prosecuted in the Elim and Shaktoolik Subdistricts.

Commercial salmon fishing began in Norton Bay Subdistrict on July 4, with a 24-hour opening targeting chum salmon. Catches from the first period remain confidential due to low number of permits participating in the fishery, but catches and CPUE were below the historical average for July 4. Norton Bay Subdistrict was reopened on July 9 and placed on the same schedule as Subdistricts 2 and 3 for the remainder of the season. As in previous years, there was very limited commercial fishery participation in Norton Bay Subdistrict. Additionally, good subsistence chum salmon catches were reported from the village of Koyuk and chum salmon catch and escapement indices from other Norton Sound subdistricts were above average throughout July. Later on during coho salmon season, commercial exploitation remained low and coho salmon run performance in neighboring subdistricts was sufficient to warrant additional commercial fishing. Consequently, the department did not have any concerns with meeting escapement needs or providing for subsistence uses of chum or coho salmon in Subdistrict 4.

Table 11 shows commercial salmon harvest, effort and CPUE by period for the 2010 season. Cumulative commercial catch by species for the Norton Bay Subdistrict was 6,007 chum, 2,597 pink, 7 sockeye, and 1,606 coho salmon. The chum salmon harvest was the highest since 1988, but was 25% below the long-term (1962–2009) average harvest of 7,943 chum salmon (Table 3). Coho salmon harvest in 2010 was 114% above the long-term (1962–2009) average harvest of 751 coho salmon (Table 3) and was the fourth highest in 16 seasons of commercial coho salmon

fishing. The peak of the chum salmon fishery occurred during a 48-hour opening on July 9 when 1,343 chum salmon were harvested by 3 permit holders (Table 11). On August 5, a peak harvest of 378 coho salmon was taken by 4 permit holders during a 48-hour opening (Table 11). Strong westerly winds and limited tender capacity often prevented fishermen from deploying gear for the entire duration of several periods in August. This should be taken into consideration when evaluating 2010 catches in Norton Bay Subdistrict and making inter-annual comparisons.

Subsistence Fishery

This was the third consecutive year that household subsistence salmon surveys were conducted in the native village of Koyuk. Surveys were conducted from 1994–2003, but funding limitations precluded surveys of Koyuk during the 2004–2007 seasons. There were 73 households that were successfully contacted out of a possible 86 in 2010. Results from these households were expanded to estimate harvests by species, gear type and location (e.g., Inglutalik River, Ungalik River, Koyuk River and marine waters) for those households that were not surveyed.

Table 12 and Figure 8 summarize subsistence salmon harvests for the Norton Bay Subdistrict from 1994–2010. Subsistence harvests for all species, with the exception of sockeye salmon were below the long-term (1994–2009) average harvests. An estimated 341 Chinook, 3,180 chum, 3,115 pink, 21 sockeye, and 461 coho salmon were reported harvested by Koyuk residents in 2010. Chinook harvest was 17% below the long-term average harvest of 415 Chinook salmon but above the 2008 and 2009 harvests of 187 and 259 Chinook salmon, respectively (Table 12). The 2010 subsistence chum salmon harvest was 27% below the long-term average harvest of 4,333 chum salmon but near the 3,183 chums in 2009 and only 5% below the 2008 harvest of 3,330 chum salmon (Table 12). Coho salmon harvest was 14% below the average harvest of 537 coho salmon and well below the 2008 and 2009 harvest estimates of 1,084 and 891 coho salmon, respectively (Table 12).

Shaktoolik and Unalakleet - Subdistricts 5 and 6

Background

Both Shaktoolik and Unalakleet Subdistricts, which share a common boundary, consistently attract commercial markets due to larger volumes of fish and better transportation services. Management actions typically encompass both subdistricts because tagging studies have shown that salmon stocks originating from both Subdistricts 5 and 6 intermingle and harvest in one subdistrict can affect the movement of fish into the adjacent subdistrict. The department's test net in Unalakleet River, an enumeration tower located on the North River and inseason interviews with Unalakleet subsistence users are used to set early fishing periods in both subdistricts. As the season progresses, test net catches, commercial and subsistence catch indices, and North River tower passage estimates are used to assess run strength and migration timing of each salmon species. Aerial surveys are only useful for late season escapement assessment because of the long travel time between the fishery and the spawning grounds and turbid water in the lower reaches of the Shaktoolik and Unalakleet River drainages.

Chinook Salmon Fisheries

In Shaktoolik and Unalakleet Subdistricts, directed commercial Chinook salmon fishing has only occurred in two of the previous 10 years, and in only 1 year since 2001. Restrictive actions were taken in the subsistence and sport fisheries in 2003, 2004, and from 2006–2010. The midpoint of

the North River tower sustainable escapement goal (SEG) range of 1,200–2,600 Chinook salmon was reached in 2007, largely due to a restrictive subsistence fishing schedule, 50% reductions in the sport fish daily and annual possession limits, and an early closure to the subsistence and sport fisheries in early July. Prior to 2007, the lower end of the SEG (1,200) range had not been achieved since 2003. Record low Chinook salmon escapements and subsistence harvests occurred in 2008 despite Unalakleet River mesh-size restrictions and a July 5 early closure to subsistence and sport fisheries.

Subdistricts 5 and 6 Chinook salmon were designated a stock of yield concern in 2004 and the Alaska Board of Fisheries (BOF) continued this designation in February 2007 and January 2010. To increase Chinook salmon escapements, the BOF also adopted a more conservative Subdistricts 5 and 6 King Salmon Management Plan (5 AAC 04.395) that was first implemented during the 2007 season. Under the plan, commercial fishing directed at king salmon can only occur if the midpoint of the North River tower sustainable escapement goal (SEG) range is projected to be reached. Additionally, the plan directs the department to provide escapement windows by restricting subsistence gillnet fishing for salmon from mid-June to mid-July to two 48-hour fishing periods a week in the marine waters, and two 36-hour fishing periods a week in the Unalakleet River. Subsistence fishing time can only be liberalized if the department projects that the lower end of the SEG range will be achieved. If North River king salmon passage is projected to fall short of the SEG, the department is directed to close the king salmon fishery.

At the onset of the 2010 season, a directed Chinook salmon commercial fishery was not expected, but early closures to the marine subsistence and Unalakleet River sport fisheries were not anticipated for Subdistricts 5 and 6 in early July as in previous years. After evaluating catch and escapement data following the 2009 season, area biologists projected that the Subdistricts 5 and 6 Chinook salmon run in 2010 would be below average.

Vast stretches of shore-fast ice melting in place in the Shaktoolik and Unalakleet Subdistricts resulted in colder than average June water temperatures that likely delayed migration timing of salmon and other species. The majority of subsistence fishermen did not deploy large-mesh set gillnets in the marine waters to target Chinook salmon until the third week of June. This was due to a combination of later than average Chinook salmon run timing and the presence of spawning Pacific herring *Clupea pallasii* in mid-June. Pacific herring will spawn on any available substrate and set gillnets covered in herring spawn are more easily seen and evaded by Chinook salmon. Additionally, removing the sticky herring spawn from gillnets is very labor intensive. Thus, several fishermen elected to postpone subsistence salmon fishing until the large schools of herring had spawned and moved offshore from nearshore areas.

Despite extremely late run timing, by late June it was clear from poor subsistence catches of Chinook salmon that the 2010 Subdistricts 5 and 6 Chinook salmon run was very weak. Several fishermen reported that they had only harvested 20% of their Chinook subsistence needs by the end of June. This was in stark contrast to 2009, when many fishermen communicated that they had already pulled their nets for the season by late June because they had met their subsistence needs. Only a few Chinook salmon were harvested before subsistence catches of Chinook peaked on June 25, and catch rates plummeted drastically in late June (Figure 9). Set gillnets were restricted to 6-inches or less for the Unalakleet River on July 5 in order to protect milling Chinook salmon and large females in the lower reaches of the Unalakleet River; this marked the third consecutive year that mesh-size restrictions were implemented on the Unalakleet River before the closure of the fishery.

Record low July 9 escapement of Chinook salmon at North River (135 fish) and weak Unalakleet River weir Chinook salmon passage (256 fish) was of concern to managers. It appeared highly unlikely that the lower bound of the North River tower based SEG range (1,200–2,600 fish) would be reached based on historical run timing information. While the Unalakleet River weir project was new, the July 9 cumulative count was worrisome considering that radiotelemetry studies determined that the mainstem of the Unalakleet River contributes approximately 60% to the overall drainage-wide escapement. In addition, continued poor subsistence catches in early July indicated that the main pulse of the Chinook salmon run was not sufficient to both meet escapement goals and subsistence needs. Consequently, on July 10, area managers restricted the marine subsistence Chinook salmon fishery to gillnets with a mesh size of 6 inches or less and sport fishing for Chinook salmon in Subdistricts 5 and 6 was closed. Additionally, subsistence fishing in the Unalakleet River was further restricted to set gillnets with a mesh size of 4 ½-inches or less on July 10. Beginning July 9, beach seining was permitted 7 days a week in order to allow subsistence harvest opportunity of abundant pink and chum salmon, but all Chinook salmon had to be returned to the water immediately.

The 2010 Unalakleet River Chinook salmon run to Subdistricts 5 and 6 ended up being the poorest on record. However, total run size estimates are only available for the Unalakleet Subdistrict because escapement estimates are lacking for the Shaktoolik Subdistrict. The 2010 Unalakleet Subdistrict Chinook Salmon total run size estimate of 3,938 fish is 35% below the recent 5-year (2005–2009) average run size of 5,926 Chinook salmon, and 163% below the long-term (1984–1986, and 1996–2009) average runs size estimate of 10,160 Chinook salmon (Table 13; Figure 10). While yields were low, restrictions and early closures to Chinook salmon fisheries had the desired effect of increasing escapements of Chinook salmon. Additionally, several individuals that were historically high harvesters of Chinook salmon focused on commercial chum salmon fishing in early July, which undoubtedly curtailed subsistence harvest pressure on Chinook salmon. Estimated escapement at North River tower was 1,302 Chinook salmon, which was 23% and 9% below the long-term and recent 5-year average escapement counts; respectively (Table 13). However, the lower bound of the SEG range (1,200–2,600 Chinook) was exceeded for the second consecutive year (Figure 11). Escapement goals have been reached in three out of 4 years since the Subdistricts 5 and 6 Management Plan was adopted. Exploitation rate for 2010 is estimated at 41%, which is an increase from the 27.5% in 2009, but similar to the recent 5-year average exploitation rate of 40.2 (Table 13; Figure 10).

Commercial Fishery

Chinook salmon conservation concerns have affected the management of commercial fisheries directed on chum and pink salmon in Subdistricts 5 and 6, particularly since 2007 when market interest in chum and pink salmon began to improve. Until 2007, buyer interest was primarily focused on coho salmon, but in recent years, there has been interest in prosecuting chum and pink salmon fisheries earlier in order to increase harvests of these species. Additionally, the quality of chum and pink salmon harvests is typically much higher before mid July as these catches are comprised of fewer watermarked fish. However, fishery managers had been reluctant to prosecute a chum salmon fishery before July 15 in order to ensure that few Chinook salmon were incidentally harvested. To address these issues, department staff proposed changes to the management plan that were later adopted by the Alaska Board of Fisheries in January 2010. These changes struck a balance between Chinook salmon conservation concerns and the demand by the industry and users to increase commercial harvests of relatively abundant chum

and pink salmon. Under the modified plan, commercial chum or pink salmon fisheries may not occur before July 1 if Chinook salmon escapement goals are not projected to be reached and/or if restrictions to the subsistence fishery are being implemented. A trigger point date of July 1 was chosen because historical subsistence catch information indicated that the vast majority of Chinook salmon entered the lower reaches of the Shaktoolik and Unalakleet Rivers by July 1. Prosecuting a commercial chum or pink salmon fishery after July 1 was therefore not anticipated to have a significant impact on subsistence use of Chinook salmon or escapement needs. This new language in the plan provides clear direction for fishery managers, and effectively allows increased commercial harvests of chum and pink salmon while minimizing impacts to Chinook salmon in years of low abundance.

Pink salmon runs to southern Norton Sound in 2010 were below the even-numbered year average in 2010, although there were surpluses available for commercial harvest had there been buyer interest. However, a very strong chum salmon run coupled with a \$0.65 per pound grounds price led the buyer to target chum salmon and pink salmon harvests were incidental in other directed salmon fisheries in 2010.

By July 1, a total of 297 chum salmon had been caught in the Unalakleet River test net, which was above the recent 10-year (2000–2009) and 20-year (1990–2009) average catches for that date. NSSP expressed interest in having a chum salmon opener in early July. In consultation with NSSP, the department allowed 24-hour openings in Subdistricts 5 and 6 on July 2 and 3, respectively. In light of the very poor Chinook salmon counts, fishery managers wanted to implement a very conservative management approach during the first half of the chum salmon fishery, especially given the assessment of later than average run timing. Staggered times for the openings also reduced overall commercial effort, and the northern half of Subdistrict 6 was closed to commercial fishing. As a further precautionary measure, several commercial fishermen recommended prohibiting commercial fishing in the marine waters just south of the Unalakleet River until the Chinook salmon run was over. Fishermen indicated that milling Chinook salmon will back out of the Unalakleet River and mill in the marine waters north of Coral Lake, which is known locally as “Big Lake”. Biologists concurred with this opinion and limited commercial salmon fishing in Subdistrict 6 from a regulatory marker near Coral Lake south to the tip of Black Point until July 10.

A total of 8,755 chum salmon were harvested by 21 permit holders during the July 3 opening in Shaktoolik, and 2,223 chum salmon were harvested by 19 fishermen during the July 2 period in Unalakleet (Tables 14 and 15). The Shaktoolik Subdistrict chum salmon catch was the fourth highest ever and CPUE (17.37 index points) was record setting. Additionally, the harvest was the largest for a single 24-hour period. While the chum salmon harvest in Unalakleet was below average for early July, the CPUE of 4.9 index points was more than double the early July average of 1.8 index points. Unalakleet catch rates were even better considering that more than one-half of Subdistrict 6 was closed to commercial fishing to protect Chinook salmon. These 24-hour openings were beneficial to management biologists because they not only provided an early index of the strong chum salmon run, but also showed that incidental catches of Chinook salmon were low in the directed chum fishery; a combined 31 Chinook salmon were harvested in both subdistricts during these periods (Tables 14–15). Incidental catches of Chinook salmon continued to gradually decline over the next week and the northern half of Subdistrict 6 was reopened to commercial salmon fishing on July 10. By this date, the test fishery catch of chum salmon was 672 fish, which was the third highest on record for July 10. Additionally, over

28,000 and 4,800 chum salmon had been enumerated at the Unalakleet River weir and North River counting tower, respectively. North River chum salmon passage lagged only behind the July 10 count of 5,268 chum salmon in 1996, a year with a July 8 midpoint. Management biologists were certain that the 2010 chum salmon run had significantly later run timing than 1996 run—the 2010 run had a midpoint passage date of July 20. Taken collectively, available assessment data indicated that additional commercial fishing time was warranted to target chum salmon surpluses. Dates and durations of fishing periods from July 10–14 were set at the request of the buyer, but a schedule of two 48-hour periods per week was eventually established by July 15 for the remainder of the month. Commercial catches of chum salmon continued to be well above average throughout the month of July in the Shaktoolik Subdistrict and above average during most periods in the Unalakleet Subdistrict. Shaktoolik Subdistrict chum salmon catch was the highest during the July 3 opening, whereas the peak chum salmon catch occurred during the July 6 opening in the Unalakleet Subdistrict (Tables 14–15). Test fishery catches were record-setting by July 22 and escapement indexed by the North River tower set a new record by July 26.

The first coho salmon was caught in the department test net on July 19 and the department switched into coho salmon management beginning the final week of July. However, as in northern Norton Sound, coho salmon catch rates did not eclipse those of chum salmon in southern Norton Sound until the first week of August because of the large chum salmon run. In early August, commercial and test fishery catches of coho salmon were clearly below record levels observed during the 2005–2009 seasons, but near the long-term average catch indices with record runs excluded from the average. Fishery managers kept Subdistricts 5 and 6 on the schedule of two 48-hour periods per week until August 5 in order to gauge run strength. On August 5, a 72-hour period was scheduled in an attempt to maximize harvests and catch quality of coho salmon during the historical peak of the commercial coho salmon fishery. A consecutive 72-hour period would have been scheduled had coho salmon catch rates improved, but only 1,132 coho salmon were caught by 15 permit holders in Shaktoolik and 5,586 cohos were harvested by 49 permit holders in Unalakleet (Tables 14–15). Coho salmon CPUE for Shaktoolik was 1.05 index points was only 45% of the long-term (1961–2009) average CPUE of 2.35 index points and the Unalakleet CPUE of 1.58 index points was 67% of the long-term average CPUE of 2.36 index points (Tables 14–15). If the record years of 2005–2009 were excluded from the average, catch rates in 2010 were near average. The average coho salmon run to Norton Sound did not warrant increasing the duration of subsequent fishing periods unless catch rates suddenly increased. Subdistricts 5 and 6 returned to a schedule of two 48-hour periods per week for the remainder of the season. However, the August 16 and September 2 openings were increased from 48 hours to 72 hours and 120 hours, respectively, but only as a result of stormy weather severely hampering fishing effort during these periods.

Escapement counts of coho salmon in southern Norton Sound ended up being average. At North River tower, 7,979 coho salmon were enumerated in 2010, which is eighth best in only ten seasons of counting the entire coho salmon run. The 2010 test fishery catch of 467 coho salmon also ranked eighth best in the project's 26-year history and was slightly above average if the 1996 and 2005–2009 seasons were excluded from the average. Commercial salmon seasons in Subdistricts 5 and 6 have been extended beyond the regulation closure date in three (2006, 2008, and 2009) of the previous 4 years due to record coho salmon runs and late season surges of coho salmon. However, an extension to the 2010 Subdistricts 5 and 6 commercial salmon season was not granted based on average late August catch and escapement indices of coho salmon.

Consequently, the department closed the Subdistricts 5 and 6 commercial salmon fish season by regulation on September 7.

Commercial harvests for 2010 in the Shaktoolik Subdistrict were 4 Chinook salmon, 18 sockeye salmon, 40,483 chum salmon, 4,622 pink salmon, and 11,868 coho salmon harvested by 35 permit holders (Table 14). In Unalakleet Subdistrict, the 2010 commercial harvest by 59 permit holders was 124 Chinook salmon, 64 sockeye salmon, 10,641 pink salmon, 30,588 chum salmon, and 32,839 coho salmon (Table 15). Chum salmon catch in the Shaktoolik Subdistrict was the highest since 1983 (67,310 chums) and ranked third highest in 50 years of directed chum salmon fishing (Table 3). The Unalakleet Subdistrict 2010 chum salmon harvest ranked fourteenth in 50 years of fishing and was 155% above the recent 5-year (2005–2009) average harvest of 11,999 chums and 22% above the long-term (1961–2009) average harvest of 25,146 chum salmon. Shaktoolik Subdistrict commercial coho harvest was the twelfth best in 48 years of commercial coho salmon fishing and 55% above the long-term (1962–2009) average harvest of 7,648 coho salmon (Table 3). The 2010 Shaktoolik coho salmon harvest was only 43% of the recent 5-year (2005–2009) average of 27,357 coho salmon, which is comprised of record-breaking runs (Table 3). Coho salmon harvest in the Unalakleet Subdistrict was only 42% of the recent 5-year average catch of 77,525 coho salmon, but was 21% above the long-term (1961–2009) average harvest of 27,125 coho salmon and ranked fourteenth in 50 years of commercial coho fishing (Table 3).

Shaktoolik and Unalakleet Subdistrict chum salmon harvests were the best since 1983 and 1992, respectively. However, harvests of chum salmon in both subdistricts would have been considerably higher had Chinook salmon conservation measures not been necessary in early July. Additionally, Shaktoolik Subdistrict harvest of chum salmon would have been much higher had there been ample tendering and processing capacity to deal with the large volume of chum salmon being taken in southern Norton Sound; the first 48-hour opening did not occur in Shaktoolik until July 15 because of these capacity concerns. Coho salmon harvests may also have been higher, but southwesterly storm systems in August reduced commercial fishing opportunity, particularly in the Shaktoolik Subdistrict. This is particularly evident by the fact that coho salmon harvest and CPUE did not peak in the Shaktoolik Subdistrict until August 23 when 20 permit holders harvested 2,289 cohos for a CPUE of 2.38 index points during the August 23 opening. This was well after the historical peak of the Shaktoolik Subdistrict coho salmon fishery which typically occurs during the first week of August.

Subsistence Fishery

Shaktoolik and Unalakleet subsistence harvests of salmon have been captured using similar household survey methodology since 1994. Tables 16 and Figure 12 compare the 2010 Shaktoolik subsistence salmon harvest by species with the historical data going back to 1994 when standardized survey methods began. Since 1994, harvest estimates of surveyed households have been used to estimate harvests for households not included in the survey. Unalakleet subsistence harvests are summarized in Table 17 and illustrated in Figure 13.

A total of 57 households out of a possible 63 were successfully interviewed in the Native Village of Shaktoolik. Estimated subsistence harvests are 327 Chinook, 1,680 chum, 6,406 pink, 1,940 coho, and 115 sockeye salmon (Table 16; Figure 12). The harvest of Chinook salmon was a new record low and was only 64% and 39% of the 2005–2009 (509 Chinook) and 1994–2009 (844 Chinook) average harvests, respectively. Pink salmon harvest was 5% above the 2005–2009

average harvest of 6,124 pinks, but below the 1994–2009 average harvest of 7,277 pink salmon. Similarly, coho salmon harvest was 8% above the 2005–2009 average harvest of 1,794 cohos, but 14% below the 1994–2009 average harvest of 2,264 cohos. Chum and sockeye salmon harvests increased significantly in 2010. The 2010 Shaktoolik harvest of chum salmon shot up 427% from the 2005–2009 average harvest of 319 chum salmon, and was the largest since 2000 (Table 16; Figure 12). Sockeye salmon harvest was the third highest since 1994 and more than double the long-term average of 50 sockeyes.

Shaktoolik residents appear to have taken advantage of large chum salmon surpluses and relied more heavily on chum salmon in 2010 compared to previous seasons when coho salmon were more heavily utilized. Moreover, the drying weather in July was more conducive to smoking and drying fish which may account for some of the reduction in coho harvests.

Of a possible 220 households, only 170 households (77%) were successfully interviewed in the Native Village of Unalakleet in 2010. Expanding household estimates to those not surveyed resulted in overall subsistence harvest estimates of 1,257 Chinook, 3,159 chum, 9,002 pink, 3,780 coho and 297 sockeye salmon (Table 17; Figure 13). While the chum salmon harvest was 22% above the 2005–2009 average harvest of 2,588 chums, subsistence salmon harvests of other species in the Unalakleet Subdistrict were below average. As in the case of Shaktoolik, Chinook salmon subsistence harvest was a new record low and was 35% and 53% below the 2005–2009 (1,938 Chinook) and 1994–2009 (2,677 Chinook) average harvests, respectively (Table 17). Perhaps most surprising in 2010 was the big drop in pink salmon harvests; the 2010 pink harvest was 48% below the 2005–2009 average harvest of 17,298 pink salmon (Table 17). Similarly, the 2010 coho harvest was only 50% of both historical average harvests (~7,600 cohos) (Table 17). Sockeye salmon harvest was 10% below the 1994–2009 average harvest of 330 sockeyes (Table 17).

The very low Chinook salmon harvest is consistent with poor escapements and subsistence catch rates reported in season. However, the major reductions in pink and coho salmon harvests from previous seasons were more perplexing given that run sizes of these species were sufficient to easily provide for subsistence needs. Unalakleet experienced a wetter than average summer, even in early July, the optimal drying period for preserving subsistence caught salmon. There were several individuals that told department staff that if pinks were not harvested during the first few days of July, it wasn't worth it. Several individuals also reported spoilage of pink salmon dry fish due to the wet weather in 2010. Thus, unseasonably wet July weather may in large part account for the major decrease in pink salmon harvests.

Coho salmon harvests were also well below average in 2010 which is surprising given that coho salmon harvests were much higher in years of lower abundance indexed by the North River escapements, such as in 2002 and 2003. However, rainy weather may also have been a major contributing factor to the below average coho salmon harvests observed in 2010. High water levels and turbid conditions appeared to have negatively impacted catch rates in both the inriver and marine subsistence fisheries. Additionally, very high water levels may have hastened migration of coho salmon up river to spawning areas, well upstream from most subsistence fishing spots. Several subsistence users indicated that large schools of coho salmon did not mill or hold up for long in most of the eddies and back channels that are well established fishing holes. The “fall fish” component to the subsistence coho salmon harvest may also have been underestimated in 2010 due to the timing of the survey. “Fall fish” refer to mature or nearly spawned out coho salmon that are harvested in late September and early October, and are dried

and/or smoked. The relatively low oil content of these older fish coupled with a lack of maggot-producing flies and relatively low humidity in the fall generally produce an easily dried product with a low risk of spoilage. While a small proportion of households partake in this activity, “fall fish” harvest may not have been fully captured in the survey, which occurred in early October, as some residents were still procuring coho salmon for subsistence during this time.

Port Clarence District

Subsistence Fishery

A commercial salmon fishery was not expected to occur in the Port Clarence District because the sockeye salmon run was not forecasted to reach the Pilgrim River inriver goal of 30,000 sockeye salmon, which is required for a commercial fishery to occur. Additionally, the sole buyer from previous years, NSSP, notified the department before the season that they would not purchase salmon from Port Clarence in 2010 because of the expected poor run and opposition to the commercial fishery from local subsistence users.

Like northern Norton Sound, subsistence salmon fishing permits are required for the Port Clarence District, Pilgrim River drainage, and at Salmon Lake. Catch limits are set at the beginning of the season according to forecasted run strength, and are listed on the back of these subsistence permits. In years of high abundance (e.g., 2003–2007), catch limits are often liberalized or waived entirely or restrictions or early closures are implemented if run strength is weaker than expected. The sockeye salmon run in the Pilgrim River crashed in 2009 after the previous 6 years had record passage through the Pilgrim River weir ranging from 20,452 to 85,417 sockeye salmon. Based on the sockeye salmon escapement and age composition, as well as smolt outmigration data (body size) obtained in 2009, the department expected the 2010 run to be similar to the 2009 run. In light of the weak forecasted run, restrictions and/or early closures to the Pilgrim River subsistence fishery were anticipated after the 4th of July weekend in 2010 unless the run showed early strength at the Pilgrim River weir.

As in 2009, fishermen in Brevig Mission and Teller reported poor subsistence catches of sockeye salmon in June 2010. As expected, sockeye salmon passage at Pilgrim River weir was also low in late June the Pilgrim River was closed to subsistence net fishing on July 10. By July 10, the historical quarter-point passage date at the Pilgrim River weir, only 31 sockeye salmon had been counted.

Subsistence permits have been required for Pilgrim River since 1964 and since 2002 the number of permits issued has skyrocketed with the record sockeye salmon runs. In 2010 there were 146 permits issued, 44 less than the 190 permits issued in 2009, and 109 fewer than in 2008 when a record 255 permits were issued. In 2003, the first year of the great runs of sockeye salmon there were 100 permits issued. The next year, 2004, there were 223 permits were issued. For comparison, in 2002 only 25 permits were issued and a counting tower in operation that year at the same location as the present-day weir estimated less than 4,000 sockeye salmon passing. The lower number of permits issued this year was likely the result of anticipated poor fishing and the early closure. Salmon Lake remained closed to all salmon fishing in 2010. On August 8, the Pilgrim River was reopened to the use of beach seines to allow users to target pink and chum salmon, but all Chinook, sockeye, and coho salmon had to be immediately released.

Although permits have been required in the Pilgrim River drainage for over 40 years, 2010 was only the 7th year that permits were required throughout Port Clarence District. The number of

subsistence salmon permits issued for all waters of Port Clarence District, excluding Pilgrim River and Salmon Lake, was 145 permits, up slightly from the 137 permits in 2009, but down slightly from the 150 permits issued in 2008.

Table 18 and Figure 14 summarize subsistence salmon harvests from 1994–2010 for the Port Clarence District including harvests from the Pilgrim River and Salmon Lake. At the time of this writing, only 109 out of the 145 permits issued for Port Clarence District have been returned and entered. Thus, the following estimates should be considered preliminary and revised numbers will be presented in subsequent reports. Subsistence harvests were well below the recent 5-year (2005–2009) average harvests for Chinook, sockeye, and coho salmon. Preliminary sockeye salmon harvest in 2010 (668 sockeyes) was only 10% and 14% of the 2005–2009 (6,926 fish) and 1994–2009 (4,668 fish) average harvests, respectively. Coho salmon harvests also declined drastically, as the 2010 preliminary harvest is 60% and 75% below the 2005–2009 and 1994–2009 average harvests, respectively. Preliminary pink salmon harvest is 4% above the 1994–2009 average harvest of 3,601 pink salmon, but 17% below the 2005–2009 average harvest of 4,486 pink salmon. Chum salmon harvest in 2010 increased 9% from the 2005–2009 average harvest of 3,359 chums and 24% from the 1994–2009 average harvest of 2,955 chum salmon.

There were 1,654 sockeye salmon counted through Pilgrim River weir in 2010 and the count increased 73% from the record low 953 sockeyes counted the previous season at the weir. However, the 2010 total run estimated at 2,322 sockeye salmon represents a 10% decline from the 2009 total run size estimate of 2,596 sockeyes (Figure 15). Early closures to the Pilgrim River subsistence fishery had the desired effect of reducing exploitation of sockeye salmon en route to Salmon Lake. Preliminary exploitation rate is estimated to be around 29% in 2010, which is a major reduction from the 63% exploitation observed in 2009 (Figure 15).

The poor run of Pilgrim River sockeye salmon in 2010 was consistent with run performance, age class information, and smolt outmigration data collected in 2009. Unlike 2009 however, some salmon escapements were above average; record-low escapements were observed for all species at the weir in 2009. The coho salmon escapement (272 fish) was well below average this year, but the Pilgrim River weir has not operated through the entire coho salmon run since 2008. Both pink salmon (29,239 fish) and chum salmon (25,379 fish) escapements were the third best since the weir became operational in 2003. Chinook salmon escapement (44 fish) was a new record low.

ESCAPEMENT

Table 19 summarizes escapement assessments for the major index river systems of Norton Sound and Port Clarence Districts in 2010. These assessments are often qualitative and relative to historical escapement sizes. Most of the chum salmon assessments are described relative to a sustainable escapement goal (SEG) for an index area. An SEG is a level of escapement that is known to provide for sustained yields over a 5-to-10 year period, and is used in situations where a biological escapement goal (BEG) cannot be estimated due to the absence of a stock specific catch estimate. A BEG is based on spawner-recruit relationships estimated to provide maximum sustained yield. An optimal escapement goal (OEG) is a specific management objective for escapement that considers biological and allocative factors and may differ from the SEG or BEG.

Department salmon counting projects in Norton Sound include towers on Kwiniuk River and Niukluk River, a test net operated on Unalakleet River, and weirs on the Nome River and Unalakleet River. Norton Sound Economic Development Corporation (NSEDC) provides essential support for these projects and the Native Village of Unalakleet (NVU) provided support for the Unalakleet River weir; a new project funded by the U.S. Fish & Wildlife Service's Office of Subsistence Management.

Five additional counting projects were also operated in the management area this season. The Snake River weir project was operated cooperatively by ADF&G and NSEDC, and Eldorado River weir, Pilgrim River weir and the North River counting tower project were operated solely by NSEDC in 2010. The department and NSEDC also operated a weir at the headwaters of Glacial Creek which flows from Glacial Lake into the Sinuk River. Except for the Glacial Lake project, most projects have been operational since the 1990s. All projects supplied important daily information to the department that was very useful to the management of local salmon resources.

Aerial survey assessment conditions were poor during the month of July in southern Norton Sound and fair to good in northern Norton Sound. Consequently, aerial survey estimates of chum salmon escapement were obtained in northern Norton Sound, but were peak surveys were not flown in southern Norton Sound. Wet rainy weather continued in southern Norton Sound in August, which precluded aerial surveys of important coho salmon index rivers in 2010. However, peak survey estimates were obtained for the majority of coho salmon spawning drainages in northern Norton Sound. As usual, Nome Subdistrict streams received the most intensive assessment efforts because salmon stocks local to the Nome area are strictly regulated, easily accessed by road system, and are exposed to intensive subsistence and sport fishing pressure.

Chinook Salmon

The 2010 Chinook salmon run had some of the poorest escapements seen in years throughout most of Norton Sound. In Norton Sound only the eastern area has sizable runs of Chinook salmon and rivers in Unalakleet and Shaktoolik Subdistricts are the primary Chinook salmon producers in Norton Sound. The Unalakleet River test net and floating weir, enumeration towers on Kwiniuk, Niukluk, and North rivers, aerial surveys, and inseason subsistence catch reports were the primary assessment tools for gauging Chinook salmon run strength in Norton Sound. The Unalakleet test net catch was the sixth lowest since 1985. Prior to 1985, varying data collection and test fishing methodologies were used. Fishery managers were surprised by the poor test fishery catch in light of mesh-size restrictions and early closures. However, the catch may have been biased low due to avoidance by Chinook salmon due to a large amount of chum salmon caught in the net. The North River tower count of 1,302 Chinook salmon ranked 12th best in 18 years of counting, but the sustainable escapement goal was reached for the second consecutive year, and the third time in four seasons since the management plan's inception (Figure 11). Aerial surveys on the North and Shaktoolik Rivers were conducted, but are rated as poor surveys because they were conducted under fair conditions after peak spawning periods for Chinook salmon.

In Elim Subdistrict, the Kwiniuk River tower count of 135 Chinook salmon was the second lowest count since 1985 and only 45% of the lower bounds of the SEG (300–550) range (Figure 16). The 2010 Chinook salmon count represents the 4th time in the previous 5 years that

the goal has not been reached and the 7th of 12 years that the goal has not been reached (Figure 16). Chinook salmon passage at the Niukluk River tower was 42 and the sixth lowest count since the project began in 1995. The Pilgrim River Chinook salmon weir passage of 44 was the worst since the project became operational in 2003.

Chum Salmon

Chum salmon escapements were well above average to record-setting across Norton Sound and the Port Clarence Area. In Nome Subdistrict, Nome River (5,877 chums) and Snake River (6,973 chums) weirs had their second and third highest escapements, respectively. Eldorado River weir had a weir count of 21,211 chum salmon, which was well below the mid-July aerial survey index of 30,600 chum salmon. Thus, the Eldorado River weir chum salmon passage in 2010 is considered to be gross underestimate of the actual escapement. All Nome Subdistrict weir escapement goals were exceeded and estimated escapement for the entire subdistrict was over 97,000 chum salmon, a 179% increase from the upper bound of the overall subdistrict-wide BEG of (23,000–35,000 chum salmon).

Port Clarence District had an above-average chum salmon run indicated by escapement at the Pilgrim River and escapement of a fall chum salmon run in the American River, a tributary of the Agiapuk River. At Pilgrim River, the escapement of 25,379 chum salmon was above the recent 5-year average of 24,163 chum salmon despite the fact that the average includes the record count of 45,361 chums from the 2006 season. On the American River, over 14,000 chums were counted during an aerial survey conducted under exceptional viewing conditions. The 2010 American River survey count is the highest on record, although surveys of this river are conducted sporadically and few were conducted before the late 1990s.

To the east in Golovnin Bay Subdistrict, Niukluk River tower chum salmon passage was over 48,000 fish, the fifth best since the project's inception in 1995 and well above the SEG threshold of 23,000 chum salmon. Elim Subdistrict had record levels of chum salmon return to its major salmon-producing drainages in 2010. The 71,388 chum salmon counted at Kwiniuk River tower shattered the previous record of 66,000 chum salmon enumerated in 1970. Nearby on the Tubutulik River, over 16,000 chums were counted via an aerial survey, which is the fifth highest survey ever recorded.

Other than aerial surveys, escapements are not assessed in Shaktoolik Subdistrict. However, Subdistricts 5 and 6 are managed according to test net and escapement indices in the Unalakleet Subdistrict because tagging studies conducted in the late 1970s showed an intermingling of stocks in Subdistricts 5 and 6. The aerial survey count of 12,815 chums in Shaktoolik River was above average considering it was conducted well after peak spawn. The Unalakleet River test fishery of 2,039 chum salmon was a record for the 26-year project. There were also 16,359 chum salmon counted at North River tower, which also established a new record for that project. At Unalakleet River weir, there were 70,811 chum salmon counted. Radiotelemetry studies showed that approximately 20% of the mainstem chum salmon spawning escapement occurs in the Unalakleet River below the current weir site. Considering this information, and that the weir was pulled before the third quarter point of the chum salmon run, chum salmon escapement to the Unalakleet River was most likely well over 100,000 fish this season.

Coho Salmon

Coho salmon are found in nearly all of the chum salmon producing streams throughout Norton Sound with the primary commercial contributors being the Unalakleet and Shaktoolik Rivers. Because inclement weather is normally experienced in this area during August and September, escapement data can be somewhat incomplete. Escapement data is also not available over a long time series for several streams because few projects counted the coho salmon run prior to the early 2000s due to funding limitations. More recent Norton Sound escapement assessment projects have been funded to monitor coho salmon as well as chum salmon and are becoming increasingly important to fisheries management. Coho salmon escapement estimates and indices in 2010 were average to above average at most projects and aerial surveys, except for in Port Clarence District.

In northern Norton Sound, the coho salmon run ended up being a bit stronger than forecasted, especially in the Nome Subdistrict. Final weir counts of coho salmon in 2010 at the Nome and Snake River weirs were 4,114 and 2,243 coho salmon, respectively (Table 19). Nome River coho salmon escapement was the fifth best in 12 years of fully counting the coho salmon run and was 29% above the 2001–2009 average count of 3,193 coho salmon. Similarly, the Snake River count was the fourth best in 10 years of coho salmon counts and was 16% above the 2001–2009 average escapement count of 1,941 coho salmon. Record aerial survey counts of coho salmon were also observed in 2010 on the Sinuk River (5,507) and Cripple River (764), and the Penny River aerial survey count of 349 coho salmon was the second highest on record. Dry Creek, a small tributary of Snake River, near the boat harbor was surveyed for the second consecutive year and 141 coho salmon were observed; there were 38 coho salmon counted on an aerial survey in 2009. Normal problems such as fall storm activity and rising water levels that interfere with aerial surveying were not a factor this season and viewing conditions were exceptional.

Subdistricts 2 and 3 coho salmon escapement needs were also easily met in 2010. In Golovnin Bay Subdistrict, the Niukluk River tower coho salmon escapement (8,922 cohos) exceeded the upper bound of the tower-based SEG range (2,400–7,200 coho salmon) for the third consecutive season. The Niukluk River escapement goal has been achieved since 2005. The Kwiniuk River tower coho salmon count (8,049 cohos) ranked eighth in 10 years of counting the coho salmon run. However, the Kwiniuk River and Tubutulik River coho salmon runs supported a record commercial harvest of coho salmon in 2010 and there was no commercial salmon fishing from 2001–2006 in the Elim Subdistrict. More importantly, escapements lower than the 2010 count have produced sustained yields of coho salmon in the past. Additionally, the 2010 aerial survey count of 2,925 cohos was 125% above the upper bound of the aerial survey SEG range of 650–1,300 coho salmon for the Kwiniuk River.

Subdistricts 5 and 6 coho salmon escapements were lower than originally forecasted, at least based on North River tower counts and test fishery catches in the lower Unalakleet River. Season total coho salmon catch in the test fishery was 467 cohos, which was eighth highest in 26 seasons of test fishery operations. While the 2010 catch was only 73% of the long-term (1985–2009) average catch of 644 cohos, it is 95% above the long-term average of 239 cohos if the record-breaking runs of 1996 and 2004–2009 are excluded from the average. Coho salmon production in southern Norton Sound increased dramatically in the mid-2000s and the 2010 coho salmon run was more characteristic of the period before this productivity shift began. North River coho salmon escapement (7,979 cohos) ranked eighth in 10 years of coho salmon counts (North River has only operated into coho salmon season since 2001). The 2002 (2,966 cohos)

and 2003 (5,837 cohos) parent year escapements at North River produced escapements of 9,835 and 19,965 coho salmon in 2006 and 2007, respectively. Additionally, the top two commercial coho salmon harvests occurred during the 2006 (98,336 cohos) and 2007 (88,397 cohos) seasons, which further shows that escapements well below the 2010 escapement are capable of producing large yields. Radiotelemetry studies indicate that North River contributes 8–15% to the overall drainage-wide coho salmon escapement. Expanding the North River tower count by this range of proportional abundance suggests that the 2010 drainage-wide escapement for coho salmon was between 53,000–100,000 coho salmon. Some subsistence and sport harvest undoubtedly occurred above the tower site and in the upper reaches of the main stem, but exploitation of coho salmon is relatively low from these user groups. Aerial surveys were not possible for Subdistricts 5 and 6 rivers in 2010 during peak coho spawning periods due to a combination of exceptionally high water levels and dark overcast skies on most days.

Pilgrim River coho salmon escapement (272 cohos) ranked 6th in 8 years of weir counts and was only 43% of the 2003–2009 average count of 630 coho salmon. However, Port Clarence District has never been a large producer of coho salmon relative to Norton Sound. Additionally, there have been problems with accurate speciation of coho salmon during the tail end of the sockeye salmon in some years (i.e., 2004), leading to speculation about the validity of historical estimates of coho salmon escapement to the Pilgrim River. These inaccuracies were made apparent by sockeye and coho salmon scales being mixed up on scale cards in past years.

Pink Salmon

For over 20 years, pink salmon returns to Norton Sound have followed an odd and even year cycle with the even-numbered year returns typically much higher in number than the odd-numbered years. In 2010, the pink salmon run was below average for an even-numbered year, but escapement goals for pink salmon in Norton Sound were easily made.

Sockeye Salmon

River spawning sockeye salmon are typically found in small numbers throughout Norton Sound District. Glacial Lake (Nome Subdistrict) and Salmon Lake (Port Clarence District) support populations of lake-spawning sockeye salmon and constitute the northernmost populations of sockeye salmon in North America of any significance. Salmon Lake spawning populations seldom exceeded 10,000 fish in years previous to 2003, whereas from 2003–2007 there were near-record to record returns of sockeye salmon. Likewise, Glacial Lake saw an upswing in sockeye salmon returns beginning in 2004, and record count of 11,135 sockeye salmon occurred in 2005.

In 2008 sockeye counts dropped off at both Glacial Lake and Salmon Lake and in 2009 sockeye counts fell off a cliff at both Pilgrim River weir and Glacial Lake weir. The Glacial Lake weir is operated at Glacial Creek near the outlet of the lake and about one mile upstream from the confluence with the Sinuk River and 826 sockeyes were counted in 2009, the lowest count since the weir project started in 2000. The Salmon Lake sockeye run was also the lowest since Pilgrim River weir began operations in 2003 with 953 sockeyes counted through the weir in 2009. Aerial survey counts in 2009 during peak spawning periods had 169 and 272 sockeye salmon for Glacial and Salmon Lakes, respectively. The combined aerial survey escapement goal of Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon and the Glacial Lake aerial survey escapement goal is 800–1,600 sockeye salmon.

Sockeye salmon escapements to these two systems increased in 2010, although not by much. Sockeye salmon escapement in 2010 at Glacial Lake was 1,047 sockeyes, tying 2002 for the third lowest count since the project began in 2000. Pilgrim River weir sockeye salmon escapement in 2010 was 1,654 sockeyes, which was the second lowest on record. However, sockeye salmon escapement into Salmon Lake would have been much lower had it not been for an early closure to the Pilgrim River subsistence fishery in mid-July. Aerial surveys of Glacial Lake were not conducted in 2010 due to poor weather conditions. The combined aerial survey count for Salmon Lake and Grand Central River was 762 sockeye salmon in 2010 (Table 19).

Table 1.—Commercial salmon catches by species, Norton Sound District, 1961–2010.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1961	5,300	35	13,807	34,327	48,332	101,801
1962	7,286	18	9,156	33,187	182,784	232,431
1963	6,613	71	16,765	55,625	154,789	233,863
1964	2,018	126	98	13,567	148,862	164,671
1965	1,449	30	2,030	220	36,795	40,524
1966	1,553	14	5,755	12,778	80,245	100,345
1967	1,804	-	2,379	28,879	41,756	74,818
1968	1,045	-	6,885	71,179	45,300	124,409
1969	2,392	-	6,836	86,949	82,795	178,972
1970	1,853	-	4,423	64,908	107,034	178,218
1971	2,593	-	3,127	4,895	131,362	141,977
1972	2,938	-	454	45,182	100,920	149,494
1973	1,918	-	9,282	46,499	119,098	176,797
1974	2,951	-	2,092	148,519	162,267	315,829
1975	2,393	2	4,593	32,388	212,485	251,861
1976	2,243	11	6,934	87,916	95,956	193,060
1977	4,500	5	3,690	48,675	200,455	257,325
1978	9,819	12	7,335	325,503	189,279	531,948
1979	10,706	57	31,438	167,411	140,789	350,401
1980	6,311	40	29,842	227,352	180,792	444,337
1981	7,929	56	31,562	232,479	169,708	441,734
1982	5,892	10	91,690	230,281	183,335	511,208
1983	10,308	27	49,735	76,913	319,437	456,420
1984	8,455	6	67,875	119,381	146,442	342,159
1985	19,491	166	21,968	3,647	134,928	180,200
1986	6,395	233	35,600	41,260	146,912	230,400
1987	7,080	207	24,279	2,260	102,457	136,283
1988	4,096	1,252	37,214	74,604	107,966	225,132
1989	5,707	265	44,091	123	42,625	92,811
1990	8,895	434	56,712	501	65,123	131,665
1991	6,068	203	63,647	0	86,871	156,789
1992	4,541	296	105,418	6,284	83,394	199,933
1993	8,972	279	43,283	157,574	53,562	263,670
1994	5,285	80	102,140	982,389	18,290	1,108,184
1995	8,860	128	47,862	81,644	42,898	181,392
1996	4,984	1	68,206	487,441	10,609	571,241
1997	12,573	161	32,284	20	34,103	79,141
1998	7,429	7	29,623	588,013	16,324	641,396
1999	2,508	0	12,662	0	7,881	23,051
2000	752	14	44,409	166,548	6,150	217,873
2001	213	44	19,492	0	11,100	30,849
2002	5	1	1,759	0	600	2,365
2003	12	16	17,058	0	3,560	20,646
2004	0	40	42,016	0	6,296	48,352
2005	151	280	85,255	0	3,983	89,669
2006	12	3	130,808	0	10,042	140,865
2007	19	2	126,115	3,769	22,431	152,336
2008	83	60	120,293	75,384	25,124	220,944
2009	84	126	87,041	17,364	34,122	138,737
2010	140	103	62,079	31,557	117,743	211,622
Recent 5-year						
Average ^a	70	94	109,902		19,140	148,510
Long-term						
Average ^b	4,581	118 ^c	36,878		88,946	230,174

^a 2005-2009^b 1961-2009^c 1961-1966, and 1975-2009

Table 2.—Norton Sound commercial salmon harvest summary by subdistrict, 2010.

		Subdistricts						Total
		1	2	3	4	5	6	Number ^{a,b}
Number of Fishermen ^a		0	10	19	5	35	59	115
Chinook	Number	0	3	9	0	4	124	140
	Weight(lbs.)	0	6	81	0	36	1,574	1,697
Sockeye	Number	0	2	5	7	18	71	103
	Weight(lbs.)	0	15	35	56	133	487	726
Coho	Number	0	5,586	10,180	1,606	11,868	32,839	62,079
	Weight(lbs.)	0	41,235	78,391	12,788	90,800	249,725	472,939
Pink	Number	0	2,039	11,658	2,597	4,622	10,641	31,557
	Weight(lbs.)	0	5,498	32,978	7,626	13,353	28,499	87,954
Chum	Number	0	17,212	23,453	6,007	40,483	30,588	117,743
	Weight(lbs.)	0	114,354	158,095	41,911	277,812	207,378	799,550
Total	Number	0	24,842	45,305	10,217	56,995	74,263	211,622
	Weight(lbs.)	0	161,108	269,580	62,381	382,134	487,663	1,362,866

^a Number of Fishermen is unique number of permit holders that fished in each subdistrict. Some permit holders fished in more than one subdistrict.

^b Total number includes salmon retained for personal use that were not commercially sold. Poundage is from fish sold for commercial use. Average commercial weights by species were 14.4 lbs for Chinook salmon, 7.6 lbs for sockeye salmon, 7.6 lbs for coho salmon, 2.8 lbs for pink salmon, and 6.8 lbs for chum salmon.

Table 3.—Annual coho and chum salmon harvests compared to the number of permits fished by subdistrict, Norton Sound District, 1961–2009.

Year	<u>Subdistrict 2</u>			<u>Subdistrict 3</u>			<u>Subdistrict 4</u>			<u>Subdistrict 5</u>			<u>Subdistrict 6</u>				
	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon		
1961	NA	-	-	NA	-	-	NA	-	-	NA	-	24,746	NA	13,807	23,586		
1962	NA	264	68,720	NA	-	50,683	NA	40	24,380	NA	2,113	8,718	NA	6,739	30,283		
1963	NA	-	49,850	NA	-	46,274	NA	-	12,469	NA	563	19,153	NA	16,202	27,003		
1964	NA	3	58,301	NA	-	28,568	NA	-	5,916	NA	16	35,272	NA	79	19,611		
1965	NA	-	-	NA	-	-	NA	-	-	NA	-	8,356	NA	2,030	26,498		
1966	NA	584	29,791	NA	-	24,741	NA	-	-	NA	956	8,292	NA	4,183	16,840		
1967	NA	747	31,193	NA	-	-	NA	-	-	NA	88	1,655	NA	1,544	8,502		
1968	NA	205	10,011	NA	1	17,908	NA	-	-	NA	130	2,504	NA	6,549	14,865		
1969	NA	1,224	20,949	NA	-	26,594	NA	-	3,974	NA	276	8,645	NA	5,273	22,032		
1970	33	3	20,566	21	-	29,726	-	-	-	12	155	15,753	45	4,261	40,029		
1971	22	197	33,824	45	4	43,831	6	-	-	19	238	13,399	72	2,688	37,543		
1972	20	20	27,097	48	11	30,919	32	-	7,799	20	11	12,022	71	412	20,440		
1973	34	183	41,689	57	-	31,389	30	-	4,672	27	177	14,500	94	8,922	25,716		
1974	25	3	30,173	60	9	55,276	8	-	3,826	23	179	26,391	53	1,778	36,170		
1975	42	206	41,761	67	-	46,699	42	89	17,385	39	812	49,536	61	3,167	48,740		
1976	22	1,311	30,219	54	232	10,890	27	95	7,161	37	129	15,798	60	5,141	24,268		
1977	25	426	53,912	52	6	47,455	24	1	13,563	30	418	36,591	45	2,781	32,936		
1978	24	94	41,462	44	244	44,595	26	144	21,973	26	1,116	35,388	51	5,737	37,079		
1979	21	1,606	30,201	41	177	37,123	22	2,547	15,599	29	3,383	22,030	63	23,696	30,445		
2005-2009 Average	^a a	^a a	^a a	^c c	13	6,692	1,823	^a a	^a a	^a a	19	27,357	5,434	44	77,525	11,999	
Long-term Average	^b b	18	923	^b b	30	2,485	21,312	^b b	16	751	7,943	24	7,648	16,170	57	27,125	25,146

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Year	<u>Subdistrict 2</u>			<u>Subdistrict 3</u>			<u>Subdistrict 4</u>			<u>Subdistrict 5</u>			<u>Subdistrict 6</u>				
	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon		
1980	17	328	52,609	26	-	14,755	13	-	7,855	26	8,001	27,453	66	21,512	64,198		
1981	19	13	58,323	33	5	29,325	10	-	3,111	26	1,191	21,097	73	29,845	39,186		
1982	17	4,281	51,970	28	318	40,030	10	2,332	7,128	32	22,233	26,240	68	61,343	44,520		
1983	21	295	48,283	39	-	65,776	15	204	17,157	34	12,877	67,310	72	36,098	109,220		
1984	22	2,462	54,153	25	5,959	9,477	8	-	3,442	24	10,730	32,309	74	47,904	43,317		
1985	21	1,196	55,781	34	1,803	24,466	12	384	9,948	21	2,808	13,403	64	15,421	25,111		
1986	24	958	69,725	34	5,874	20,668	9	1,512	1,994	30	6,626	16,126	73	20,580	30,239		
1987	21	2,203	44,334	34	64	17,278	12	145	3,586	39	6,193	14,088	65	15,097	17,525		
1988	21	2,149	33,348	36	3,974	18,585	13	709	7,521	21	6,096	21,521	69	24,232	25,363		
1989	-	-	-	13	-	167	-	-	-	26	8,066	19,641	73	36,025	20,825		
1990	15	-	15,993	23	-	3,723	-	-	-	28	4,695	21,748	73	52,015	23,659		
1991	16	-	14,839	24	-	804	-	-	-	25	11,614	31,619	75	52,033	39,609		
1992	1	2,085	1,002	21	3,531	6	9	-	1,787	25	14,660	27,867	71	84,449	52,547		
1993	8	2	2,803	26	4,065	167	15	-	1,378	37	11,130	20,864	66	26,290	28,156		
1994	5	3,424	111	21	5,345	414	-	-	-	39	22,065	5,411	71	71,019	12,288		
1995	7	1,616	1,987	12	3,742	1,171	-	-	-	26	10,856	14,775	58	31,280	24,843		
1996	4	638	-	12	1,915	-	-	-	-	20	13,444	3,237	54	52,200	7,369		
1997	11	102	8,003	21	1,409	2,683	9	-	531	19	4,694	5,747	57	26,079	17,139		
1998	16	3	723	23	1,462	2,311	-	-	-	28	3,624	7,080	52	24,534	6,210		
1999	-	-	-	-	-	-	-	-	-	15	2,398	2,181	45	10,264	5,700		
2005-2009 Average	^a a	^a a	^a a	^c c	13	6,692	1,823	^a a	^a a	^a a	19	27,357	5,434	44	77,525	11,999	
Long-term Average	^b b	18	923	^b b	30	2,485	21,312	^b b	16	751	7,943	24	7,648	16,170	57	27,125	25,146

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Year	<u>Subdistrict 2</u>			<u>Subdistrict 3</u>			<u>Subdistrict 4</u>			<u>Subdistrict 5</u>			<u>Subdistrict 6</u>				
	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon	Permits Fished	Coho Salmon	Chum Salmon		
2000	12	1,645	164	13	5,182	535	-	-	-	26	7,779	2,751	49	29,803	2,700		
2001	5	30	7,094	5	1,696	681	-	-	-	13	2,664	1,819	29	15,102	1,512		
2002	-	-	-	-	-	-	-	-	-	7	680	261	5	1,079	339		
2003	-	-	-	-	-	-	-	-	-	10	4,031	485	20	13,027	3,075		
2004	-	-	-	-	-	-	-	-	-	11	12,734	1,372	25	29,282	4,924		
2005	-	-	-	-	-	-	-	-	-	12	21,818	791	28	63,437	3,192		
2006	-	-	-	-	-	-	-	-	-	22	32,472	3,321	40	98,336	6,721		
2007	-	-	-	11	5,908	4,567	-	-	-	15	31,810	6,076	47	88,397	11,788		
2008	4	256	623	12	4,586	304	4	600	507	23	37,624	6,042	58	77,227	17,648		
2009	5	2,452	87	17	9,582	597	7	1,714	1,850	21	13,063	10,941	49	60,230	20,647		
2010	10	5,586	17,212	19	10,180	23,453	5	1,606	6,007	35	11,868	40,483	59	32,839	30,588		
2005-2009 Average ^a	a	a	a	c	13	6,692	1,823	a	a	a	a	19	27,357	5,434	44	77,525	11,999
Long-term Average ^b	b	18	923	b	30	2,485	21,312	b	16	751	7,943	24	7,648	16,170	57	27,125	25,146

^a Recent 5-year average harvest unavailable. Golovnin Bay Subdistrict fishery did not occur from 2002–2007; Norton Bay fishery did not occur from 1998–2007.

^b Long-term average harvests are from 1961–2009. Long-term average permits fished is from 1970–2009.

^c Elim Subdistrict recent average is from 2007–2009. Elim Subdistrict fishery did not occur from 2002–2006.

Table 4.—Dollar estimates of Norton Sound District commercial salmon fishery, 1961–2010.

Year	Number of Permit Holders	Gross Value of Catch to Permit Holders	Average Value of Catch to Permit Holder
1961	a	a	a
1962	a	\$105,800	a
1963	a	\$104,000	a
1964	a	\$51,000	a
1965	a	\$21,483	a
1966	a	\$68,000	a
1967	a	\$44,038	a
1968	a	\$63,700	a
1969	a	\$95,297	a
1970	a	\$99,019	a
1971	a	\$101,000	a
1972	a	\$102,225	a
1973	a	\$308,740	a
1974	a	\$437,127	a
1975	a	\$413,255	a
1976	a	\$285,283	a
1977	164	\$546,010	\$3,329
1978	176	\$907,330	\$5,155
1979	175	\$878,792	\$5,022
1980	159	\$572,125	\$3,598
1981	167	\$761,658	\$4,561
1982	164	\$1,069,723	\$6,523
1983	170	\$946,232	\$5,566
1984	141	\$738,064	\$5,234
1985	155	\$818,477	\$5,280
1986	163	\$546,452	\$3,352
1987	164	\$517,894	\$3,158
1988	152	\$760,641	\$5,004
1989	110	\$319,489	\$2,904
1990	128	\$474,064	\$3,704
1991	126	\$413,479	\$3,282
1992	110	\$463,616	\$4,215
1993	153	\$368,723	\$2,410
1994	119	\$863,060	\$7,253
1995	105	\$356,164	\$3,392
1996	86	\$292,264	\$3,398
1997	102	\$326,618	\$3,202
1998	82	\$351,410	\$4,285
1999	60	\$82,638	\$1,377
2000	79	\$143,621	\$1,818
2001	51	\$56,921	\$1,116
2002	12	\$2,941	\$245
2003	30	\$64,473	\$2,149
2004	36	\$122,706	\$3,409
2005	40	\$296,154	\$7,404
2006	61	\$389,707	\$6,389
2007	71	\$572,195	\$8,059
2008	91	\$759,451	\$8,346
2009	88	\$722,167	\$8,206
2010	115	\$1,220,487	\$10,613
Previous 5-Year Average	70	\$547,935	\$7,681
Long-term Average ^c	112	\$391,776 ^d	\$4,314

^a Information is not available. ^b 2005–2009 ^c 1977–2009 ^d 1962–2009

Table 5.—Norton Sound salmon value and average price paid to fishermen by species, 2010.

Species	Dollar Value	Average Price Per Pound
Chinook Salmon	\$3,812.10	\$2.25
Sockeye Salmon	\$459.95	\$0.63
Pink Salmon	\$28,409.25	\$0.32
Coho Salmon	\$693,426.39	\$1.47
Chum Salmon	\$494,379.60	\$0.62
Total Value	\$1,220,487.29	

Table 6.—Annual subsistence salmon harvest by species, Nome Subdistrict (Subdistrict 1), Norton Sound District, 1975–2010.

Year	Chinook Salmon	Chum Salmon	Pink Salmon	Coho Salmon	Sockeye Salmon
1975	2	2,858	6,267	97	
1976	13	1,705	5,492	189	
1977	35	12,192	2,773	498	
1978	35	4,295	13,063	225	
1979	11	3,273	6,353	1,120	
1980	129	5,983	22,246	2,157	
1981	35	8,579	5,584	1,726	14
1982	21	4,831	19,202	1,829	6
1983	74	7,091	8,086	1,911	53
1984	83	4,883	17,182	1,795	16
1985	56	5,667	2,117	1,054	114
1986	150	8,085	8,720	688	107
1987	200	8,394	1,251	1,100	107
1988	63	5,952	2,159	1,076	133
1989	24	3,399	924	469	131
1990	58	4,246	2,233	510	234
1991	83	3,715	194	1,279	166
1992	152	1,684	7,351	1,481	163
1993	52	1,766	873	2,070	80
1994	23	1,673	6,556	983	69
1995	26	3,794	336	1,365	148
1996	9	2,287	3,510	828	185
1997	10	2,696	175	325	50
1998	15	964	4,797	1,057	14
1999	11	337	58	161	85
2000	7	535	2,657	747	26
2001	2	858	113	425	92
2002	4	1,114	3,161	666	79
2003	63	565	507	351	76
2004	100	685	15,047	1,574	106
2005	62	803	5,075	1,287	177
2006	24	940	9,329	3,808	159
2007	18	2,938	850	1,103	297
2008	39	739	12,592	3,423	127
2009	32	387	487	1,132	64
2010	^a 29	2,903	5,420	1,824	76
2005-2009 Average	35	1,161	5,667	2,151	165
1975-2009 Average	49	3,426	5,638	1,157	105

^a 2010 subsistence data preliminary with data entered from only 429 permits out of a possible 494 permits issued.

Table 7.—Commercial salmon harvest and cumulative (Cum.) CPUE by fishing period, Golovnin Bay Subdistrict (Subdistrict 2), Norton Sound District, 2010.

Period	Target Species	Dates Fished	Length of Period	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Sockeye Salmon	Coho Harvest	Coho CPUE
1	Chum	6/30 - 7/02	48		Catch Information By Period Confidential						
2	Chum	7/05 - 7/07	48	4	0	2,842	14.80	118	0	0	
3	Chum	7/09 - 7/11	48	6	0	2,504	8.69	1,701	0	0	
4	Chum	7/12 - 7/14	48	6	0	2,669	9.27	208	0	0	
5	Chum	7/15 - 7/17	48	5	0	2,208	9.20	12	0	0	
6	Chum	7/19 - 7/21	48	6	0	2,398	8.33	0	0	66	0.23
7	Chum	7/23 - 7/25	54	6	0	872	2.69	0	2	188	0.58
8	Chum	7/26 - 7/28	48	4	0	441	2.30	0	0	313	1.63
9	Coho	7/29 - 7/31	48	5	1	375	1.56	0	0	552	2.30
10	Coho	8/02 - 8/04	48	6	0	237	0.82	0	0	883	3.07
11	Coho	8/05 - 8/07	48	6	0	153	0.53	0	0	717	2.49
12	Coho	8/09 - 8/11	72	4	0	196	0.68	0	0	967	3.36
13	Coho	8/13 - 8/16	72	5	0	63	0.18	0	0	519	1.44
14	Coho	8/17 - 8/20	72	5	2	56	0.16	0	0	618	1.72
15	Coho	8/21 - 8/24	72	3	0	16	0.07	0	0	362	1.68
16	Coho	8/25 - 8/28	72	3	0	29	0.13	0	0	329	1.52
17	Coho	8/29 - 9/01	72					No One Fished			
18	Coho	9/02 - 9/07	120	3	0	6	0.02	0	0	72	0.20
Totals				1,086	10	3	17,212		2,039	2	5,586

Note: There were 2 Chinook salmon retained for personal use in 2010.

Table 8.—Commercial salmon harvest and cumulative (Cum.) CPUE by fishing period, Elim Subdistrict (Subdistrict 3), Norton Sound District, 2010.

Period	Target Species	Dates Fished	Length		Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Sockeye Harvest	Coho Harvest	Coho CPUE
			of	Permits Fished							
1	Chum	6/30 - 7/02	48	14	1	5,701	8.48	2,562		0	0.00
2	Chum	7/05 - 7/07	48	16	0	5,383	7.01	1,241		0	0.00
3	Chum	7/09 - 7/11	48	15	0	2,715	3.77	1,079		1	0.00
4	Chum	7/12 - 7/14	48	14	0	2,731	4.06	2,452		0	0.00
5	Chum	7/15 - 7/17	48	9	0	957	2.22	1,033	3	1	0.00
6	Chum	7/19 - 7/21	48	14	1	2,414	3.59	3,291	0	24	0.04
7	Chum	7/23 - 7/25	54	13	1	1,673	2.38	-	0	176	0.25
8	Chum	7/26 - 7/28	48	10	0	617	1.29	-	0	191	0.40
9	Coho	7/29 - 7/31	48			No One Fished					
10	Coho	8/02 - 8/04	48	16	0	412	0.54	-	0	917	1.19
11	Coho	8/05 - 8/07	48	16	1	331	0.43	-	0	1063	1.38
12	Coho	8/09 - 8/11	72	13	0	61	0.07	-	0	627	0.67
13	Coho	8/13 - 8/16	72	13	4	42	0.04	-	1	1602	1.71
14	Coho	8/17 - 8/20	72	17	1	161	0.13	-	1	2480	2.03
15	Coho	8/21 - 8/24	72	16	0	123	0.11	-	0	1514	1.31
16	Coho	8/25 - 8/28	72	11	0	62	0.08	-	0	865	1.09
17	Coho	8/29 - 9/01	72	14	0	68	0.07	-	0	619	0.61
18	Coho	9/02 - 9/07	120	3	0	2	0.01	-	0	100	0.28
Totals				1,086	5	9	23,453		11,658	5	10,180

Note: There were 1 Chinook, 2 chum, and 3 coho salmon retained for personal use in 2010.

Table 9.—Annual subsistence salmon harvest by species, Golovnin Bay Subdistrict (Subdistrict 2), Norton Sound District, 2004–2010.

Year	Chinook Salmon	Chum Salmon	Pink Salmon	Coho Salmon	Sockeye Salmon
1994	253	1,337	8,410	733	168
1995	165	10,373	7,818	1,649	34
1996	86	2,867	17,399	3,014	134
1997	138	4,891	4,570	555	427
1998	184	1,893	13,340	1,292	37
1999	60	3,656	469	1,234	48
2000	169	1,155	10,906	2,335	18
2001	89	3,291	1,665	880	72
2002	69	1,882	14,430	1,640	66
2003	166	1,477	5,012	309	28
2004	164	880	19,936	654	6
2005	96	1,852	11,467	686	15
2006	136	722	14,670	1,760	38
2007	188	4,217	3,980	1,179	321
2008	146	350	10,155	2,337	95
2009	237	1,694	3,787	1,377	33
2010	^a 4	278	4,880	1,531	12
2005-2009 Average	161	1,767	8,812	1,468	100
1994-2009 Average	147	2,659	9,251	1,352	96

^a 2010 subsistence harvest data preliminary with only 118 of 159 permits entered.

Table 10.—Annual subsistence salmon harvest by species, Elim Subdistrict (Subdistrict 3), Norton Sound District, 2004–2010.

Year	Chinook Salmon	Chum Salmon	Pink Salmon	Coho Salmon	Sockeye Salmon
1994	322	1,180	9,345	3,476	104
1995	284	1,353	2,046	3,774	17
1996	417	1,720	9,442	2,319	52
1997	619	1,213	1,314	2,064	50
1998	414	1,831	6,891	1,376	49
1999	424	975	1,564	744	13
2000	248	1,429	5,983	1,173	46
2001	427	1,352	1,390	898	70
2002	565	1,801	8,345	1,451	14
2003	660	1,143	2,524	1,687	39
2004	412	683	7,858	704	0
2005	225	598	3,721	1,011	9
2006	179	1,267	5,216	1,769	13
2007	260	2,334	1,742	2,295	0
2008	269	1,284	7,655	1,804	0
2009	545	600	1,522	2,434	13
2010	^a 93	3,669	7,347	1,419	2
2005-2009 Average	296	1,217	3,971	1,863	7
1994-2009 Average	392	1,298	4,785	1,811	31

^a 2010 subsistence harvest data preliminary with only 57 of 64 permits entered.

Table 11.—Commercial salmon harvest and cumulative (Cum.) CPUE by fishing period, Norton Bay Subdistrict (Subdistrict 4), Norton Sound District, 2010.

Period	Target Species	Dates Fished	Length of Period	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Sockeye Harvest	Coho Harvest	Coho CPUE
1	Chum	7/04 - 7/05	24					Catch Information Confidential			
2	Chum	7/09 - 7/11	48	3	0	1,343	9.33	303	0	0	0.00
3	Chum	7/12 - 7/14	48	3	0	749	5.20	709	0	0	0.00
4	Chum	7/15 - 7/17	48	3	0	478	3.32	353	0	1	0.01
5	Chum	7/19 - 7/21	48	3	0	445	3.09	757	0	17	0.12
6	Chum	7/23 - 7/25	54	3	0	942	5.81	227	1	143	0.88
7	Chum	7/26 - 7/28	48	3	0	320	2.22	0	0	51	0.35
8	Chum	7/29 - 7/31	48					No One Fished			
9	Coho	8/02 - 8/04	48	3		144	1.00	0	1	128	
10	Coho	8/05 - 8/07	48	4	0	320	1.67	0	0	378	1.97
11	Coho	8/09 - 8/11	48	4	0	161	0.84	0	0	168	0.88
12	Coho	8/13 - 8/16	72					Catch Information Confidential			
13	Coho	8/17 - 8/20	72	3	0	140	0.65	0	1	321	1.49
14	Coho	8/21 - 8/24	72					No One Fished			
15	Coho	8/25 - 8/28	72					Catch Information Confidential			
16	Coho	8/29 - 9/01	72	3	0	74	0.34	0	0	76	0.35
17	Coho	9/02 - 9/07	120	3	0	105	0.29	0	0	41	0.11
Totals			990	5	0	6,007		2,597	7	1,606	

Table 12.—Annual subsistence salmon harvest by species, Norton Bay Subdistrict (Subdistrict 4), Norton Sound District, 1994–2010.

Year	Chinook Salmon	Chum Salmon	Pink Salmon	Coho Salmon	Sockeye Salmon
1994	308	4,581	6,049	370	1
1995	475	5,828	3,514	985	46
1996	295	4,161	3,929	676	3
1997	656	4,040	1,795	322	54
1998	684	6,192	2,009	388	0
1999	327	4,153	1,943	167	0
2000	397	4,714	2,255	267	2
2001	460	4,445	5,203	276	14
2002	557	3,971	6,049	509	0
2003	373	3,397	4,184	510	46
2004	a	a	a	a	a
2005	a	a	a	a	a
2006	a	a	a	a	a
2007	a	a	a	a	a
2008	187	3,330	4,489	1,084	2
2009	259	3,183	2,508	891	2
2010	341	3,180	3,115	461	21
1994-2009 Average	415	4,333	3,661	537	14

^a Surveys not conducted.

Table 13.—Annual estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River Chinook salmon, 1984–1986 and 1996–2010.

Year	Escapement ^{a, b}		Harvest ^{c, f}	Total	
	North River	Unalakleet River		Estimated Run Size	Exploitation Rate (Percent)
1984	2,844	7,368	10,064	17,432	57.7
1985	1,426	3,694	16,034	19,728	81.3
1986	1,613	4,179	8,437	12,616	66.9
^d					
1996	1,197	3,101	7,060	10,161	69.5
1997	4,185	10,842	14,302	25,144	56.9
1998	2,100	5,440	10,999	16,439	66.9
1999	1,639	4,246	5,096	9,342	54.5
2000	1,046	2,710	3,417	6,127	55.8
2001 ^e	1,337	3,464	3,255	6,719	48.4
2002	1,484	3,845	2,959	6,804	43.5
2003	1,452	3,762	2,717	6,479	41.9
2004	1,125	2,915	3,186	6,101	52.2
2005	1,015	2,630	2,432	5,062	48.0
2006	906	2,347	2,560	4,907	52.2
2007	1,948	5,047	1,825	6,872	26.6
2008	903	2,339	2,047	4,386	46.7
2009	2,352	6,093	2,310	8,403	27.5
2010	1,302	2,323	1,615	3,938	41.0
Long-Term Average ^g	1,681	4,354	5,806	10,160	52.7
2005-2009 Average	1,425	3,691	2,235	5,926	40.2

^a Drainage-wide escapement estimate calculated by expanding tower counts by 0.386, the average proportion of Chinook salmon migrating into the North River, 1997 and 1998 (Wuttig, 1999).

^b Drainage-wide escapement from 2010 is summation of North River tower and Unalakleet River weir counts.

^c The 1994–2001 average subsistence harvest of 3,041 Chinook salmon was used for 1984–1986 harvest estimates.

^d North River tower not operational from 1987–1995.

^e Project started late. Chinook salmon escapement underestimated in 2001.

^f Sport fish harvest unavailable for 2010. Recent 5-year (2005–2009) average harvest of 339 substituted for 2010.

^g Average is from 1984–1986, and 1996–2009.

Table 14.—Commercial salmon harvest and cumulative (Cum.) CPUE by fishing period, Shaktoolik Subdistrict (Subdistrict 5), Norton Sound District, 2010.

Period	Target Species	Dates Fished	Length of Period	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Pink CPUE	Coho Harvest	Coho CPUE	<u>Cumulative Catch</u>			
												Chinook	Chum	Pink	Coho
1	Chum	7/03-7/04	24	21	4	8,755	17.37	3,303	6.55	0	0.00	4	8,755	3,303	0
2	Chum	7/06-7/07	36	22	0	8,306	10.49	1,284	1.62	1	0.00	4	17,061	4,587	1
3	Chum	7/10-7/11	36	21	0	5,146	6.81	0	0.00	1	0.00	4	22,207	4,587	2
4	Chum	7/13-7/14	24	20	0	3,204	6.68	12	0.03	1	0.00	4	25,411	4,599	3
5	Chum	7/15-7/17	48	16	0	2,873	3.74	0	0.00	3	0.00	4	28,284	4,599	6
6	Chum	7/19-7/21	48	13	0	2,475	3.97	0	0.00	108	0.17	4	30,759	4,599	114
7	Chum	7/23-7/25	54	23	0	2,688	2.16	23	0.02	644	0.52	4	33,447	4,622	758
8	Chum	7/26-7/28	48	21	0	1,280	1.27	0	0.00	655	0.65	4	34,727	4,622	1,413
9	Chum	7/29-7/31	48	16	0	2,126	2.77	0	0.00	1,515	1.97	4	36,853	4,622	2,928
10	Coho	8/02-8/04	48	22	0	1,144	1.08	0	0.00	1,226	1.16	4	37,997	4,622	4,154
11	Coho	8/05-8/08	72	15	0	1,145	1.06	0	0.00	1,132	1.05	4	39,142	4,622	5,286
12	Coho	8/09-8/11	48	14	0	171	0.25	0	0.00	297	0.44	4	39,313	4,622	5,583
13	Coho	8/12-8/14	48	17	0	205	0.25	0	0.00	844	1.03	4	39,518	4,622	6,427
14	Coho	8/16-8/19	72	13	0	203	0.22	0	0.00	712	0.76	4	39,721	4,622	7,139
15	Coho	8/20-8/22	48	15	0	245	0.34	0	0.00	1,395	1.94	4	39,966	4,622	8,534
16	Coho	8/23-8/25	48	20	0	380	0.40	0	0.00	2,289	2.38	4	40,346	4,622	10,823
17	Coho	8/26-8/28	48	18	0	79	0.09	0	0.00	572	0.66	4	40,425	4,622	11,395
18	Coho	8/30-9/01	48	16	0	58	0.08	0	0.00	473	0.62	4	40,483	4,622	11,868
19	Coho	9/02-9/07	120					No one fished.							
Totals			966	35	4	40,483		4,622		11,868					

Note: There were 410 chum salmon and 12 pink salmon retained for personal use in 2010. There were also 18 sockeye salmon sold commercially in 2010.

Table 15.—Commercial salmon harvest and cumulative (Cum.) CPUE by fishing period, Unalakleet Subdistrict (Subdistrict 6), Norton Sound District, 2010.

Period	Target Species	Dates Fished	Length of Period	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Pink CPUE	Coho Harvest	Coho CPUE	Cumulative Catch			
												Chinook	Chum	Pink	Coho
1	Chum	7/02-7/03	24	19	27	2,223	4.88	3,159	6.93	0	0.00	27	2,223	3,159	0
2	Chum	7/06-7/08	48	23	24	4,832	4.38	3,153	2.86	1	0.00	51	7,055	6,312	1
3	Chum	7/10-7/11	36	27	17	3,249	3.34	1,609	1.66	4	0.00	68	10,304	7,921	5
4	Chum	7/13-7/14	24	10	7	1,830	7.63	427	1.78	6	0.03	75	12,134	8,348	11
5	Chum	7/15-7/17	48	19	1	2,075	2.28	706	0.77	26	0.03	76	14,209	9,054	37
6	Chum	7/19-7/21	48	24	9	3,289	2.86	777	0.67	309	0.27	85	17,498	9,831	346
7	Chum	7/22-7/24	48	21	6	1,152	1.14	238	0.24	563	0.56	91	18,650	10,069	909
8	Chum	7/26-7/28	48	39	8	2,138	1.14	375	0.20	1,417	0.76	99	20,788	10,444	2,326
9	Chum	7/29-7/31	48	41	3	2,243	1.14	197	0.10	2,016	1.02	102	23,031	10,641	4,342
10	Coho	8/02-8/04	48	43	3	1,472	0.71	0	0.00	3,096	1.50	105	24,503	10,641	7,438
11	Coho	8/05-8/08	72	49	7	2,260	0.64	0	0.00	5,586	1.58	112	26,763	10,641	13,024
12	Coho	8/09-8/11	48	39	0	1,274	0.68	0	0.00	4,236	2.26	112	28,037	10,641	17,260
13	Coho	8/12-8/14	48	50	2	871	0.36	0	0.00	3,716	1.55	114	28,908	10,641	20,976
14	Coho	8/16-8/19	72	28	5	542	0.27	0	0.00	3,871	1.92	119	29,450	10,641	24,847
15	Coho	8/20-8/22	48	37	1	243	0.14	0	0.00	1,795	1.01	120	29,693	10,641	26,642
16	Coho	8/23-8/25	48	35	2	288	0.17	0	0.00	2,113	1.26	122	29,981	10,641	28,755
17	Coho	8/26-8/28	48	27	0	196	0.15	0	0.00	812	0.63	122	30,177	10,641	29,567
18	Coho	8/30-9/01	48	29	2	174	0.13	0	0.00	990	0.71	124	30,351	10,641	30,557
19	Coho	9/02-9/07	120	20	0	237	0.10	0	0.00	2,282	0.95	124	30,588	10,641	32,839
Totals			972	59	124	30,588		10,641		32,839					

Note: There were 19 of the 124 Chinook harvested that were retained for personal use. Additionally there were 7 sockeye, 6 coho, and 5 pink salmon retained for personal use. An additional 64 sockeye salmon were sold commercially in 2010.

Table 16.—Annual subsistence salmon harvest by species, Shaktoolik Subdistrict (Subdistrict 5), Norton Sound District, 1994–2010.

Year	Chinook Salmon	Chum Salmon	Pink Salmon	Coho Salmon	Sockeye Salmon
1994	1,175	1,221	9,133	2,777	1
1995	1,303	2,534	7,176	2,682	72
1996	1,114	4,425	8,370	3,615	31
1997	1,146	1,612	5,779	2,761	62
1998	982	1,034	6,270	1,872	92
1999	818	467	5,092	1,556	183
2000	440	2,412	5,432	2,799	20
2001	936	1,553	10,172	2,090	143
2002	1,230	800	8,769	2,169	4
2003	881	587	12,332	2,941	50
2004	943	139	7,291	1,994	12
2005	807	202	12,075	1,913	0
2006	382	351	4,817	1,968	36
2007	515	465	2,708	1,443	28
2008	422	201	4,920	1,504	2
2009	417	374	6,101	2,141	57
2010	327	1,680	6,406	1,940	115
2005-2009 Average	509	319	6,124	1,794	25
1994-2009 Average	844	1,149	7,277	2,264	50

Table 17.—Annual subsistence salmon harvest by species, Unalakleet Subdistrict (Subdistrict 6), Norton Sound District, 1994–2010.

Year	Chinook Salmon	Chum Salmon	Pink Salmon	Coho Salmon	Sockeye Salmon
1994	3,035	3,325	27,163	11,386	404
1995	3,114	5,458	16,625	9,833	591
1996	3,023	4,227	18,026	11,187	181
1997	4,191	1,603	10,600	6,746	196
1998	4,066	3,038	13,654	7,489	201
1999	2,691	3,692	10,060	8,140	537
2000	2,429	3,000	10,540	5,878	212
2001	2,810	2,918	11,269	6,270	359
2002	2,367	3,877	15,915	4,988	280
2003	2,585	1,785	21,779	6,192	297
2004	2,829	2,154	22,755	6,653	417
2005	2,193	2,660	25,447	7,886	656
2006	2,537	2,712	22,547	9,905	326
2007	1,665	2,057	11,674	5,859	292
2008	1,402	2,805	15,116	7,452	137
2009	1,892	2,708	11,707	6,923	200
2010	1,257	3,159	9,002	3,780	297
2005-2009 Average	1,938	2,588	17,298	7,605	322
1994-2009 Average	2,677	3,001	16,555	7,674	330

Table 18.—Annual subsistence salmon harvest by species, Port Clarence District, 1994–2010.

Year		Chinook Salmon	Sockeye Salmon	Coho Salmon	Pink Salmon	Chum Salmon	Total
1994	^a	203	2,220	1,892	4,309	2,294	10,918
1995	^a	76	4,481	1,739	3,293	6,011	15,600
1996	^a	194	2,634	1,258	2,236	4,707	11,029
1997	^a	158	3,177	829	755	2,099	7,018
1998	^a	289	1,696	1,759	7,815	2,621	14,180
1999	^a	89	2,392	1,030	786	1,936	6,233
2000	^a	72	2,851	935	1,387	1,275	6,520
2001	^a	84	3,692	1,299	1,183	1,910	8,168
2002	^a	133	3,732	2,194	3,394	2,699	12,152
2003	^b	177	4,495	1,434	4,113	2,430	12,649
2004	^c	278	8,688	1,131	5,918	2,505	18,520
2005	^c	152	8,492	726	6,615	2,479	18,464
2006	^c	102	9,940	1,061	4,939	4,353	20,395
2007	^c	85	9,484	705	1,468	4,454	16,196
2008	^c	125	5,069	512	7,527	2,449	15,682
2009	^c	40	1,643	804	1,882	3,060	7,429
2010	^{c,d}	34	668	301	3,737	3,658	8,398
2005-2009 Average		101	6,926	762	4,486	3,359	15,633
1994-2009 Average		141	4,668	1,207	3,601	2,955	12,572

^a Harvest estimate from Div. of Subsistence survey. Data expanded to households that were not surveyed.

^b Harvests obtained from Port Clarence household surveys and Pilgrim River subsistence salmon permits.

^c Harvests obtained from Tier 1 subsistence salmon permits.

^d Harvests preliminary for 2010. All 146 Pilgrim River permits have been returned, but 109 out of 145 Pt. Clarence District permits issued have not been returned.

Table 19.–Salmon counts of Norton Sound rivers in 2010 and associated salmon escapement goal ranges (SEG, BEG or OEG).

Stream Name	Chinook				Chum			
	Weir/ Tower Count	Escapement Goal Range	Aerial Survey Count ^a	Escapement Goal Range	Weir/ Tower Count	Escapement Goal Range	Aerial Survey Count ^a	Escapement Goal Range
Salmon L.								
Grand Central R.								
Pilgrim R.	44				25,379			
Agiapuk R.								
American R.							14,100	
Glacial L.								
Sinuk R.						4,000 - 6,200 ^b	3,955	
Cripple R.							5	
Penny R.							3	
Snake R.	43				6,973	1,600 - 2,500 ^c	2,625	
Nome R.	9				5,877	2,900 - 4,300 ^c	2,998	
Flambeau R.						4,100 - 6,300 ^b	13,600	
Eldorado R.	23				21,211	6,000 - 9,200 ^c	30,600	
Bonanza R.			2			2,300 - 3,400 ^b	686	
Solomon R.						1,100 - 1,600 ^b	454	
Fish R.				Combined				
Boston Cr.			29	100 - 250		Tower goal	3,010	
Niukluk R.	42				48,110	>23000		
Ophir Cr.								
Kwiniuk R.	135	300 - 550	44		71,388	11,500 - 23,000 ^d	13,047	
Tubutulik R.			122			9,200 - 18,400 ^{b, d}	16,097	
Inglutalik R.								
Ungalik River								
Pikmiktalik R.								
Shaktoolik R.			29	400 - 800			12,815	
Unalakeet R.	1,021			Combined	70,811			Combined
Old Woman R.				550 - 1,100				2,400 - 4,800
North R.	1,302	1,200 - 2,600	124		16,359		1,623	

-continued-

Table 19.–Page 2 of 2.

Stream Name	Coho			Sockeye			Pink		
	Weir/ Tower Count	Aerial Survey Count ^a	Escapement Goal Range	Weir/ Tower Count	Aerial Survey Count ^a	Escapement Goal Range	Weir/ Tower Count	Escapement Goal	Aerial Survey Count ^a
Salmon L.					136	Combined			
Grand Central R.					626	4,000 - 8,000			
Pilgrim R.	272			1,654			29,239		
Agiapuk R.									
American R.									
Glacial L.				1,047		800 - 1,600			
Sinuk R.		5,507			1				168,600
Cripple R.		764							26,415
Penny R.		349							13,030
Snake R.	2,243	1,378		124	2		51,099		22,095
Nome R.	4,114			43	2		165,931	>3,150	98,272
Flambeau R.									36,000
Eldorado R.	2			8			48,136		81,542
Bonanza R.					4				106,000
Solomon R.					1				21,804
Fish R.									
Boston Cr.		73	Tower goal						5,110
Niukluk R.	8,922		2,400-7,200				433,529	>10,500	
Ophir Cr.									
Kwiniuk R.	8,049	2,925	650-1,300		2		634,220	>8,400	27,833
Tubutulik R.		1,914			5				16,520
Inglutalik R.									
Ungalik River									
Pikmiktalik R.									
Shaktoolik R.									12,598
Unalakeet R.	5,382			130			832,904		
Old Woman R.									
North R.	7,979		550-1,100				150,807	>25,000	1,480

^a All aerial surveys are rated fair to good.

^b The goal listed is actual fish and not aerial counts. However, at this time there is no counting project on the river.

^c The Board of Fisheries also established an OEG with the same range as the BEG.

^d This represents the OEG in regulation. The BEG is 10,000–20,000 for the Kwiniuk River and 8,000–16,000 for the Tubutulik River.

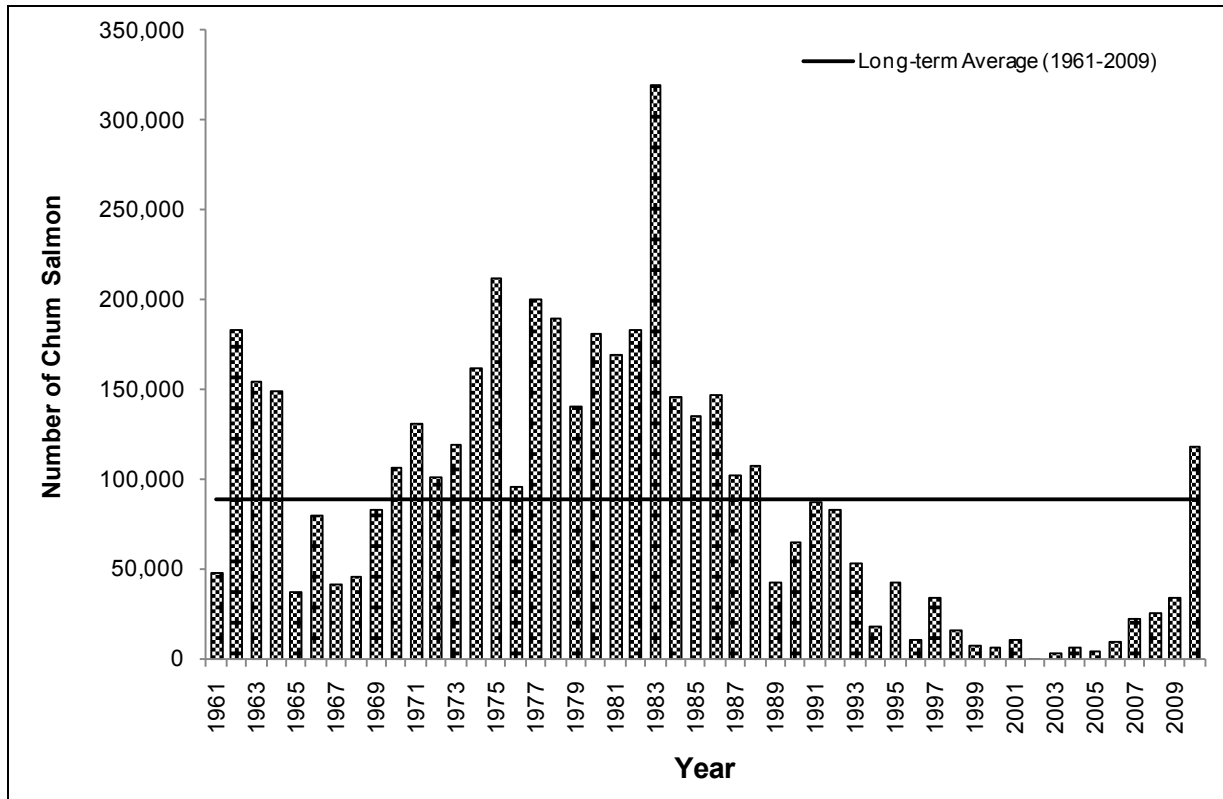


Figure 1.—Commercial chum salmon harvest, Norton Sound District, 1961–2010.

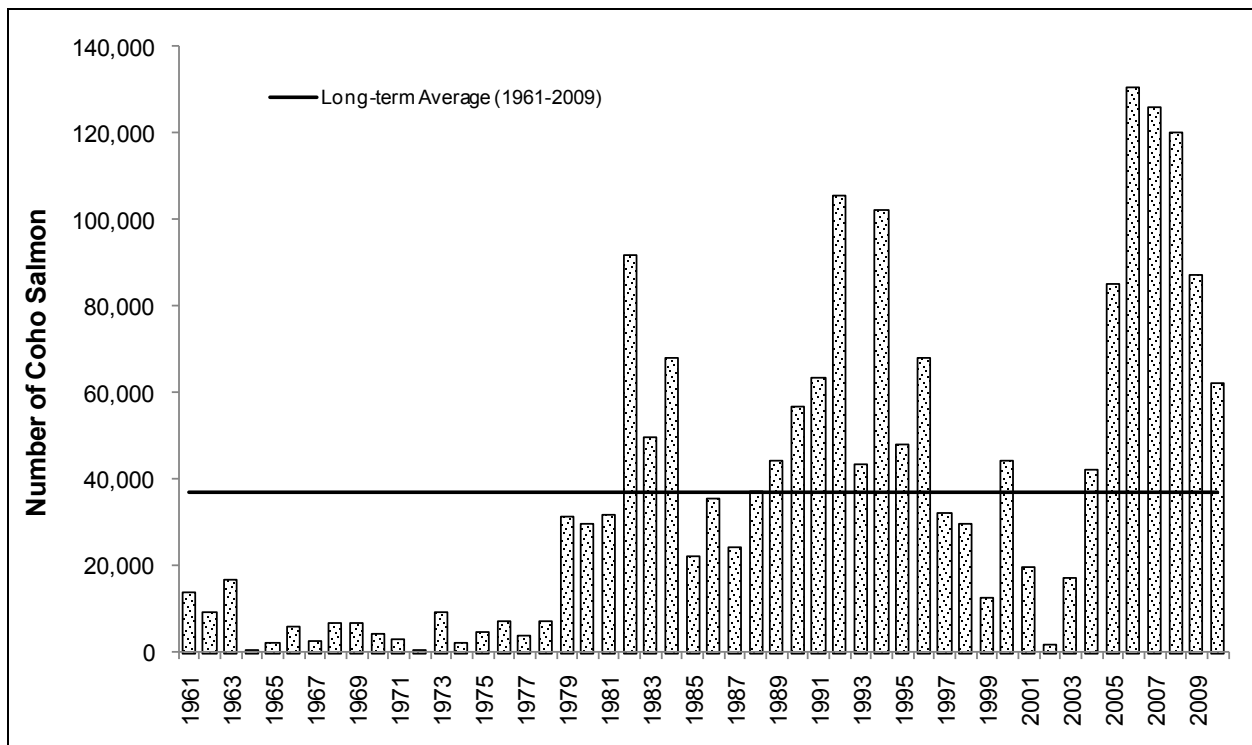


Figure 2.—Commercial coho salmon harvest, Norton Sound District, 1961–2010.

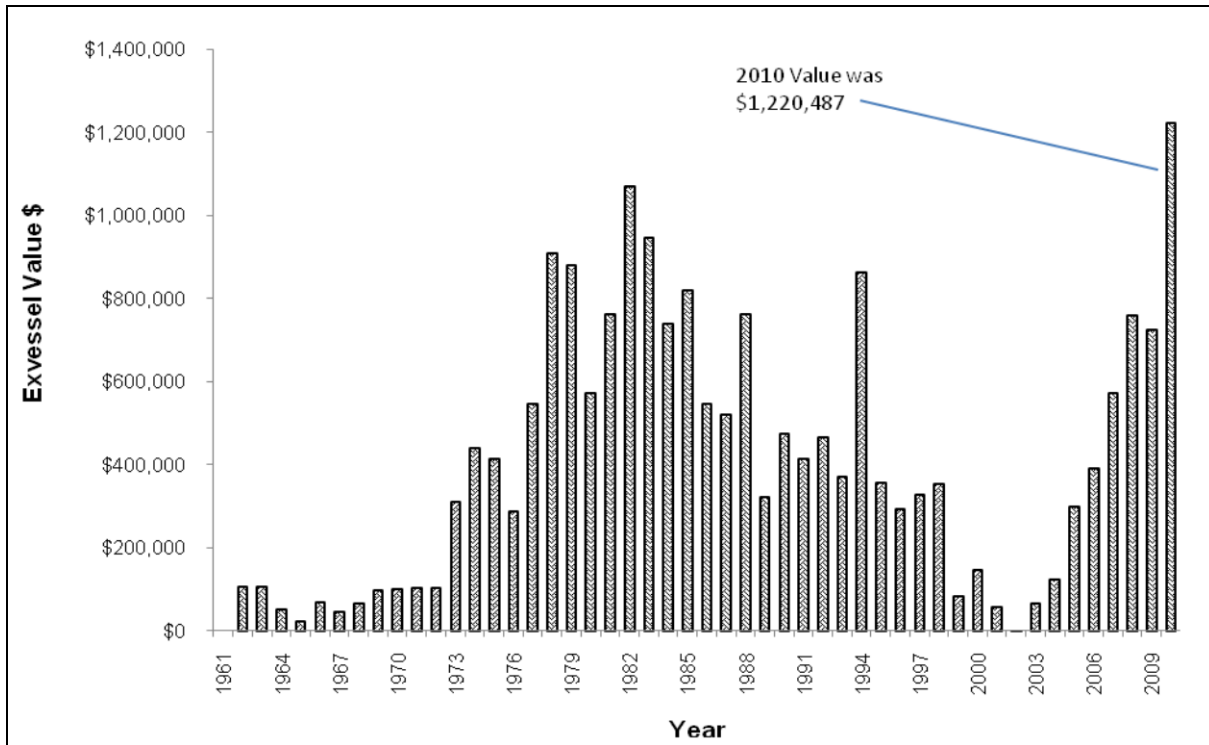
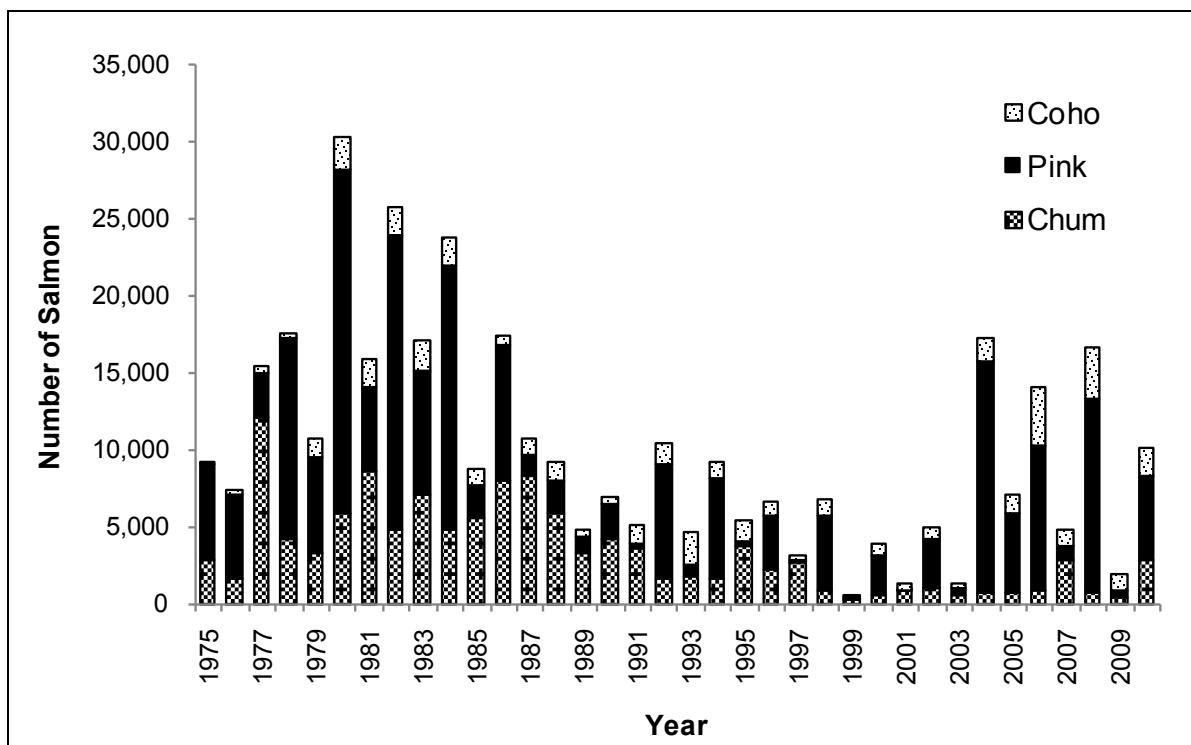


Figure 3.—Norton Sound District commercial salmon fishery exvessel value, 1961–2010.



Note: 2010 subsistence data preliminary with data entered from only 429 permits out of a possible 494 permits issued.

Figure 4.—Annual subsistence coho, pink and chum salmon harvest, Nome Subdistrict (Subdistrict 1), Norton Sound District, 1975–2010.

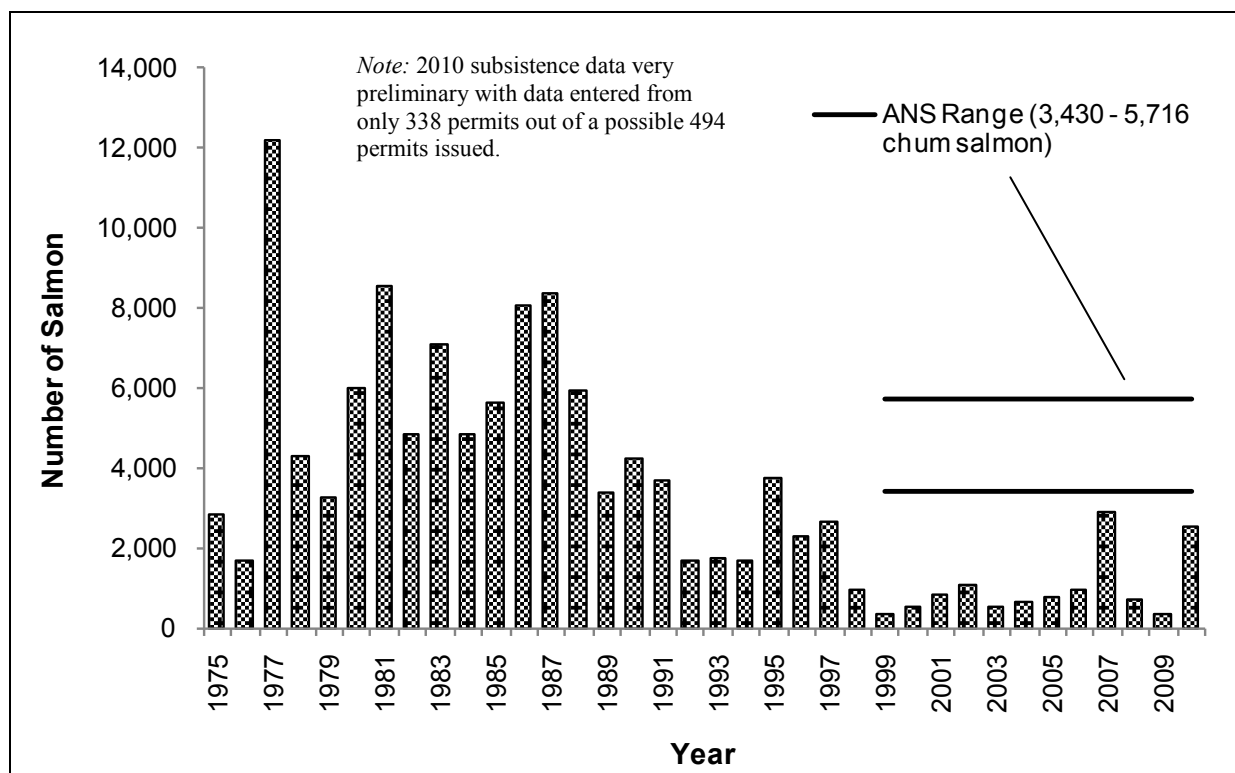


Figure 5.—Annual subsistence chum salmon harvest compared to the ANS (Amount Necessary for Subsistence) Range (3,430–5,716 chum salmon), Nome Subdistrict (Subdistrict 1), Norton Sound District, 1975–2010.

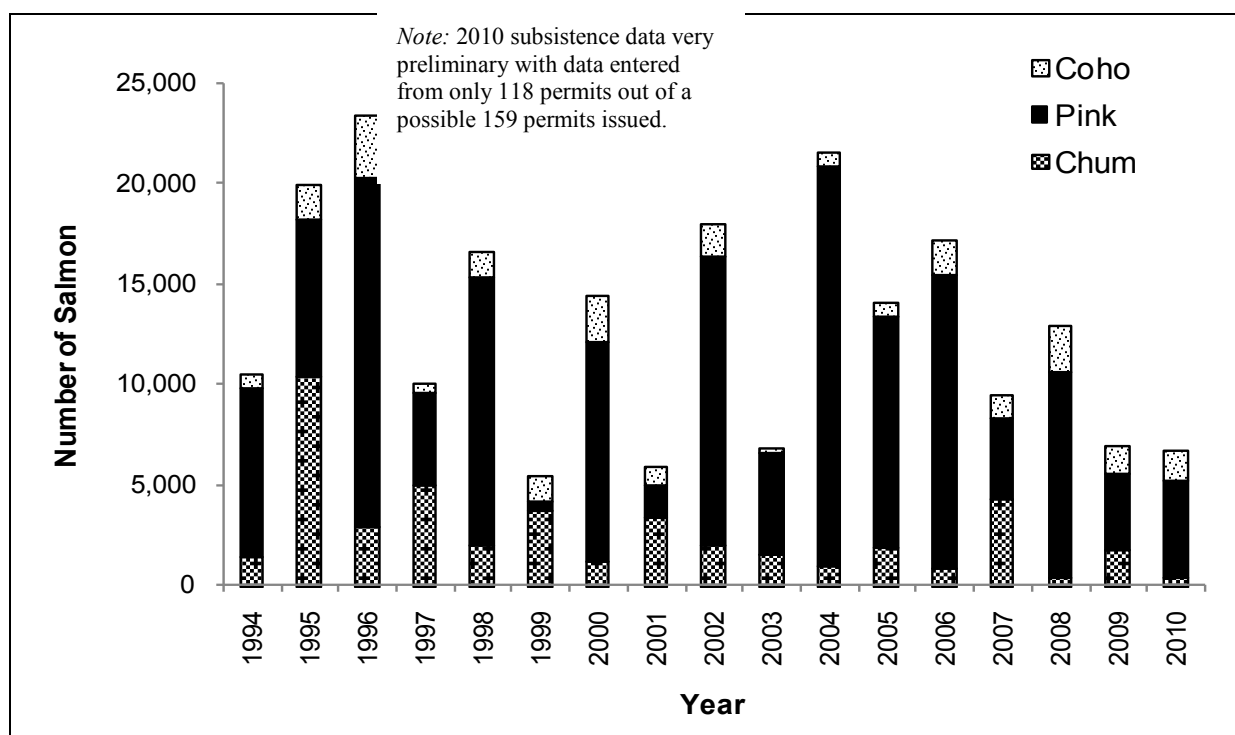
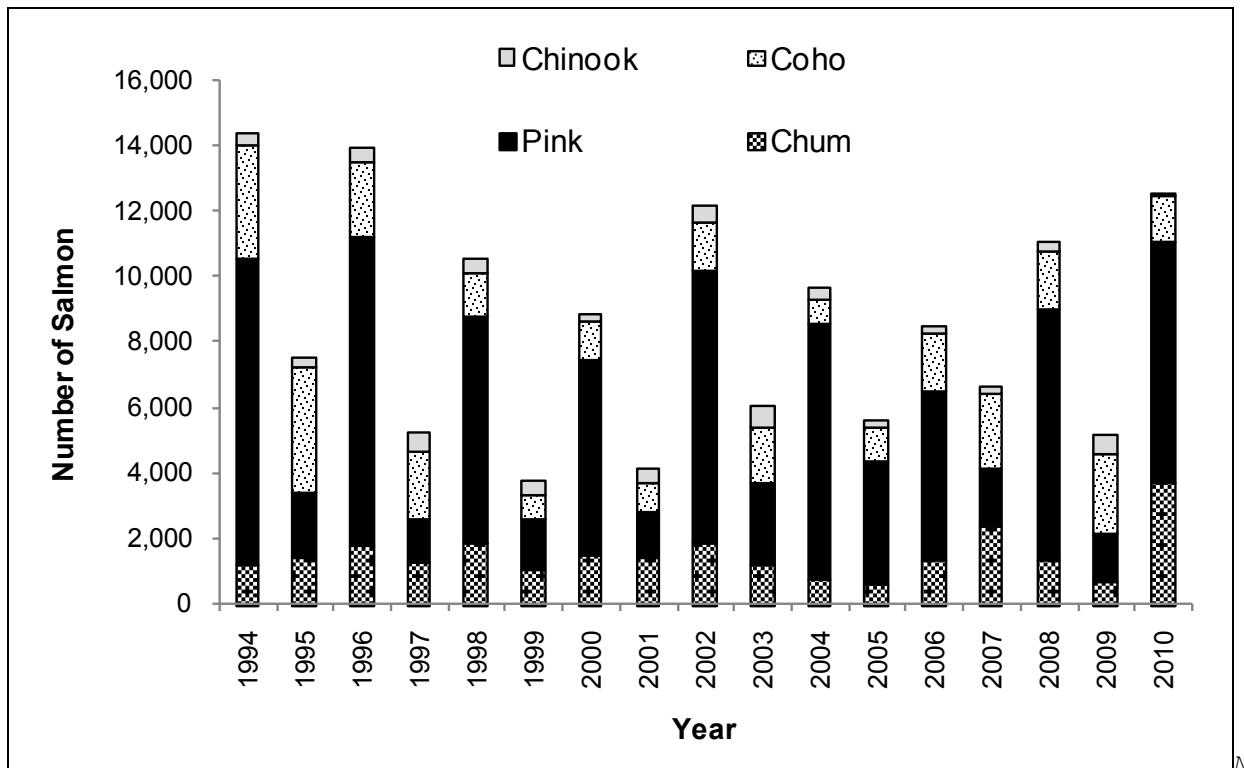


Figure 6.—Annual subsistence coho, pink and chum salmon harvest, Golovnin Bay Subdistrict (Subdistrict 2), Norton Sound District, 2004-2010.



Note: 2010 subsistence data very preliminary with data entered from only 24 permits out of a possible 64 permits issued.

Figure 7.—Annual subsistence coho, pink, and chum salmon harvest, Elim Subdistrict (Subdistrict 3), Norton Sound District, 1994–2010.

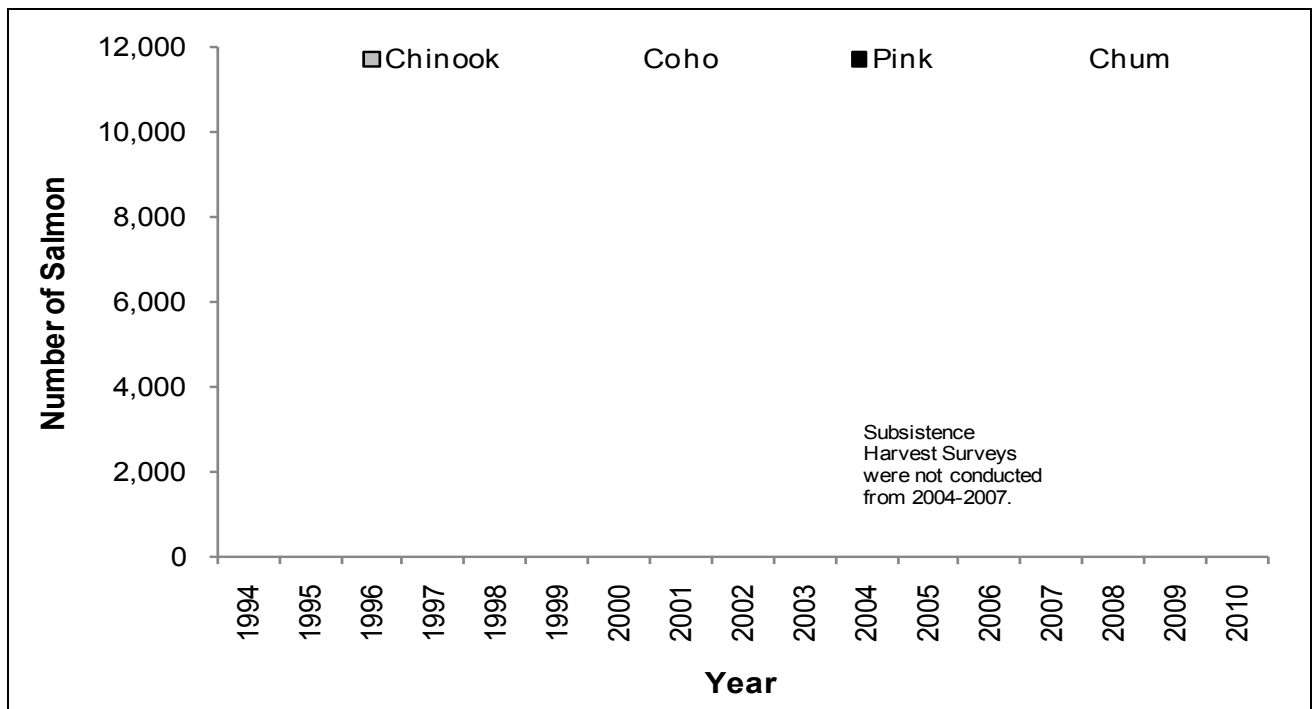


Figure 8.—Annual subsistence salmon harvest by species, Norton Bay Subdistrict (Subdistrict 4), Norton Sound District, 1994–2010.

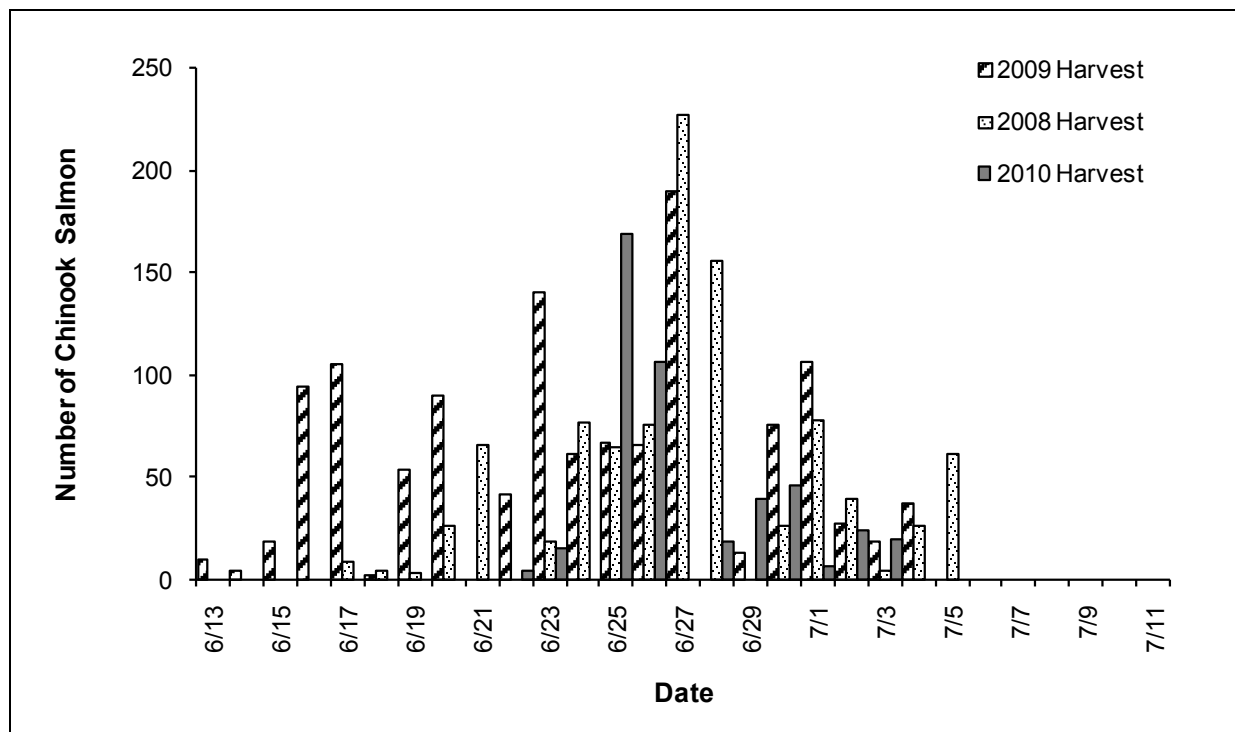
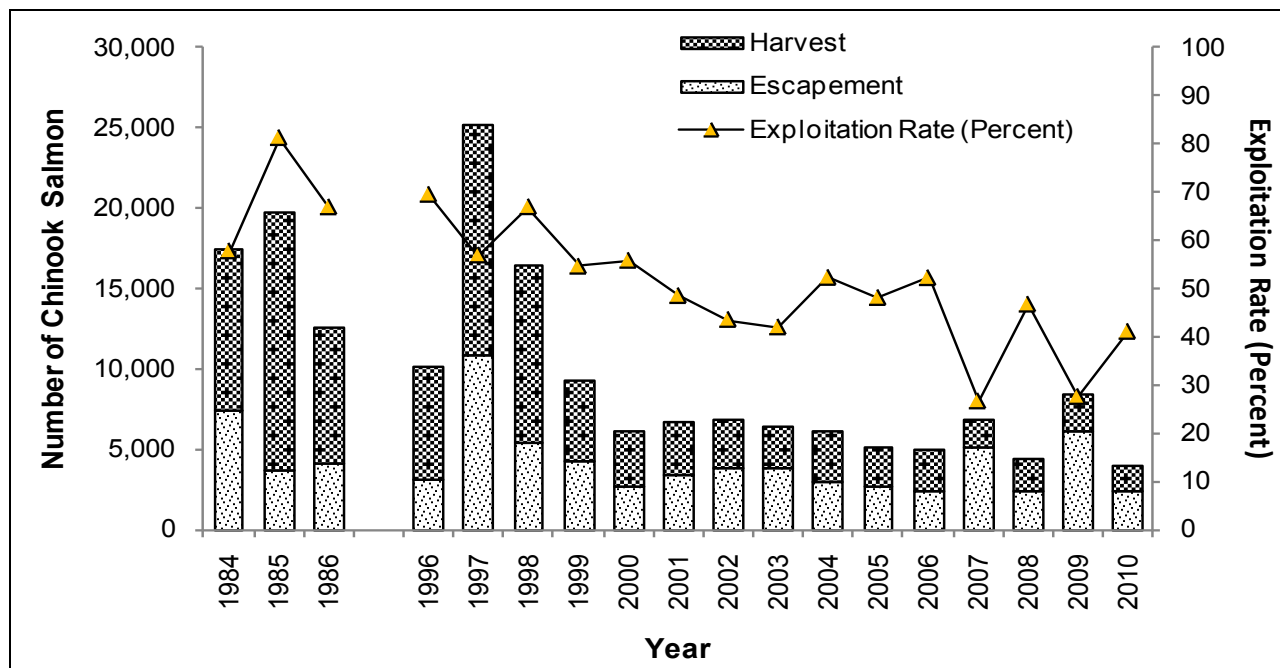
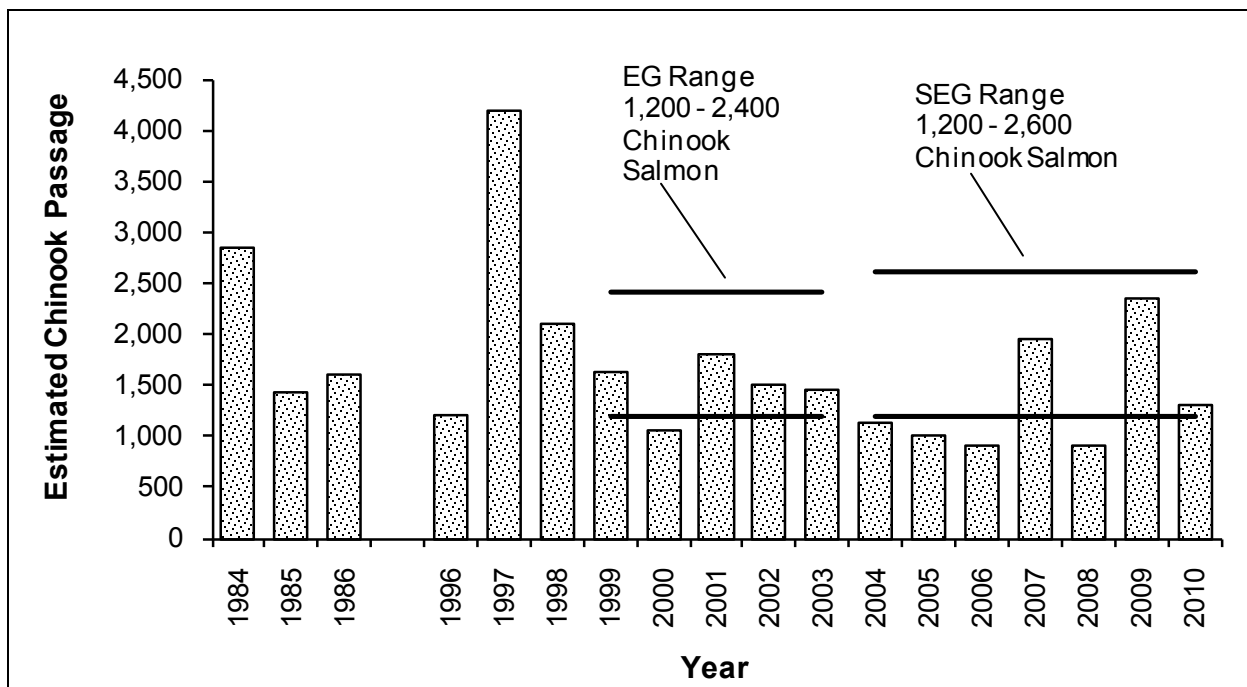


Figure 9.—Reported inseason Chinook salmon harvest by date, marine subsistence fishery, Unalakleet Subdistrict (Subdistrict 6), Norton Sound District, 2008–2010.



Note: Drainage-wide escapement estimates from 1984–2009 calculated by expanding tower counts by 0.386, the average proportion of Chinook salmon migrating into the North River determined from radiotelemetry from 1997–1998 (Wuttig, 1999). Drainage-wide escapement from 2010 is summation of North River tower and Unalakleet River weir counts.

Figure 10.—Annual estimated escapement, total harvest, and total run compared to exploitation rate, Unalakleet River Chinook salmon, Unalakleet River drainage, Norton Sound, 1984–1986 and 1996–2010.



Note: North River tower was not operated from 1987–1995 due to funding limitations.

Figure 11.—North River Chinook salmon passage estimates compared to escapement goal ranges, 1984–1986 and 1996–2010.

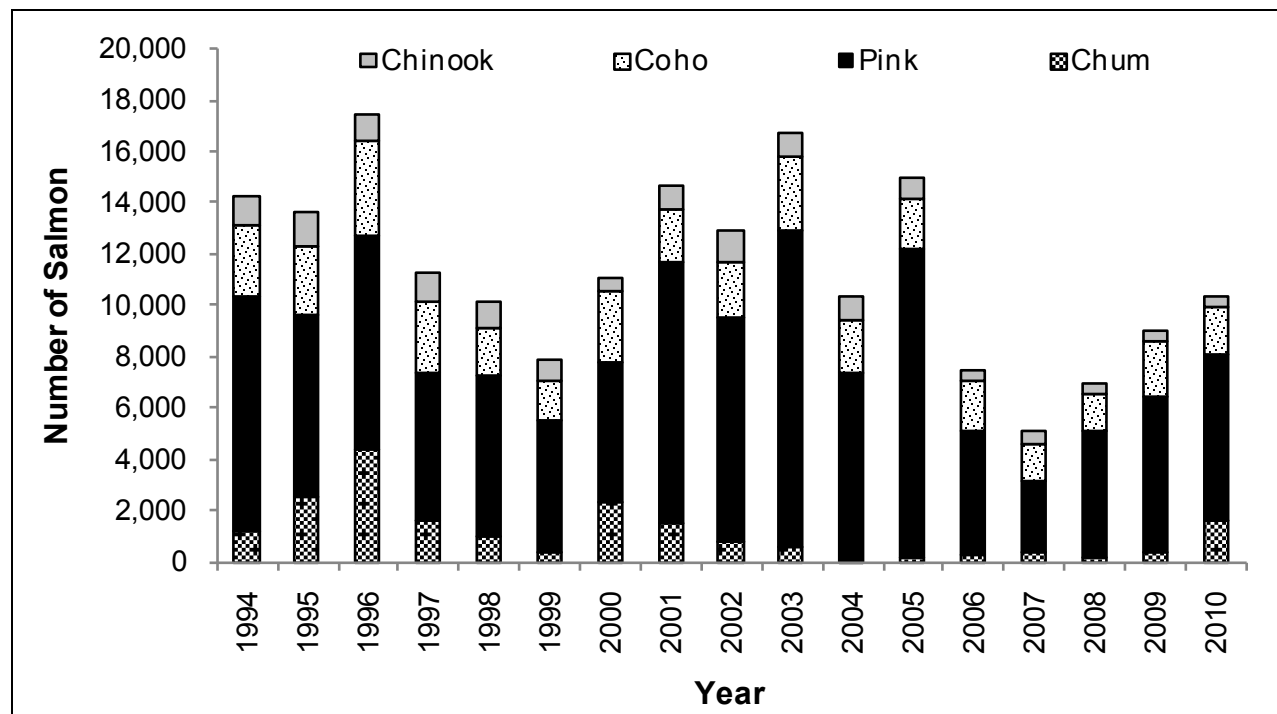


Figure 12.—Annual subsistence salmon harvest by species, Shaktoolik Subdistrict (Subdistrict 5), Norton Sound District, 1994–2010.

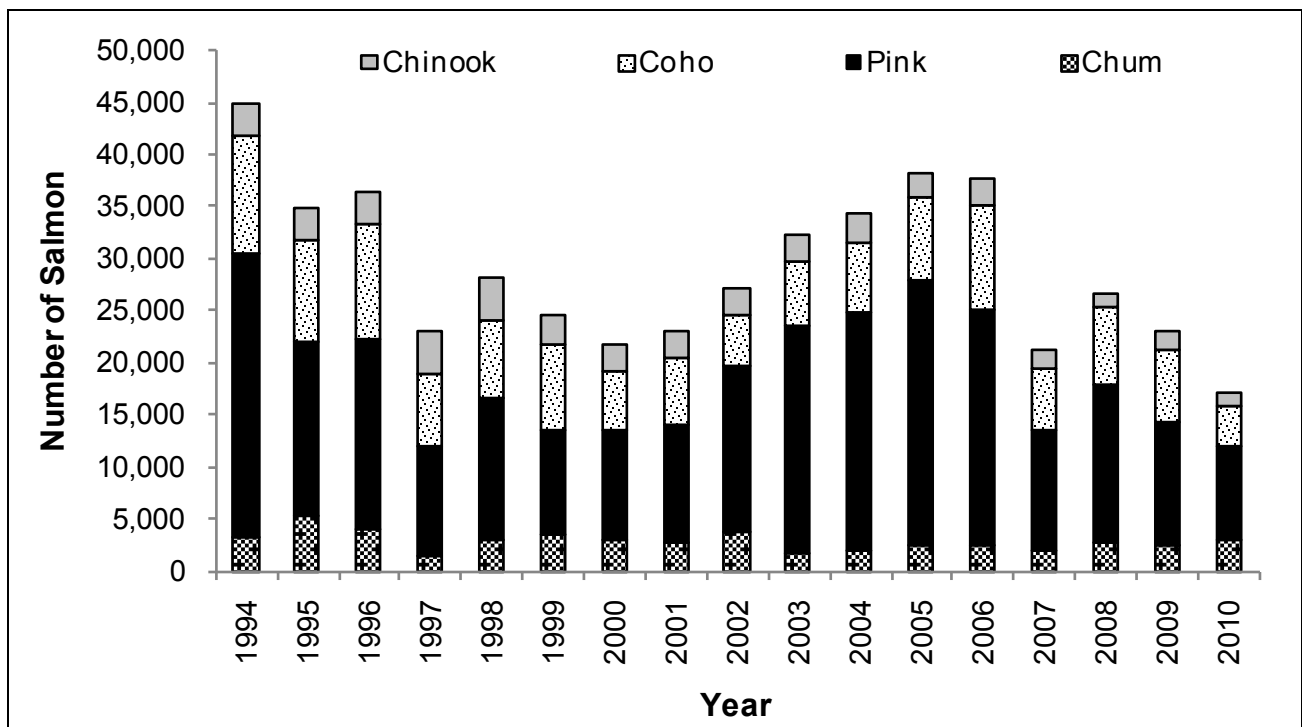
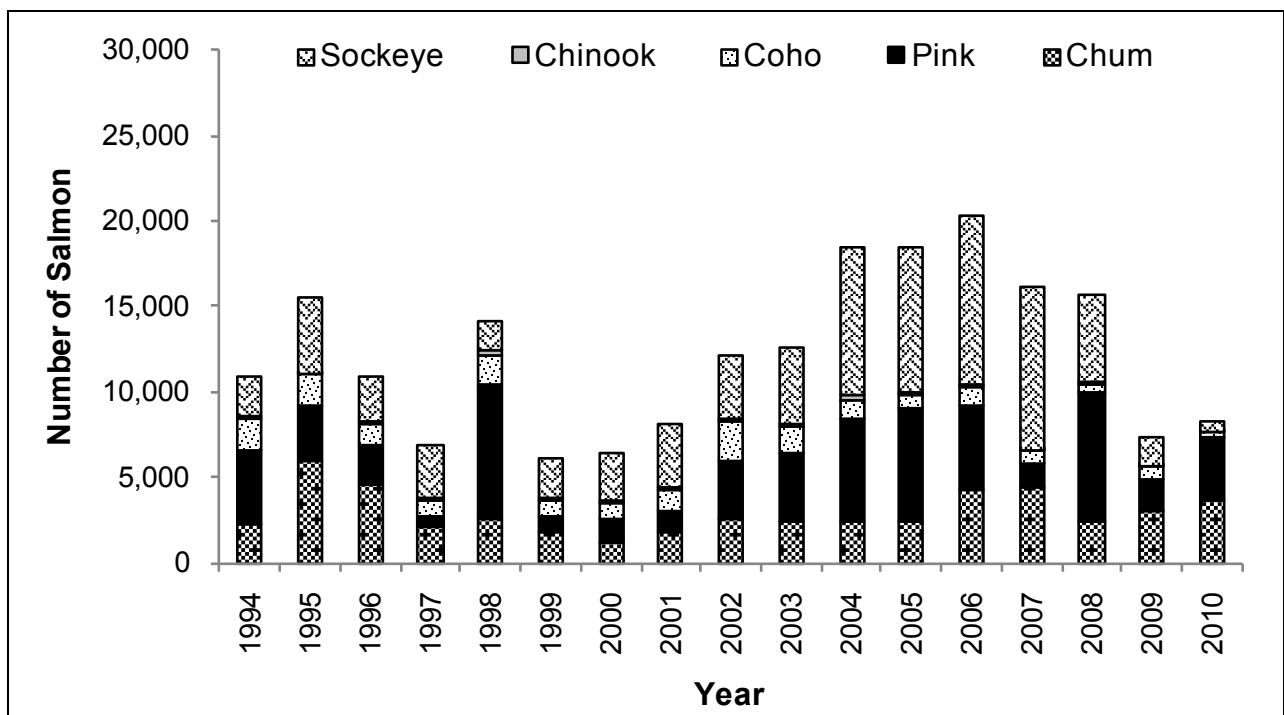


Figure 13.—Annual subsistence salmon harvest by species, Unalakleet Subdistrict (Subdistrict 6), Norton Sound District, 1994–2010.



Note: Harvests preliminary for 2010. All 146 Pilgrim River permits have been returned, but only 105 out of 145 Port Clarence District permits issued have been returned.

Figure 14.—Annual subsistence salmon harvest by species, Port Clarence District, 1994–2010.

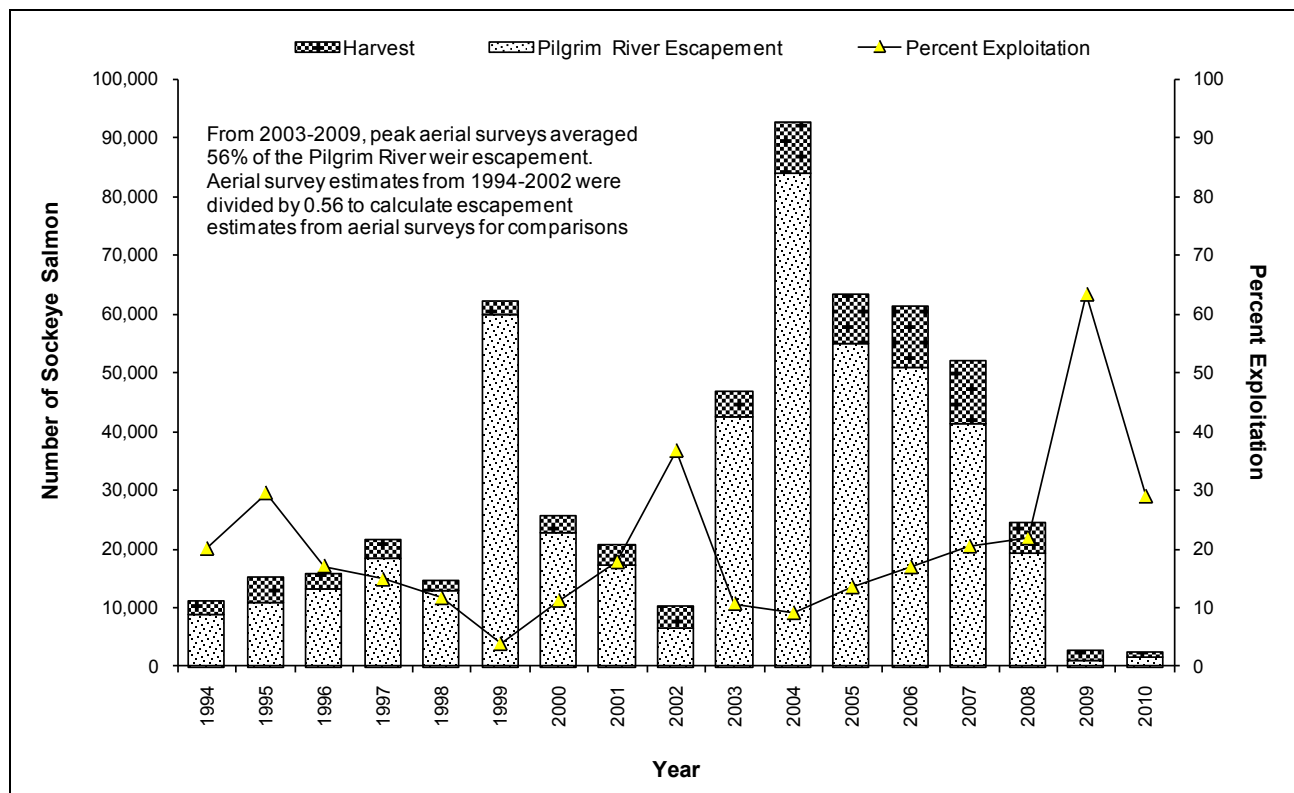


Figure 15.—Sockeye salmon escapement, harvest, and total run compared to percent exploitation, 1994–2010, Pilgrim River, Kuzitrin River drainage, Port Clarence District.

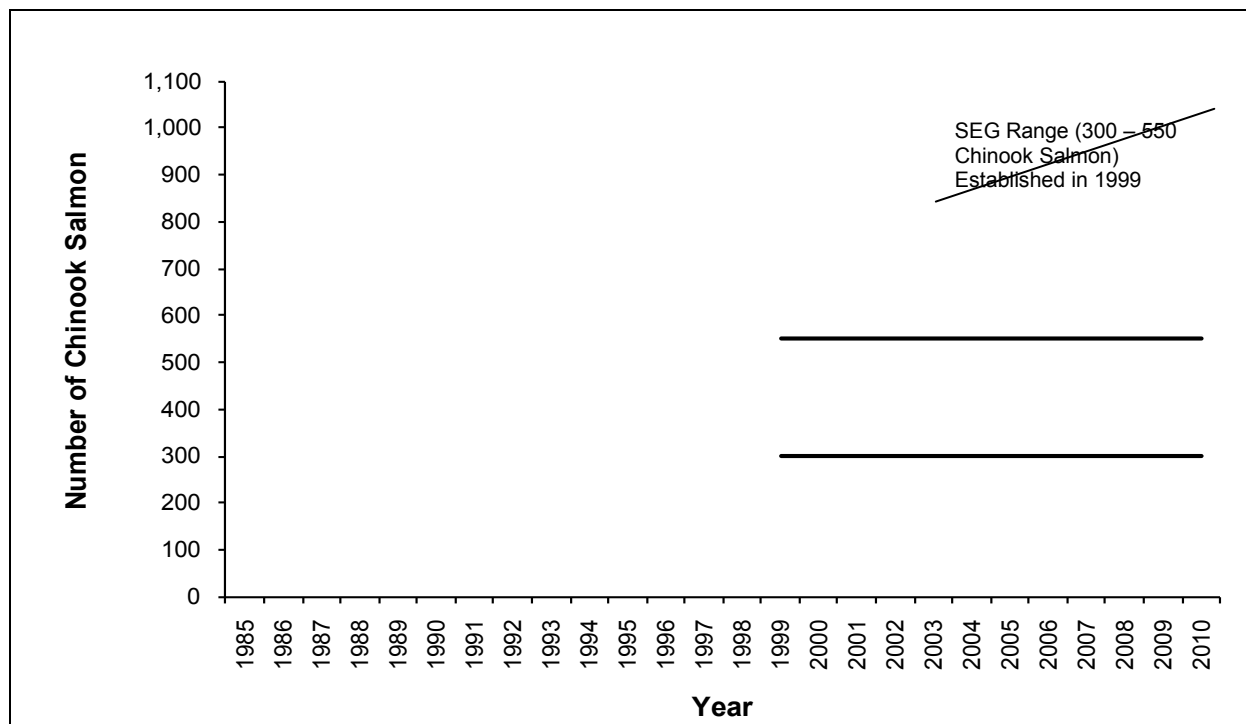


Figure 16.—Annual Chinook salmon escapement compared to the sustainable escapement goal range (300–550 Chinook salmon), Kwiniuk River tower, Elim Subdistrict (Subdistrict 3), Norton Sound, 1985–2010.