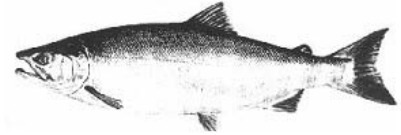


**ALASKA DEPARTMENT OF FISH AND GAME  
DIVISION OF COMMERCIAL FISHERIES  
NEWS RELEASE**



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Date Issued: December 22, 2011

**2011 NORTON SOUND SALMON SEASON SUMMARY**

Highlights of the 2011 Norton Sound District salmon fisheries included the second largest commercial chum salmon harvest since 1986, a record coho salmon harvest in the Norton Bay Subdistrict (Subdistrict 4) and a record exvessel value and record average value of salmon catch per permit holder without adjusting for inflation.

As forecasted, the strong 2006 brood year led to another above average run of chum salmon to northern Norton Sound (Subdistricts 1–3) and good survival by both the 2006 and 2007 brood years resulted in one of the largest chum salmon runs on record to southern Norton Sound (Subdistricts 4–6). Pink salmon directed fisheries did not occur in 2011 due to strong market interest in chum salmon. Coho salmon runs to northern Norton Sound were below average, but surpluses were adequate to provide for limited commercial harvest in Golovnin Bay Subdistrict and the third best coho salmon harvest in Elim Subdistrict. Coho salmon commercial harvests to Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) were near the long-term historical average and in the top 20 all time.

Chinook salmon runs to most areas of Norton Sound were not sufficient to provide for customary levels of subsistence use and precluded commercial fishing directed on Chinook salmon for the sixth consecutive season in Subdistricts 5 and 6. Early closures to Chinook salmon sport and subsistence fisheries were implemented for the sixth consecutive season in an attempt to meet escapement needs. Chinook salmon escapement goals were not achieved on the Kwiniuk River (Elim Subdistrict) or North River (Unalakleet Subdistrict). However, the 2011 North River tower estimate is thought to be incomplete due to high water levels that contributed to poor counting conditions for much of the Chinook salmon run; the late July aerial survey count of 433 Chinook salmon represented more than half the reported tower count at that time; the tower-based goal was easily achieved in all years which had acceptable aerial surveys with over 400 Chinook salmon.

The sockeye salmon run to Salmon Lake was poor for the third consecutive season, but much improved compared to the previous two years. An early closure to the Pilgrim River subsistence fishery also occurred for the third year in row but had the desired effect of achieving the sockeye

salmon aerial survey sustainable escapement goal (SEG) for Salmon Lake and the Grand Central River tributary.

### EXVESSEL VALUE

Exvessel value in 2011 was \$1,269,730 and was record breaking for the second year in a row and 202% above the recent 10-year (2001–2010) average exvessel value of \$420,720 without adjusting for inflation (Figure 1). Average value per permit holder dropped slightly from \$10,613 per permit in 2010 to \$10,323 per permit in 2011. A strong forecast of chum salmon and high grounds prices also led to an increase in fishing effort for the third consecutive year. The 123 permits fished in 2011 increased from 115 fished in 2010 and 88 permits fished in 2009. Number of permits fished in 2011 is also the highest number of permits fished in nearly 20 years (153 permit holders fished in 1993) and 16<sup>th</sup> best in the 35 years for which effort statistics are available (Figure 1).

Record fishery values from 2010–2011 have largely been the result of strong chum salmon harvests and high grounds prices paid for salmon, particularly coho salmon. Prices paid for salmon in 2011 also increased for all species except pink salmon when compared to prices paid in 2010. In 2010, the grounds price per pound was \$2.25, \$0.62, \$1.47, \$0.32, and \$0.63, for Chinook, chum, coho, pink, and sockeye salmon, respectively. Prices paid per pound by species in 2011 were \$3.01, \$0.68, \$1.70, \$0.25, and \$1.04 for Chinook, chum, coho, pink, and sockeye salmon, respectively.

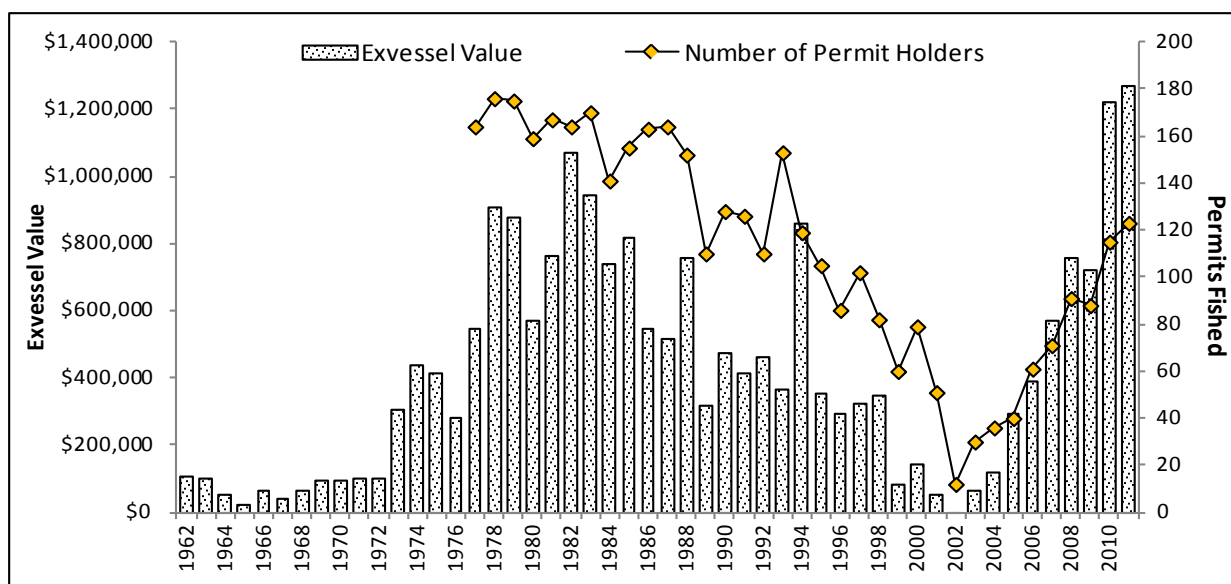


Figure 1.—Commercial salmon fishery exvessel value compared to number of permits fished, 1961–2011, Norton Sound District.

### COMMERCIAL SALMON FISHERY NARRATIVE

In northern Norton Sound (Subdistricts 2–3), commercial salmon fishing began with a 24-hour index opening on June 20 directed at chum salmon. Above average catch rates of chum salmon, particularly in Subdistrict 2 (Golovnin Bay), occurred from the start. On June 22, a 48-hour period was scheduled for Subdistrict 2 and a 24-hour period was set for Subdistrict 3 (Elim). Tendering capacity was reached by midnight June 23 in Golovnin Bay Subdistrict because of

near record CPUE and buying operations were cut short. Following this period, the department set weekly schedules for the Golovnin Bay and Elim Subdistricts for the remainder of the chum salmon run based on above average chum salmon CPUE and early projections that escapement goals would be attained in both subdistricts. However, projections of escapement in Golovnin Bay fell short in mid-July and the chum salmon commercial fishery was closed on July 16 to ensure that the Niukluk River tower-based chum salmon escapement goal was achieved. In late July, the department switched to coho salmon management, but incidental coho salmon catches during the tail end of the chum salmon fishery and late July tower counts at the Niukluk and Kwiniuk Rivers were well below average. Escapement counts improved slightly in early August in Elim Subdistrict and the department prosecuted the fishery on a period by period basis until mid-August. By mid-August, the coho salmon aerial survey SEG (650–1,300 fish) was projected to be reached on the Kwiniuk River and a schedule of two 48-hour periods per week was established. In Golovnin Bay, early August projections of coho salmon escapement at the Niukluk River were barely above the lower end of the tower-based SEG (2,400–7,200 fish). Two index periods were allowed to evaluate coho salmon run strength, but catch rates of coho salmon were below average and the fishery was closed to provide for subsistence needs and ensure that the escapement goal would be achieved.

Commercial salmon fishing returned to Norton Sound Subdistrict 4 (Norton Bay Subdistrict), for the fourth consecutive season. By the third week of June it was apparent that the chum salmon run to Norton Bay was very strong based on reports from subsistence users and escapement counts at the new Inglutalik River tower project. Unfortunately, the bulk of the buyer's tendering capacity was maximized and focused on Subdistricts 2 and 3 at this time. Consequently, commercial fishing in the Norton Bay Subdistrict (Subdistrict 4) was delayed until July 13 and large surpluses of chum salmon were not utilized. By the second week of July, additional tendering capacity was brought on line when the king crab tendering vessel *Inalik* was put into the rotation of salmon tendering vessels. This freed up other vessels to support fishermen in Subdistrict 4 and chum salmon directed periods ranging from 36–66 hours in duration were set in consultation with the buyer from July 13 to July 25. There was no participation during the first two periods and the first salmon harvests did not occur until July 18. Despite the late start, chum salmon CPUE indices were well above average for the third week of July and coho salmon catches did not surpass chum salmon harvests in a period until the July 31 opening. By the end of the 48-hour opening on August 5, the 1979 record coho salmon harvest of 2,547 cohos was eclipsed when 1,346 cohos were caught by 8 permit holders; this also established a record harvest for a single period in Subdistrict 4. On August 10, Norton Bay Subdistrict was placed on a schedule of two 48-hour periods per week until the regulatory closure date of September 7.

As forecasted, a weak run of Chinook salmon to Subdistrict 5 and 6 precluded commercial fisheries directed on Chinook but also led to a significant amount of foregone chum salmon harvest surplus. As a consequence of the poor Chinook salmon run, directed chum salmon fishing was delayed until July 1 per the Subdistricts 5 and 6 management plan. Brief index periods were set in consultation with the buyer for July 2 in the Unalakleet Subdistrict and July 3 for the Shaktoolik Subdistrict. 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. Additionally, the low volume of chum salmon harvests early allowed the buyer to make adjustments to tendering and shift schedules to prepare for periods with increased fishing time.

To further protect milling Chinook salmon, the northern half of the Unalakleet Subdistrict was also closed to commercial salmon fishing until July 8 to allow Chinook salmon to enter the Unalakleet Subdistrict and Unalakleet River drainage. During the first Unalakleet Subdistrict opening, the incidental harvest of Chinook salmon was 18 fish by 8 permit holders and only 495 chum salmon were harvested. Therefore, 1 Chinook salmon was harvested incidentally for every 28 chum salmon harvested; this rate of incidental Chinook salmon harvest was much higher than rates observed in previous years. In contrast, incidental harvests of Chinook salmon in Shaktoolik Subdistrict for the July 3 opening were acceptable with only 1 Chinook salmon harvested for every 245 chum salmon taken. The department delayed the next Unalakleet period until July 7 to allow time for milling Chinook salmon to move into the Unalakleet River. During the next Unalakleet Subdistrict index period, the incidental harvest rate dropped to 1 Chinook for every 200 chum salmon taken in the fishery. These data suggested that pulling the period had the desired effect of allowing the bulk of the Chinook salmon run to move into the lower reaches of the Unalakleet River drainage.

On July 9, the entire Unalakleet Subdistrict was reopened with back to back 72-hour periods in an attempt to maximize harvests from the second peak of the chum salmon run and make up for lost commercial opportunity from the first major pulse of the run. Two 36-hour periods and one 72-hour period were also set for the Shaktoolik Subdistrict at the same time. This was done at the buyer's request to maximize chum salmon harvests while at the same time providing tendering windows between periods to avoid spoilage. It also allowed both subdistricts to resume commercial fishing on the same schedule of two 48-hour periods per week beginning July 17.

Coho salmon catches did not exceed chum salmon catches in either subdistrict for a single period until July 31 and then a storm system in early August kept Norton Sound fishermen on the beach from August 3–4. Following the storm, a 72-hour period was set for Subdistrict 5 and a 96-hour period was allowed in Subdistrict 6 in an attempt to maximize coho salmon harvests at the historical peak of the commercial fishery. However, CPUE during the extended periods was well below average and essentially remained low in both Subdistricts for the remainder of August with the exception of the August 14 period in Shaktoolik when 4,646 coho salmon were harvested by 22 permit holders. Catches dropped sharply after this period and test fishery indices and tower counts were also near average with the 1996, and 2004–2009 record catches excluded. Given the near average coho salmon run to Subdistricts 5 and 6, an extension to the season beyond the regulatory closure date (September 7) and additional extended periods were not warranted in 2011.

### COMMERCIAL HARVEST STATISTICS

Table 1 summarizes chum and coho salmon harvests by subdistrict compared to recent 5-year and long-term average harvests. The 2011 chum salmon harvest of 110,555 for the Norton Sound District ranks 19<sup>th</sup> best in 51 years of commercial chum salmon harvests and was 164% above the recent 5-year (2006–2010) average harvest of 41,892 chum salmon, and 23% above the long-term (1961–2010) average harvest of 89,522 chum salmon (Table 1). This year also marks the first time in 24 years in which there have been consecutive years with harvests exceeding 100,000 chum salmon. Despite the near average coho salmon run, the 2011 Norton Sound District harvest of 58,917 ranked 13<sup>th</sup> best in 51 years of harvests and was 58% above the long-term average harvest of 37,382 cohos. The 2011 coho salmon harvest was only 56% of the recent 5-year average harvest of 105,267 fish (Table 1). However, the recent 5-year average includes record harvests from 2006–2008. An additional 185 Chinook, 7,141 pink, and 369 sockeye salmon were harvested incidentally in directed chum and coho salmon fisheries in 2011.

Average weight by species was 11.4, 7.0, 7.3, 2.8, and 6.9 pounds for Chinook, chum, coho, pink and sockeye salmon, respectively.

Table 1.—Commercial chum and coho salmon harvests by subdistrict for 2011 compared to the recent 5-year (2006–2010) and 1961–2010 historical average harvests, Norton Sound District.

Norton Sound Subdistrict	Chum Salmon			Coho Salmon		
	2011 Harvest	2006-2010 Harvest	1961-2010 Harvest	2011 Harvest	2006-2010 Harvest	1961-2010 Harvest
Nome	–	–	–	–	–	–
Golovnin Bay	20,075	5,974 *	29,715	859	2,765 *	1,049
Elim	23,531	7,230 *	21,365	8,336	7,564 *	2,760
Norton Bay	7,558	2,788 *	7,871	4,836	1,307 *	808
Shaktoolik	25,388	13,373	16,656	15,368	25,367	7,736
Unalakleet	34,003	17,478	25,255	29,518	71,406	27,239
District Total	110,555	41,892	89,522	58,917	105,267	37,382

\* Note: Golovnin Bay, Elim, and Norton Bay recent 5-year averages unavailable; average is from 2008–2010 for Golovnin Bay and Norton Bay and 2007–2010 for Elim.

Golovnin Bay Subdistrict had its biggest chum salmon harvest (20,075 fish) since 1988 but was 32% below the long-term average harvest of 29,715 chum salmon. Coho salmon harvest (859 fish) was 69% and 18% below the 2008–2010 and long-term average harvests, respectively.

The 23,531 chum salmon harvested in Elim Subdistrict was the best since 1985 and 225% and 10% above the 2007–2010 and long-term average harvests of 7,230 and 21,365 fish, respectively. Coho salmon harvest in Subdistrict 3 ended up being the third highest on record and 10% above the 2007–2010 average harvest (7,654 fish) and 202% above the long-term average harvest of 2,760 coho salmon.

Despite a three week delay in the fishery, Norton Bay Subdistrict also had its highest chum salmon harvest (7,558 fish) since 1985, which was 171% above the 2008–2010 average harvest of 2,788 chum salmon and 96% of the long-term average harvest of 7,871 chum salmon. Coho salmon harvest (4,836 fish) in Norton Bay Subdistrict was nearly double the previous record harvest of 2,547 coho salmon caught in 1979.

Shaktoolik and Unalakleet Subdistricts had their 13<sup>th</sup> highest harvests of chum salmon in 2011, with 25,388 and 34,003 fish harvested, respectively. The 2011 chum salmon harvest in Shaktoolik was 90% and 52% above the recent 5-year and long-term average harvests, respectively. Unalakleet Subdistrict harvest of chum salmon was 95% and 35% above the recent 5-year and long-term average harvests. Coho salmon harvest ranked 7<sup>th</sup> best in Shaktoolik and 19<sup>th</sup> best in Unalakleet. Harvest of coho salmon was well below the recent 5-year average harvest in both Shaktoolik (39% below) and Unalakleet (59% below). However, the 2011 Shaktoolik Subdistrict and Unalakleet Subdistrict coho salmon harvests were 99% and 8% above their respective long-term average harvests.

Norton Sound District harvests of chum salmon could have been substantially higher in 2011, particularly in Subdistricts 3–6. Shortages of tendering vessels early in the fishery precluded going to a schedule of 48-hour periods in Subdistrict 3 and prevented commercial fishing altogether in Subdistrict 4 until mid-July. In Subdistricts 5 and 6, decreased commercial

opportunity arising from Chinook salmon conservation measures resulted in a delayed chum salmon fishery for the fifth consecutive season. These factors contributed to foregone harvest surpluses and escapements well above the escapement needs of most chum salmon stocks.

### **SUBSISTENCE FISHERY SUMMARY**

Subsistence harvests are monitored using a combination of subsistence permits and standardized household surveys conducted post season. Subsistence permits are required for the Elim, Golovnin Bay, and Nome Subdistricts, as well as for Pilgrim River and the Port Clarence District. In these areas, harvests are recorded on catch calendars contained within the permit and submitted at the end of the season. In Koyuk (Norton Bay), Shaktoolik, and Unalakleet, the Department conducts household surveys post season to ascertain total harvest by species, gear type, and location. The majority of subsistence fisheries in Norton Sound-Port Clarence Area are not managed intensively. Exceptions include the Subdistricts 5 and 6 Chinook salmon fishery and chum and coho salmon fisheries in the Nome Subdistrict (Subdistrict 1), which are managed similar to commercial fisheries with weekly fishing schedules for freshwater areas and marine waters. Additionally, salmon harvests in the Nome Subdistrict and on the Pilgrim River draining into Port Clarence are also managed using bag limits on subsistence salmon permits.

In Nome Subdistrict, the 2011 chum salmon run was above average and easily provided for escapement needs and subsistence harvests above the ANS (Amounts Necessary for Subsistence) range of 3,430–5,716 chum salmon. Thus, there was no need for a Tier II fishery in 2011 and there has not been a Tier II fishery since 2005. However, the Nome Subdistrict coho salmon run was below average in 2011 and action needed to be taken late in the season to ensure escapement needs were met. By the first week of July, assessments of chum salmon abundance were tracking with the forecast and good numbers of chum salmon were observed in most Nome Subdistrict drainages. On July 8, the upper end of the Eldorado River chum salmon escapement goal (6,000–9,200 chum salmon) was projected to be reached and all subsistence catch limits in freshwater areas east of Cape Nome were waived with the exception of the Solomon River.

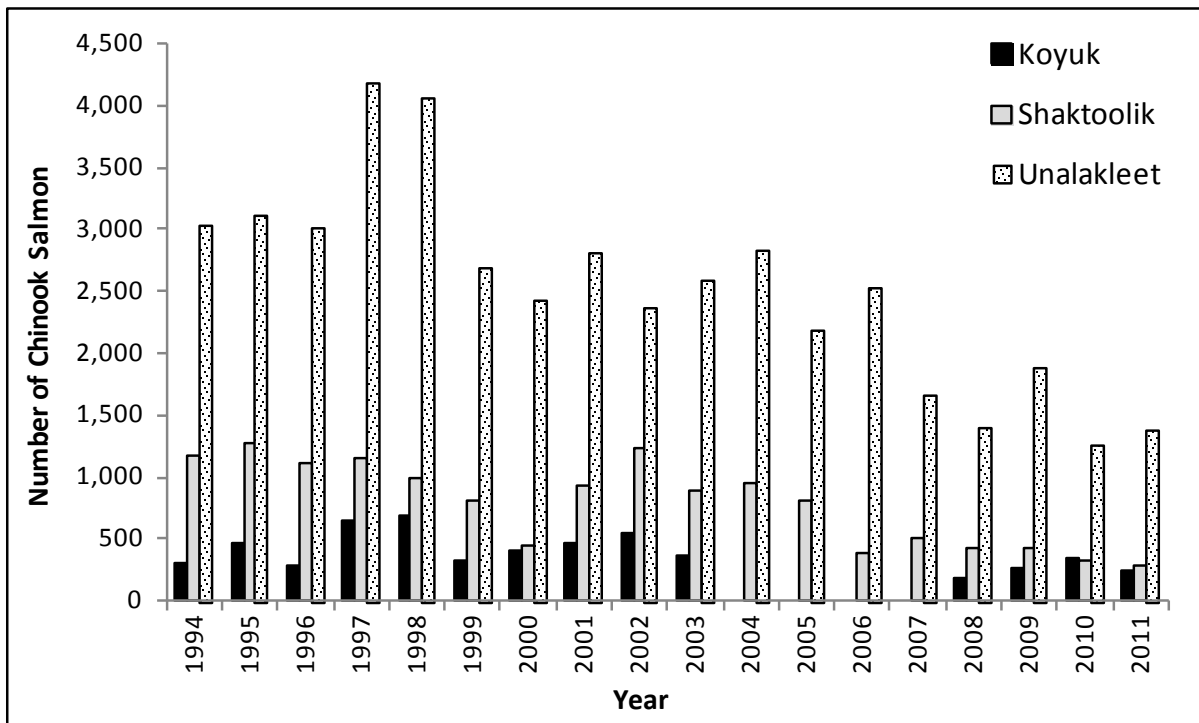
Throughout much of July, however, high surf conditions limited opportunity in the nearshore marine waters and there were several reports that rainy weather resulted in spoilage of subsistence salmon catches on many of the fish racks. To mitigate the reduced opportunity and unusable harvests, the Department extended subsistence periods in the marine waters for the second half of July. In addition, beach seining was permitted during the freshwater gillnet periods beginning in mid-June to allow users to more efficiently harvest chum salmon in freshwater areas where fishing conditions were less perilous. By July 25, all catch limits for chum salmon in the Nome Subdistrict were also waived except for the Nome, Penny, and Cripple Rivers and the department switched to coho salmon management.

In mid-August, reported catch rates of coho salmon were weak and similar to those conveyed in 2009. By late August, it was apparent that escapements of coho salmon were tracking with weak catches as there were only a handful of years with lower weir counts than the 2011 weir counts. Consequently, the coho salmon subsistence fishery was closed early by emergency order on August 27 to ensure that escapement needs would be achieved. Early closures to the coho salmon fishery have only occurred twice since 2003.

In Subdistricts 5 and 6, the 2011 Chinook salmon run was forecasted to be poor based on poor parent-year escapements from the 2005–2006 brood years and the weak run observed in 2010. As in previous years, there were freshwater and marine subsistence fishing schedules to provide

windows of escapement for migrating Chinook salmon. Additionally, mesh size restrictions were implemented for the Unalakleet River in late June to protect migrating Chinook salmon at the historical peak of the run. However, these measures were not successful at conserving enough Chinook salmon to reach the North River escapement goal. As a result, an early closure to the Subdistricts 5 and 6 Chinook salmon sport and subsistence fisheries was issued on July 9; early closures to both fisheries have occurred for six consecutive years.

In Port Clarence District, subsistence fishing remained open with catch limits in the Pilgrim and Kuzitrin River drainages in 2011. Residents of Brevig Mission and Teller typically fish in the marine waters and the fishery is directed on multiple stocks as opposed to the Pilgrim River fishery which is focused primarily on sockeye salmon. As in 2010, Pilgrim River subsistence bag limits were again set at 25 sockeye salmon in 2011 in expectation of another below average run to Salmon Lake; subsistence users were also limited to 3 Chinook and coho salmon each for the season. In late June, there were reports from Port Clarence residents that sockeye salmon subsistence catches were better than the previous two seasons. However, by July 6, only 2 sockeye salmon had been enumerated at the Pilgrim River weir and the Pilgrim River subsistence fishery was closed to net fishing on July 8 to conserve sockeye salmon for escapement needs. Sockeye salmon escapements at the Pilgrim River weir improved in the weeks following the closure. By August 1, the weir count was over 7,500 sockeye salmon and the Salmon Lake/Grand Central River aerial survey goal was projected to be reached. Pilgrim River was reopened to subsistence net fishing on August 1 to allow some late season harvest of sockeye salmon and chum salmon.



Note: historical average subsistence harvests are 409, 812, and 2,593 Chinook salmon for Koyuk, Shaktoolik and Unalakleet, respectively.

Figure 2.—Annual Chinook salmon subsistence harvests for the southern Norton Sound communities of Koyuk, Shaktoolik, and Unalakleet, 1994–2011, Norton Sound District.

Verbal reports and preliminary harvest data indicated that subsistence fishing for Chinook salmon was poor throughout Norton Sound in 2011. Permit catch data from 2011 are incomplete for northern Norton Sound communities at this time, but household survey data from the southern Norton Sound communities of Koyuk, Shaktoolik and Unalakleet are complete. Figure 2 illustrates 2011 Chinook salmon harvests from Koyuk, Shaktoolik and Unalakleet compared to historical levels of harvest since survey methodologies were standardized in 1994. In Koyuk, Chinook salmon harvest (237 fish) was the second lowest on record and was 42% below the long term (1994–2003, 2008–2010) average harvest of 409 Chinook salmon. A record low Chinook salmon subsistence harvest of 277 fish was reported from Shaktoolik and the second worst subsistence harvest occurred in Unalakleet with 1,378 Chinook salmon reported harvested. Subsistence Chinook salmon harvests in Subdistricts 5 and 6 were 66% and 47% below the long term (1994–2010) average harvests of 812 and 2,593 Chinook salmon, respectively. Comparing harvests from the three communities, Figure 2 shows a pronounced trend of decreasing Chinook salmon harvests since the early 2000s, even in Koyuk where restrictions and closures have not been implemented.

Chum salmon surpluses in 2011 were large enough to easily provide for customary levels of subsistence use and buffer greatly reduced Chinook salmon harvests in all areas of Norton Sound. Additionally, pink salmon runs to southern Norton Sound drainages were above average for odd-numbered years. However, the wettest July on record and associated poor drying conditions limited opportunity and spoiled subsistence harvests of chum and pink salmon from several households in spite of the harvestable chum and pink salmon surpluses. Pink salmon runs to northern Norton Sound were similar to long term odd-numbered year averages, but pink salmon were difficult to harvest in large numbers. Although average to below average, coho salmon runs were sufficient to provide for subsistence uses in Subdistricts 3–6. However, subsistence needs of coho salmon in Subdistricts 1 and 2 were likely not met due to below average runs and early closures (Nome Subdistrict).

## ESCAPEMENT

Table 2.—Chinook salmon counting tower (TCE) and weir (WCE) estimates, and unexpanded aerial surveys (UAS) from Norton Sound drainages compared to escapement goals, 2011, Norton Sound.

River System	2011 Escapement	TCE, UAS, WCE	Escapement Goal Range
Boston Creek/Fish River	No Survey	UAS	UAS SEG Threshold ( $\geq 100$ )
Kwiniuk River	57	TCE	TCE SEG Range (300-550)
Shaktoolik River	106	UAS	UAS SEG Range (400-800)
North River	864	TCE	TCE SEG Range (1,200-2,600)
Unalakleet River/Old Woman River	303	* UAS	UAS SEG Range (550-1,100)

*Note:* asterisk indicates survey was late or flown under adverse survey conditions.

### Chinook Salmon

Table 2 summarizes escapement observations for the major Chinook salmon producing drainages in Norton Sound that have escapement goals. Chinook salmon escapement to the Elim



Subdistrict was weak in 2011 as there was a record low 57 Chinook counted at the Kwiniuk River tower and 141 Chinook observed at the neighboring Tubutulik River. The Kwiniuk River tower count was 81% below the lower end of the SEG range (300–550). To the east in Norton Bay Subdistrict, Chinook salmon escapements were better with an estimated 1,468 Chinook salmon enumerated at the new Inglutalik River tower project operated by Norton Sound Economic Development Corporation (NSEDC). The 2011 tower count estimate was consistent with the aerial survey count of 418 Chinook salmon observed on July 25. In Shaktoolik Subdistrict, a 2011 aerial survey of 106 Chinook salmon was 73% below the lower end of the SEG range of 400–800 Chinook. In Unalakleet Subdistrict, the 2011 North River tower count (864) was 28% below the lower bound of the SEG range (1,200–2,600). However, tower counts in 2011 conflict with aerial survey and Unalakleet River weir escapement data. The July 28 aerial survey count of 433 Chinook salmon was recorded under extremely windy conditions, yet it represented over 50% of the tower count estimate which is the highest aerial survey to tower count ratio on record for surveys conducted during the peak spawning stage.

Additionally, the Unalakleet River weir count of 1,111 was higher than the 1,021 observed in 2010; the North River tower count was 1,256 Chinook salmon in 2010. If proportional abundance between the North River (55%) and Unalakleet River mainstem (45%) are similar to 2010, the weir count would suggest that the North River escapement goal was actually achieved. High water persisted for much of the month of July and it is quite possible that a significant portion of the overall Chinook salmon passage was unmonitored in mid-July due to a combination of poor viewing conditions and/or species identification problems. Unfortunately, a comparison of aerial survey data from the upper mainstem and Old Woman Rivers cannot be made to possibly evaluate proportional abundance between the North River and mainstem. This is largely the result of tannic water in the upper mainstem index area which contributed to poor viewing conditions. Thus, the Old Woman River and Unalakleet River combined aerial survey of 303 Chinook salmon is also considered incomplete.

Table 3.—Chum salmon counting tower (TCE) and weir count (WCE) estimates and unexpanded aerial surveys (UAS) from Norton Sound drainages compared to escapement goals, Norton Sound.

River System	2011 Escapement	TCE, UAS, WCE	Escapement Goal Range
Nome River	3,582	WCE	SEG Range (2,900-4,300)
Eldorado River	16,227	WCE	SEG Range (6,000-9,200)
Snake River	4,343	WCE	SEG Range (1,600-2,500)
Nome Subdistrict	66,122		BEG Range (23,000-35,000)
Niukluk River	23,607	TCE	SEG Threshold (23,000)
Kwiniuk River	31,604	TCE	OEG Range (11,500-23,000)
Tubutulik River	14,127	EAS	OEG Range (9,200-18,400)
Unalakleet River/Old Woman River	7,021	UAS	SEG Range (2,400-8,400)

*Note:* Nome Subdistrict biological escapement goal (BEG) range is an aggregate goal comprised of Eldorado, Nome, and Snake River weir count estimates and expanded aerial survey estimates from the Solomon, Bonanza, Flambeau, and Sinuk Rivers.

## Chum Salmon

Table 3 summarizes chum salmon escapement observations from 2011 for river systems that have escapement goals in the Norton Sound Port Clarence Area. In the Nome Subdistrict, the Eldorado, Nome, and Snake River SEGs were easily exceeded. Additionally, the aggregate escapement from the 7 major index rivers was 66,122 and was 89% above the upper end of the subdistrict wide BEG range of 23,000–35,000 chum salmon. The Niukluk River chum salmon tower-based SEG threshold ( $\geq 23,000$  fish) was narrowly exceeded, but high water resulted in the flooding of a previously obstructed braided channel below the tower site. Thus, it is thought that a proportion of the chum salmon escapement was allowed to migrate upstream without being enumerated at the tower site in 2011. Chum salmon escapement needs were also easily met in the Elim Subdistrict based on the Kwiniuk and Tubutulik Rivers. Chum salmon escapement at the Kwiniuk River tower was 37% above the upper of the optimal escapement goal (OEG) range (11,500–23,000 fish) and the Tubutulik River July 25 aerial survey count of 14,127 chum salmon exceeded the midpoint of the OEG range of 9,200–18,400 chum salmon. In the Unalakleet Subdistrict, escapement of chum salmon may have been one of the largest on record due to strong contributions by both the 2006 and 2007 brood years. The 2011 Old Woman and Unalakleet Rivers aggregate aerial survey index of 7,021 is considered to be very conservative due to poor viewing conditions but was 50% above the aerial survey SEG (2,400–4,800 chum salmon).

## Coho Salmon

Table 4.–Coho salmon counting tower estimates (TCE) and unexpanded aerial surveys (UAS) from Norton Sound drainages compared to escapement goals, Norton Sound.

River System	2011 Escapement	TCE, UAS, WCE	Escapement Goal Range
Niukluk River	2,405	TCE	SEG Range (2,400-7,200)
Kwiniuk River	1,331	UAS	SEG Range (650-1,300)
North River	898	UAS	SEG Range (550-1,100)

All coho salmon escapement goals for the Norton Sound-Port Clarence area were achieved in 2011. The lower end of the coho salmon Niukluk River tower-based SEG range (2,400–7,200) was narrowly exceeded. However, like chum salmon, high water levels most likely led to some unmonitored coho salmon passage via a downstream channel that is generally impassible in most years. At Kwiniuk River, the 2011 aerial survey index of 1,331 coho salmon represented 40% of the tower count (3,288 fish) and exceeded the upper end of the aerial survey SEG range of 650–1,300 coho salmon. Coho salmon escapement needs were also met in the Unalakleet River drainage in 2011 as indexed by the North River tributary. The aerial survey index of 898 coho salmon was 24% of the counting tower estimate (3,624 fish) and was 63% above the lower end of the aerial survey SEG range of 550–1,100 coho salmon.

## Sockeye Salmon

Sockeye salmon escapement to Salmon Lake in 2011 as indexed by the Pilgrim River weir was 8,449 fish and the Salmon Lake and Grand Central River peak aerial survey count of 5,144 sockeyes was 29% above the lower end of aerial survey SEG range (4,000–8,000 fish). Prior to 2011, the sockeye salmon escapement goal to Salmon Lake had not been achieved since 2008. Inclement weather and limited helicopter availability prevented a peak aerial survey of Glacial

Lake to evaluate whether the escapement goal (800–1,600 fish) had been achieved. The Glacial Lake weir count was 1,697 sockeye salmon.

### **Pink Salmon**

Table 5 summarizes 2011 pink salmon escapement estimates compared to established SEG threshold levels. The Nome River weir count of 14,403 pink salmon was 357% above the SEG threshold of 3,150 pinks. At Niukluk River tower, the estimate of pink salmon escapement was 15,425 fish, which was 47% above the SEG threshold of 10,500 pink salmon. In Elim Subdistrict, pink salmon escapement needs were also achieved as indexed by the Kwiniuk River tower count (30,023 pinks) which was 253% above the SEG threshold (8,500 fish). In the Unalakleet River drainage, the North River tower-based SEG threshold (25,000) was exceeded by 500% with a 2011 tower count of 150,807 pink salmon.

Table 5.—Pink salmon counting tower (TCE) and weir (WCE) estimates from Norton Sound drainages compared to sustainable escapement goal threshold levels, Norton Sound.

River System	2011 Escapement	TCE, WCE	SEG Threshold
Nome River	14,403	WCE	3,150
Niukluk River	15,425	TCE	10,500
Kwiniuk River	30,023	TCE	8,500
North River	150,807	TCE	25,000