

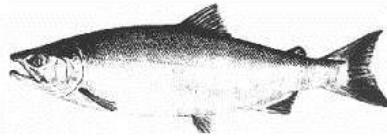
ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

NEWS RELEASE



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2012 NORTON SOUND SALMON SEASON SUMMARY

The 2012 Norton Sound salmon season was variable, with harvest levels varying by species and/or commercial subdistrict. For example, 2012 was the first year since 1998 in which there was significant market interest in pink salmon and commercial harvests were subsequently the largest since 1998. Commercial chum salmon harvest was also robust with the 8th highest harvest since 1986. However, coho salmon harvest was below average in all subdistricts, except for the Norton Bay Subdistrict (Subdistrict 4) which had its second highest coho salmon harvest on record. The reduced coho salmon harvest was largely the result of persistent severe weather and high surf conditions that kept fishermen on the beach throughout the month of August. As forecasted, there was no commercial fishing directed at Chinook salmon in Norton Sound for the 7th consecutive season and no directed sockeye salmon fishery in the Port Clarence District for the 4th year in a row. In fact, the Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) Chinook salmon run turned out to be the worst on record.

Good dock prices for salmon resulted in an exvessel value of \$758,908, which represents the 6th consecutive season in which salmon fishery value has exceeded \$500,000 in Norton Sound.

Though many escapement objectives were met, escapement goals were not achieved for the 2nd consecutive season on the Unalakleet River for Chinook salmon despite an early closure to Chinook salmon subsistence and sport fisheries. A closure to the Pilgrim River sockeye salmon subsistence fishery was also necessary for the 4th consecutive season. However, this measure was effective at ensuring the escapement goal was achieved for the second consecutive season.

Extensive June sea ice, record rainfall, and resultant flooding in August made it nearly impossible to accurately assess early run strength of chum and coho salmon runs in 2012. Large pans of first year thin ice and medium to thick shorefast ice melted in place in southern Norton Sound in 2012 keeping nearshore water temperatures low. As late as mid-May, shorefast ice thickness reports ranged from 3–5 feet from St. Michael Bay to Unalakleet and several miles of shorefast ice persisted from Stuart Island east to just south of Unalakleet into late June. Many Norton Sound residents commented that the extent, thickness, and duration of sea ice in Norton Sound was exceptional; this most likely delayed the migration timing of most Chinook, pink and

chum salmon stocks in Norton Sound, which showed late run timing at escapement projects in 2012. Early projections of salmon run strength used to set subsistence and commercial fishing schedules were difficult to make in 2012 as a result of exceptionally late run timing. Limited rainfall occurred in June and during most of July, which made for good drying conditions during the peak of the chum and pink salmon runs. Very low water levels were reported from most Norton Sound river drainages until late July when the rainy weather arrived. During the month of August, record-setting rainfall and large flood events rendered most Norton Sound salmon assessment projects inoperable for the majority of the coho salmon run. Once again, it was difficult for managers to make reliable projections of escapement at most projects as the bulk of the coho salmon run was not monitored at escapement projects. Few acceptable aerial spawning ground surveys were flown in 2012 due to murky water and high water levels.

FISHERIES MANAGEMENT NARRATIVE

The commercial harvest outlook for the 2012 season was for a harvest range of 70,000–100,000 chum salmon, 300,000–600,000 pink salmon, and 60,000–90,000 coho salmon. Salmon outlooks and harvest projections for the 2012 salmon season were based on qualitative assessments of parent-year escapements and age composition, subjective determinations of freshwater overwintering and ocean survival conditions, and in the case of the commercial fishery, anticipated market interest and processing capacity.

As in previous years, the bulk of commercial salmon harvests were expected to come from southern Norton Sound (Subdistricts 4–6). The relatively large southern Norton Sound watersheds (e.g., Inglutalik, Ungalik, Shaktoolik and Unalakleet Rivers) generally support larger runs of salmon. This fact, coupled with stable, healthy salmon runs (except Chinook salmon) and more liberal fisheries management plans, allows for more commercial harvest opportunity in the southern Norton Sound subdistricts. In contrast, salmon runs, particularly chum salmon runs, have been more unstable in the smaller drainages to the north in Subdistricts 2 (Golovin) and 3 (Elim) since the early 2000s. Subdistricts 2 and 3 chum salmon runs have either been very strong and provided large surpluses available for commercial use (e.g., 2006, 2007, 2010, 2011), or very weak with runs often below levels needed to achieve escapement goals such as in 2004, 2005, 2008, and 2009. The extent and frequency of commercial chum and pink salmon periods in Subdistricts 2 and 3 is also largely predicated on the Subdistricts 2 and 3 management plan which directs the department to ensure that chum salmon escapement goals and subsistence needs are achieved. For the first time in many years, there was also buyer interest in Nome Subdistrict salmon. Commercial fishing for chum salmon is closed by regulation in Nome Subdistrict (Subdistrict 1). However, brief index commercial fishing periods were expected for pink salmon in late July or early August and coho salmon later in August depending on run strength. Commercial periods for both pink and coho salmon in the Nome Subdistrict were not expected to exceed 24 hours in length.

2012 CHINOOK SALMON RUN

2012 Chinook Salmon Forecast and Fishery

No directed Chinook salmon commercial fisheries were expected to occur in southern Norton Sound for the 8th consecutive season. Additionally, restrictions and early closures to Chinook salmon subsistence fisheries were possible for the Shaktoolik and Unalakleet Subdistricts. A high proportion of age-4 Chinook salmon observed across sample sources in 2011 suggesting

that the 2007 brood year was showing signs of good recruitment and survival, so there was some optimism that early closures to Chinook salmon subsistence fisheries could be avoided in 2012.

Marine Chinook salmon subsistence catches did not peak until between July 7–9 as indexed by marine test fishery catches and interviews with subsistence fishermen. However, it was evident by the first week of July that the 2012 Chinook salmon run was noticeably weak. Through July 10, only 234 Chinook salmon had been enumerated at the North River tower. This count only exceeded the record low count of 903 Chinook salmon in 2008, and the 2010 count (1,256 Chinook), the latest run on record when the escapement goal was narrowly achieved. Additionally, only 57 Chinook salmon were counted at the Unalakleet River weir by July 10 compared to 277 in 2011 and 324 in 2010. Subsistence and sport fisheries for Chinook salmon were closed by emergency order on July 11 because the Subdistricts 5 and 6 salmon management plan directs the department to close Chinook salmon fishing if escapement is projected to fall short of the North River escapement goal.

2012 Subdistricts 5 and 6 Chinook Salmon Escapement

Escapement of Chinook salmon at the North River tower for the 2012 season was 996 Chinook salmon, the third lowest complete count on record. North River Chinook salmon escapement has fallen short of the SEG range in 7 of 14 seasons since the goal was established (Figure 1). Final escapement at the Unalakleet River weir was 766 Chinook salmon, which was well below the 1,021 and 1,113 Chinook salmon enumerated during the 2010 and 2011 seasons, respectively. As forecasted, the majority of Chinook salmon that returned in 2012 were age-5 fish from the 2007 brood year. However, the diminished productivity from this brood year was unexpected, and evidently, a decline even from the poor production observed in the 2005–2006 brood years.

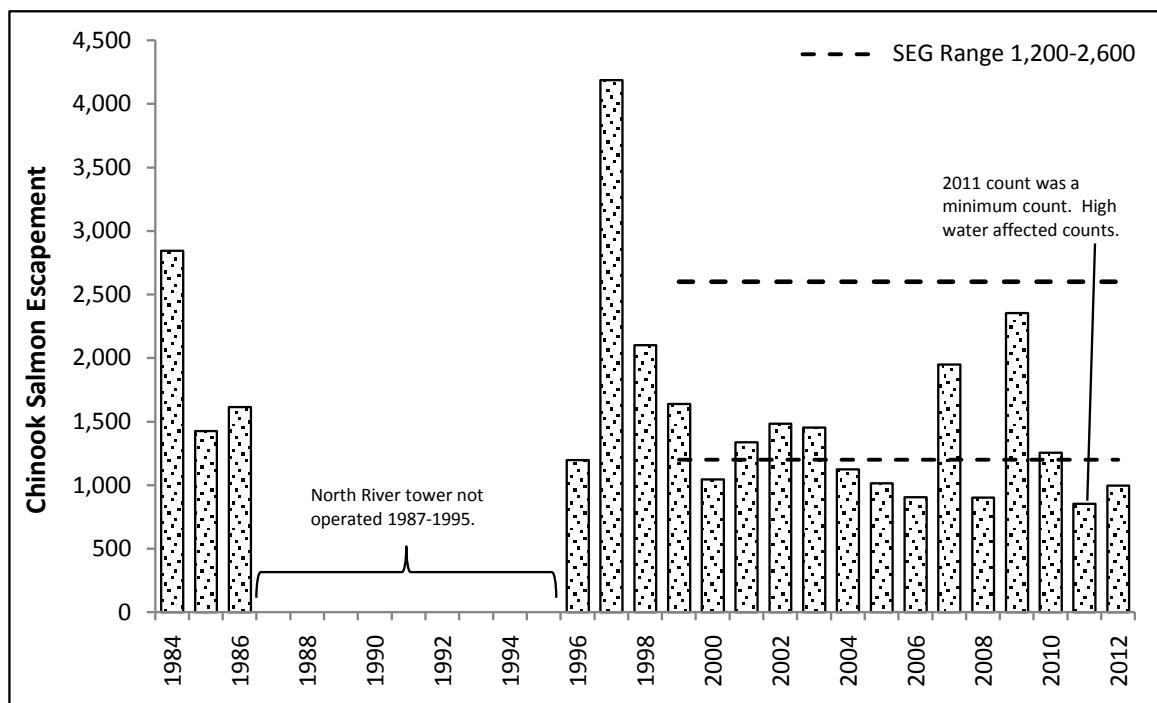


Figure 1.—Annual Chinook salmon escapement compared to the sustainable escapement goal range (1,200–2,600 Chinook salmon), 1984–1986 and 1996–2012, North River tower, Unalakleet River drainage, Norton Sound.

Chinook salmon escapement to Subdistrict 5 has not been monitored intensively due to a lack of ground-based escapement projects. However, the Shaktoolik River sonar project operated by Norton Sound Economic Development corporation (NSEDC) entered a new phase this season and provided weekly apportioned sonar passage estimates by species to ADF&G. Shaktoolik River escapement of Chinook salmon from apportioned sonar counts was 1,082 fish in 2012.

Other Norton Sound Chinook Salmon Escapements

Chinook salmon passage at the Kwiniuk River tower in 2012 was 36 Chinook salmon, which is even below the previous record low count of 57 Chinook salmon in 2011. However, local residents expressed concern to the department that escapements were affected by a large sand/gravel berm that entirely obstructed the slough connecting Kwiniuk Inlet to Moses Point Inlet. This berm gradually encroached on the channel beginning with the 2005 fall storm. Apparently, the huge November storm in 2011 completely blocked off this channel, although it was not actually observed by ADF&G until a mid-August coho salmon aerial survey in 2012. In late August, NSEDC biologists documented that the berm had been washed away from the persistent rainy weather and flooding of the Kwiniuk River. To the east in Norton Bay, an estimated 1,146 Chinook salmon were enumerated at the Inglutalik River tower, down from the 1,468 Chinook salmon counted during the 2011 season.

2012 CHUM SALMON RUN

2012 Chum Salmon Fishery Forecast

Chum salmon harvest was expected to come down from 2010–2011 harvest levels because most of the chum salmon harvest was expected to be concentrated in Norton Bay, Shaktoolik and Unalakleet. Chum salmon runs to southern Norton Sound during the 2010 and 2011 seasons both had strong contributions from the 2007 brood year, which contrasted with the 2006 brood year dominated runs in northern Norton Sound Subdistricts 2 (Golovnin Bay) and 3 (Elim) during those years. Moreover, escapements of chum salmon for the 2008 brood year were average to above average in southern Norton Sound whereas they were well below average in the northern Norton Sound drainages. Taken collectively, this information suggested it was likely for there to be a below average run of chum salmon to Subdistricts 2 and 3, but another above average run of chum salmon to the southern Norton Sound (Subdistricts 4–6). In Nome Subdistrict, 2012 chum salmon run abundance was projected to meet that necessary to achieve the subdistrict-wide biological escapement goal (BEG) range of 23,000–35,000 chum salmon and amounts necessary for subsistence (ANS) range of 3,430–5,716 chum salmon. As such, a Tier II fishery was not implemented in 2012. There has not been a Tier II fishery implemented since 2005 and Tier II subsistence fishing restrictions were rescinded early during the 2004 and 2005 seasons.

Chum Salmon Run Performance Trends

In recent years, chum salmon runs to southern Norton Sound Subdistricts 5 and 6 have shown the most improvement. Chum salmon runs were below average in the early 2000s, but increased gradually to average levels in the mid 2000s, and to record levels in 2010 and 2011. In fact, the 2006–2011 runs to Subdistricts 4–6 had the potential to easily sustain much larger commercial harvests. Additionally, there have also been major improvements in dock prices for chum salmon since 2009. However, despite these factors, the paramount issue controlling chum

salmon harvests in Subdistricts 5 and 6 has been the perennially weak runs of Chinook salmon since 2000. The most significant reduction in commercial harvest opportunity for chum salmon has been from June 21 through mid-July. During this time period, ADF&G prosecutes the commercial chum salmon fishery conservatively using a combination of brief index periods and area closures to minimize incidental harvests of Chinook salmon as they move through Subdistricts 5 and 6.

Subdistrict 4 commercial salmon harvests have been mostly limited by fishermen participation and shortages in tendering capacity to support this re-emerging fishery. Chum salmon harvests were low from 2008–2009, mostly due to almost no participation in the fishery. From 2010–2011, chum salmon harvests were below long-term average harvest levels, but the fishery did not commence until after the midpoint of the chum salmon run because of limited tendering capacity. Participation has gradually increased since 2008, and as tendering capacity improves, Norton Bay is expected to become an increasingly important contributor to Norton Sound commercial harvests.

Chum salmon runs to the northern Norton Sound Subdistricts 2 and 3 have been more volatile than runs in Subdistricts 4–6 during the 2000s. Since 2001, chum salmon runs have either been sufficient to provide large surpluses of chum salmon far above escapement and subsistence needs (e.g., 2002, 2006, 2007, 2010 and 2011), or have been so weak that escapement goals were not achieved and subsistence needs not met (e.g., 2004, 2008, and 2009). During years of high chum salmon abundance, northern Norton Sound Subdistricts 2 and 3 have accounted for as much as 40% of the Norton Sound commercial chum salmon harvest. Norton Sound Subdistricts 2 and 3 chum salmon stocks were designated as stocks of yield concern by the Alaska Board of Fisheries (board) in 2001. The Subdistricts 2 and 3 management plan directs the department to project that chum salmon escapement goals will be reached and ensure that harvestable surpluses will be in excess of subsistence needs before directed chum or pink salmon commercial fishing is allowed. Further, in times of low chum salmon abundance, directed pink salmon commercial fishing may not occur before July 14 and July 7 in Subdistricts 2 and 3, respectively. By these dates, historical data indicate that the bulk of the chum salmon run is in river and commercial pink salmon fishing would be expected to have little impact on chum salmon escapements or subsistence needs. Subdistricts 2 and 3 chum salmon has retained its stock of yield concern designation since 2001 in large part due to the above-described instability in annual run abundance. However, it should be noted that improved market interest in chum salmon and strong chum salmon runs in 2010 and 2011 led to the largest commercial harvests in over 25 years for Subdistricts 2 and 3.

2012 Chum Salmon Fisheries

The cool spring led to late runs of chum salmon in southern Norton Sound, which made ascertaining early run strength difficult. However, it was apparent by early July that southern Norton Sound chum salmon runs were exhibiting good run strength. Good subsistence catches of chum salmon were reported in Subdistricts 4–6 and chum salmon escapements were incrementally building by the first week of July as indexed by Inglutalik River tower and Unalakleet River weir counts. In 2012, directed chum salmon periods were limited to 24 hours in both Subdistricts 5 and 6 until July 14 due to Chinook salmon conservation concerns. Additionally, the northern half of Subdistrict 6 was not opened to commercial chum salmon fishing until July 14 in order to minimize the incidental harvest of Chinook salmon as they migrated through the Unalakleet Subdistrict. On July 18, Subdistricts 5 and 6 were placed on a schedule of two 48-hour periods per week until July 31. The July 18 opening of 48 hours was eventually extended to 72 hours because

of high surf conditions severely limiting fishing effort. In Norton Bay Subdistrict, there were no directed chum salmon openings until July 19 because Norton Sound Seafood Products (NSSP) directed fishermen to target pink salmon because of the increased market interest in pink salmon. From July 19 to July 31, there were two 36-hour and two 48-hour periods directed at chum salmon in Norton Bay Subdistrict before the department switched to coho salmon management.

Early indicators of chum salmon abundance to northern Norton Sound were limited to scant subsistence catch reports of fair catches in Golovnin Bay. However, early projections of chum salmon escapement in Subdistrict 3 as indexed by the Kwiniuk River tower indicated a very weak run. Likewise, escapement of chum salmon in Subdistrict 2 based on mid-July Niukluk River tower counts was well below average with projected escapement estimates near or just below the SEG threshold of 23,000 chum salmon. Directed chum salmon fishing was limited to one 36-hour period in Golovin Subdistrict on July 26 after it was projected that the Niukluk River SEG threshold would be narrowly exceeded.

Table 1 summarizes Norton Sound chum salmon harvests by subdistrict for 2012 and historical average harvests. Commercial harvest of chum salmon in Norton Sound was 62,772 fish, which was only 3% below the recent 5-year average harvest of 64,691 chum salmon, but 38% below the long-term average harvest of 101,005 chum salmon. Harvests fell below the 100,000 plus fish seasons of 2010 and 2011 in large part due to a lack of directed chum salmon fishing in Subdistricts 2 and 3. Additionally, harvests may have exceeded the forecasted harvest range of 70,000–100,000 chum salmon had there been ample tendering capacity to support concurrent chum and pink salmon fisheries in Norton Bay Subdistrict. Nevertheless, chum salmon harvest in Subdistrict 4 (8,417 fish) ranked ninth best in 29 years of commercial fishing and was 111% and 7% above the recent 5-year and long-term average harvests, respectively. Subdistricts 5 (20,141 fish) and 6 (28,161 fish) chum salmon harvests were also above their respective historical average harvests and were in the top 20 harvests in over 50 years of fishing. As expected, southern Norton Sound Subdistricts 4–6 accounted for a majority (91%) of the chum salmon harvest in 2012. The 6,053 chum salmon harvested in the northern Norton Sound Subdistricts 2–3 were incidental in directed pink and coho salmon fisheries, except for 146 chum salmon taken during the lone Golovin Subdistrict chum salmon period on July 26.

Table 1.—The 2012 chum salmon harvest (numbers of fish) by subdistrict compared to the recent 5-year (2007–2011) and long-term (1961–2011) historical average harvests, Norton Sound District.

Norton Sound Subdistrict	2012 Chum Salmon Harvest	Recent 4- or 5-Year Average Harvest	Long-term Average Harvest
Subdistrict 2 (Golovnin Bay)	3,791	9,499	29,474
Subdistrict 3 (Elim)	2,262	10,490	21,418
Northern Norton Sound	6,053	19,989	50,892
Subdistrict 4 (Norton Bay)	8,417	3,981	7,860
Subdistrict 5 (Shaktoolik)	20,141	17,786	16,827
Subdistrict 6 (Unalakleet)	28,161	22,935	25,426
Southern Norton Sound	56,719	44,702	50,113
Norton Sound Total	62,772	64,691	101,005

Note: Recent 5-year average not available for Golovnin Bay and Norton Bay; recent 4-year average harvest was substituted.

Nome Subdistrict Chum Salmon

To the west in the Nome Subdistrict, excellent marine subsistence catches of chum salmon were reported in late June and early July but weir counts of chum salmon lagged at the Snake and Nome River weir projects. Aerial surveys were conducted in mid-July of the eastern Nome Subdistrict drainages (Flambeau, Eldorado, and Bonanza Rivers) and Sinuk River in the western Nome Subdistrict. Several thousand chum salmon were observed on these surveys in the lower reaches of these drainages. Additionally, by July 12, the Eldorado River weir-based chum salmon SEG range of 6,200–9,000 was projected to easily be reached. Further, based on this assessment data, management biologists were able to project that the subdistrict-wide BEG would be achieved. Consequently, chum salmon subsistence gillnet fishing proceeded on the standard freshwater and marine schedules for the remainder of the season. Several beach seining opportunities were also issued via emergency order to increase the efficiency of subsistence chum and pink salmon harvests during optimal drying weather periods.

2012 Chum Salmon Escapements

Chum salmon escapements were successfully estimated for 13 of the 15 major river index systems in Norton Sound in 2012, which are summarized in Table 2.

Table 2.—Chum salmon expanded aerial survey, apportioned sonar, counting tower, weir escapement estimates from Norton Sound index rivers compared to established escapement goals, Norton Sound, 2012.

Index System	2012 Escapement	Enumeration Method	Escapement Goal
Bonanza River	5,508	Expanded Aerial Survey	
Eldorado River	13,393	Weir	SEG (6,000-9,200)
Flambeau River	17,517	Expanded Aerial Survey	
Nome River	1,982	Weir	SEG (2,900-4,300)
Sinuk River	10,537	Expanded Aerial Survey	
Snake River	651	Weir	SEG (1,600-2,500)
Solomon River	1,377	Expanded Aerial Survey	
Nome Subdistrict	50,965	Combined weir and aerials	BEG (23,000-35,000)
Niukluk River	19,672	Tower	SEG (\geq 23,000)
Kwiniuk River	5,499	Tower	OEG (11,500-23,000)
Inglutalik River	32,095	Tower	
Shaktoolik River	43,865	Sonar	
North River	9,042	Tower	
Unalakleet River	69,525	Weir	

Chum salmon escapement goals in most chum salmon producing drainages of northern Norton Sound were not achieved in 2012. However, the 2012 Niukluk River escapement of 19,672 chum salmon should be considered a minimum count because the project was inoperable for 9 days due to multiple flood events. To the east in Subdistrict 3, the 2012 Kwiniuk River chum salmon escapement (5,499) was a record low for the tower project. However, the blockage to the channel connecting Moses Point to Kwiniuk Inlet could have prevented large numbers of Kwiniuk River chum salmon from reaching their natal spawning grounds. Unfortunately, the Tubutulik River could not be surveyed to assess relative abundance of chum salmon escapement in this drainage because of poor viewing conditions during the peak chum salmon spawning stage.

In contrast to Subdistricts 2–6, Nome Subdistrict salmon production comes from several relatively small coastal streams contributing to the overall run. These small, shallow drainages are undoubtedly more sensitive to variability in environmental conditions (e.g., fall floods, cold temperatures, low water levels, etc.). Furthermore, variability in chum salmon production tends to be higher in the smaller Nome Subdistrict rivers (e.g., Nome and Snake Rivers), whereas runs to the eastern Nome Subdistrict rivers tend to be relatively stable. This was once again the case in 2012 as eastern Nome Subdistrict drainages accounted for 74% of the overall Nome Subdistrict chum salmon escapement in 2012 (Table 2). Eldorado River chum salmon escapement (13,393) in 2012 exceeded the weir-based escapement goal for the 3rd consecutive season and the 9th time since the goal was established in 2001. The 2012 aggregate escapement of chum salmon into the Nome Subdistrict also was within the BEG range for the 3rd consecutive season and the 10th time in 12 years (Figure 2). In fact, escapement of chum salmon has exceeded the upper bound of the BEG in seven seasons (2001, 2005, 2006, 2007, 2010, 2011, 2012) (Figure 2). Chum salmon harvest surpluses would have been available for commercial purposes during these years, but commercial fishing for chum salmon has remained closed by regulation since 2001.

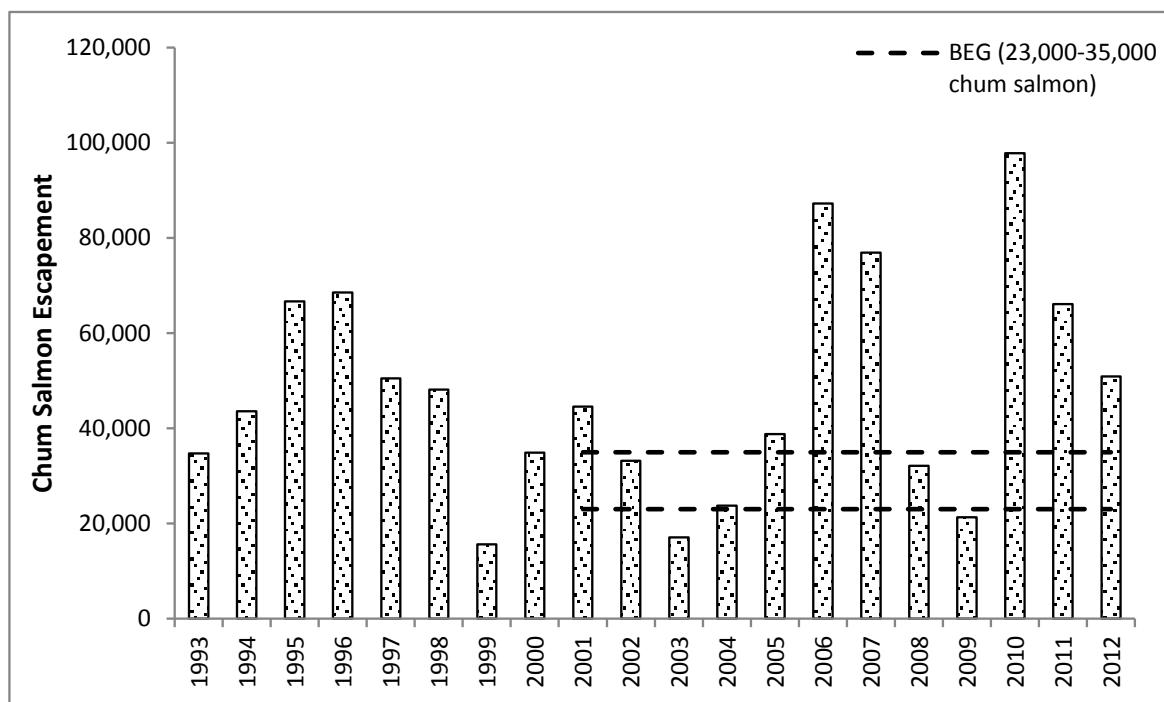


Figure 2.—Estimated Nome Subdistrict chum salmon escapement compared to the biological escapement goal range (23,000–35,000 chum salmon), 1993–2012, Norton Sound District.

As in 2010 and 2011, acceptable aerial surveys were not flown in 2012 to evaluate the Old Woman/upper Unalakleet River aerial survey SEG range (2,400–4,800 chum salmon) due to flood conditions and inclement weather. However, it is likely the goal would have been reached based on ground-based escapement counts of chum salmon in the Unalakleet River drainage; there were 69,525 chum salmon counted at Unalakleet River weir and the observed chum salmon passage at North River counting tower was 9,042 chum salmon. The 2012 weir count was down 36% from the 2011 count of 108,884 chum salmon but similar to the 70,811 chum salmon enumerated in 2010. Estimated 2012 Unalakleet River drainage chum salmon escapement based on weir counts, tower counts and historical radiotelemetry data was approximately 93,000 chum

salmon. In the Shaktoolik River, estimated escapement of chum salmon based on apportioned sonar counts was 43,865 fish. In Norton Bay, chum salmon escapement as indexed by the Inglutalik River tower was an estimated 32,095 chum salmon which was down 48% from the 61,443 chum salmon enumerated during the project's inaugural season in 2011.

2012 PINK SALMON RUN

2012 Pink Salmon Fishery Forecast

Pink salmon runs have historically been large enough to support commercial harvests in the hundreds of thousands, particularly in even-numbered years. However, significant market interest in pink salmon has not occurred since 2000. From 2001–2011, market interest in pink salmon was limited to very small fillet and roe markets, as well as a bait market to support Norton Sound halibut and crab fisheries. The improved harvest outlook for pink salmon in 2012 was based on an even-numbered year pink run, improved market interest, and planned increases in processing and tendering capacity from the major buyer, NSSP.

Pink Salmon Run Performance Trends

Since the mid-1980s, pink salmon runs have exhibited a characteristic even- and odd-year cycle with even-numbered year abundance of pink salmon typically being several magnitudes larger than odd-year abundances. Both odd- and even-year abundance of pink salmon peaked in the mid 2000s with record runs of pink salmon in Norton Sound from 2004–2006, including an anomalously huge odd-numbered year run in 2005 (Figure 3). Pink salmon run abundance has since returned to pre-2004 levels, although runs have been sufficient to support much higher harvests.

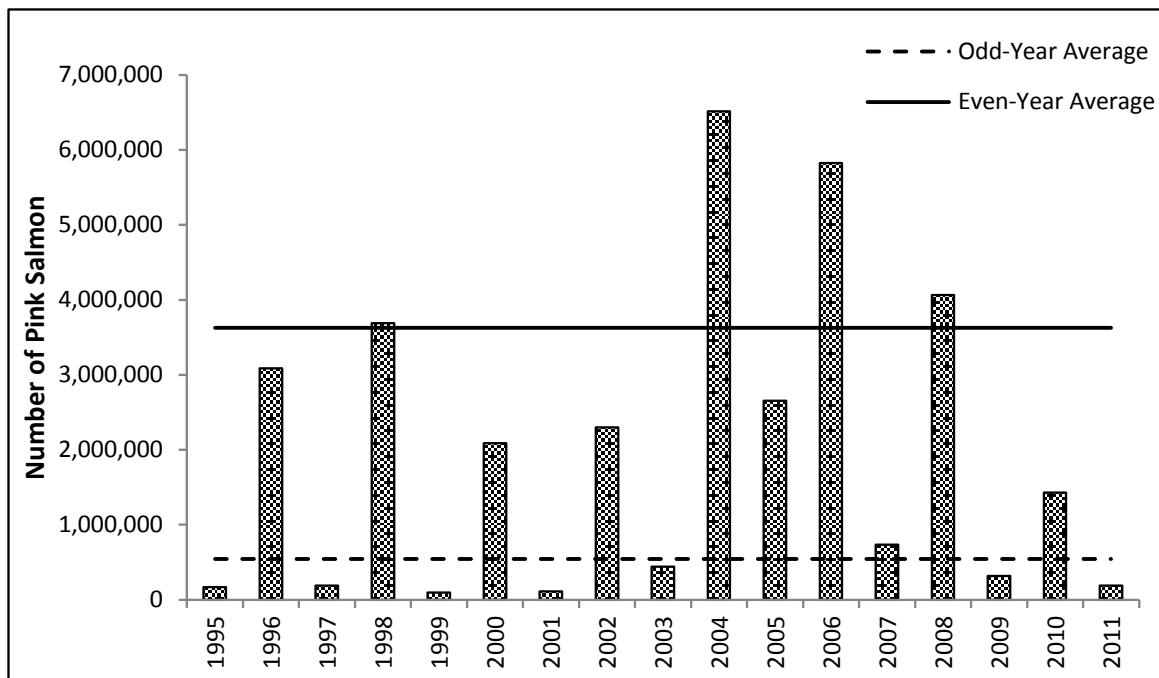


Figure 3.—Total escapement (6 rivers) and catch (commercial, subsistence, and sportfish) of pink salmon for the Norton Sound District, 1995–2011, Norton Sound District. Note: Escapements are an aggregate count of the Kwinik, Niukluk, Nome, and Snake Rivers, North River, and Eldorado River.

2012 Pink Salmon Fisheries

The pink salmon directed commercial fishery with gillnet gear restricted to 4-inch or smaller mesh size began on July 3 in southern Norton Sound with a 12-hour opening in Subdistricts 5 and 6 and a 48-hour period in Subdistrict 4. Catch-per-unit-effort (CPUE) ranged from 44 (Unalakleet) to 48 (Shaktoolik and Norton Bay) during these openings, which was well above historical average CPUE. Good catch rates of pink salmon continued in southern Norton until catches peaked around July 10. In northern Norton Sound, pink salmon commercial fishing commenced on July 7 in the Elim Subdistrict, and on July 14 in Golovin Subdistrict with 24-hour openings. CPUE ranged from 16 (July 19) to 64 on July 14 during the four openings from July 7–19. In Golovin Subdistrict, there were three pink salmon openings between July 14–18 and CPUE ranged from 9 index points on July 18 to 56 index points on July 14. Catch rates were above historical averages for the second week of July in both Elim and Golovin, but the largest catches occurred during the July 18 opening in Golovin Subdistrict (16,871 pink salmon) and July 19 opening in Elim (24,798 pink salmon). By the third week of July, the proportion of water-marked pink salmon increased to more than 50% of the catch which led to a lack of buyer interest at the conclusion of the July 19 opening.

Norton Sound overall commercial pink salmon harvest in 2012 was 205,498 fish, which was 18% above the long-term even-numbered year average harvest of 174,267 fish (Table 3). The 2012 harvest was also the highest since 1998 and ranked 7th best in 23 even-numbered year harvests since 1962 (Table 3). Like chum salmon harvests in 2012, southern Norton Sound subdistricts accounted for the majority (59%) of the overall pink salmon harvest in Norton Sound. Shaktoolik (19,253 pink salmon) and Unalakleet Subdistrict (52,445 pink salmon) harvests were below their respective long-term average even-numbered year harvests, but ranked 6th and 8th in 23 even-numbered year harvests, respectively (Table 3). In Norton Bay, the 49,970 pink salmon harvested in 2012 shattered the previous record harvest of 17,676 pink salmon set in 1963. Despite a late start in northern Norton Sound in 2012, there were 31,055 pink salmon harvested in Golovnin Bay and 52,775 pink salmon harvested in the Elim Subdistrict. Golovnin Bay Subdistrict pink salmon harvest ranked 6th and was 8% above the even-year average harvest of 28,615 pink salmon. Elim harvests were better in 2012, ranking 3rd best historically and 130% above the even-year average harvest of 22,945 pink salmon (Table 3).

Table 3.—The 2012 pink salmon harvest (numbers of fish) by subdistrict compared to long-term (1962–2010) historical even-year average harvests, Norton Sound District.

Norton Sound Subdistrict	2012 Pink Salmon Harvest	Long-term (1962-2010) Even-Year Harvest	Rank
Subdistrict 2 (Golovnin Bay)	31,055	28,615	6
Subdistrict 3 (Elim)	52,775	22,945	3
Northern Norton Sound	83,830	48,698	4
Subdistrict 4 (Norton Bay)	49,970	2,311	1
Subdistrict 5 (Shaktoolik)	19,253	65,469	6
Subdistrict 6 (Unalakleet)	52,445	80,273	8
Southern Norton Sound	121,668	146,990	7
Norton Sound Total	205,498	174,267	7

Total pink salmon harvest was well below the 500,000 to 600,000 pink salmon desired by the industry to satisfy the floating processor vessel in 2012. However, harvests of pink salmon were above average for most periods fished. Directed pink salmon periods were limited in 2012 due to chum salmon conservation concerns in Subdistricts 2 and 3, competing market interest for chum salmon in Subdistricts 5 and 6, and limited tendering capacity until mid-July to allow for prosecution of concurrent chum and pink salmon directed fisheries in Subdistricts 4–6. By the time pink salmon fishing got underway in Subdistricts 2 and 3, the pink salmon run to northern Norton Sound was at its peak and beginning to trail off, evident by the high proportion of watermarked fish comprising the catch. Additionally, Norton Bay Subdistrict could have been placed on an aggressive fishing schedule of two 48-hour periods per week for the first two weeks of July, but tendering capacity was not sufficient to support fishing to this extent until the arrival of another tender on July 13. By this time, run abundance was beginning to decline as pink salmon moved into the Ungalik, Koyuk and Inglutalik Rivers. Considering all of these factors, pink salmon harvests could have been considerably higher in 2012 and might have approached levels desired by the buyer.

Pink Salmon Escapements in 2012

Pink salmon escapement estimates were successfully obtained from all 9 rivers with ground-based escapement projects in 2012 (Table 4).

Table 4.—Pink salmon apportioned sonar, counting tower, and weir escapement estimates from Norton Sound index rivers compared to established escapement goals, Norton Sound, 2012.

Index System	2012 Escapement	Enumeration Method	Even-Year	
			Average Escapement	Escapement Goal
Eldorado River	59,952	Weir	126,909	
Nome River	148,813	Weir	445,852	Even Year SEG (\geq 13,000)
Snake River	6,119	Weir	83,859	
Niukluk River	249,326	Tower	979,670	SEG (\geq 10,500)
Kwiniuk River	381,565	Tower	722,593	SEG (\geq 8,400)
Inglutalik River	86,940	Tower	NA	
Shaktoolik River	433,837	Sonar	NA	
North River	147,674	Tower	521,688	SEG (\geq 25,000)
Unalakleet River	669,819	Weir	NA	

Pink salmon escapements in 2012 were all well below long-term even-numbered year average escapements (Table 4). However, all Norton Sound pink salmon escapement goals were easily achieved in 2012 and surpluses were more than sufficient to support subsistence needs and commercial harvests. There is no context for comparison regarding the 2012 Shaktoolik and Inglutalik River pink salmon counts as this is first year with counts at Shaktoolik River sonar and only the second year of counts at Inglutalik River tower. However, it is noteworthy that the 2012 pink salmon count at Inglutalik River was 417% below the 2011 season count of 450,283 pink salmon. In contrast, the Unalakleet River weir pink salmon passage in 2012 was 84% above the 2011 count of 364,068 pink salmon, but 20% below the 2010 count of 832,904 pink salmon.

2012 COHO SALMON RUN

2012 Coho Salmon Fishery Forecast

The 2012 coho salmon run was expected to be average with commercial fishing expected in Subdistricts 2–6. There was some optimism that the 2012 coho salmon run would be a slight improvement from the 2010 and 2011 runs based on good freshwater rearing conditions, strong parent year escapements, and good ocean conditions. As in previous years, the vast majority of coho salmon harvests were expected to come from Subdistricts 5 and 6 because of relatively large runs compared to coho salmon runs in northern Norton Sound. Northern Norton Sound has only accounted for 4–25% of the Norton Sound coho salmon harvest since commercial coho salmon fishing returned to the Elim Subdistrict in 2007.

Norton Sound Coho Salmon Run Performance Trends

Coho salmon have been harvested for commercial purposes since the inception of commercial fishing in Norton Sound in 1961. However, low coho salmon harvests characterized the fishery from 1961–1978 due to a lack of effort in August and low market interest. Coho salmon fisheries were prosecuted more aggressively beginning with the 1979 season and have been important to the local economy ever since. From 1979–2003, the average commercial coho salmon harvest was 44,394 fish and harvests ranged from a low of 1,759 fish in 2002 to a high of 105,418 fish in 1992 (Figure 4). Coho salmon abundance began to increase in 2004 for most areas except for Subdistrict 2, which had back to back below average years in 2004 and 2005. From 2004–2011, coho salmon harvests averaged 89,104 fish and this period also had the three largest coho salmon harvests (2006–2008) on record, including a record 130,808 coho salmon caught in 2006 (Figure 4). During this time frame, all Norton Sound subdistricts have registered record coho salmon harvests including the most recent record of 4,836 coho salmon harvested in Norton Bay Subdistrict in 2011.

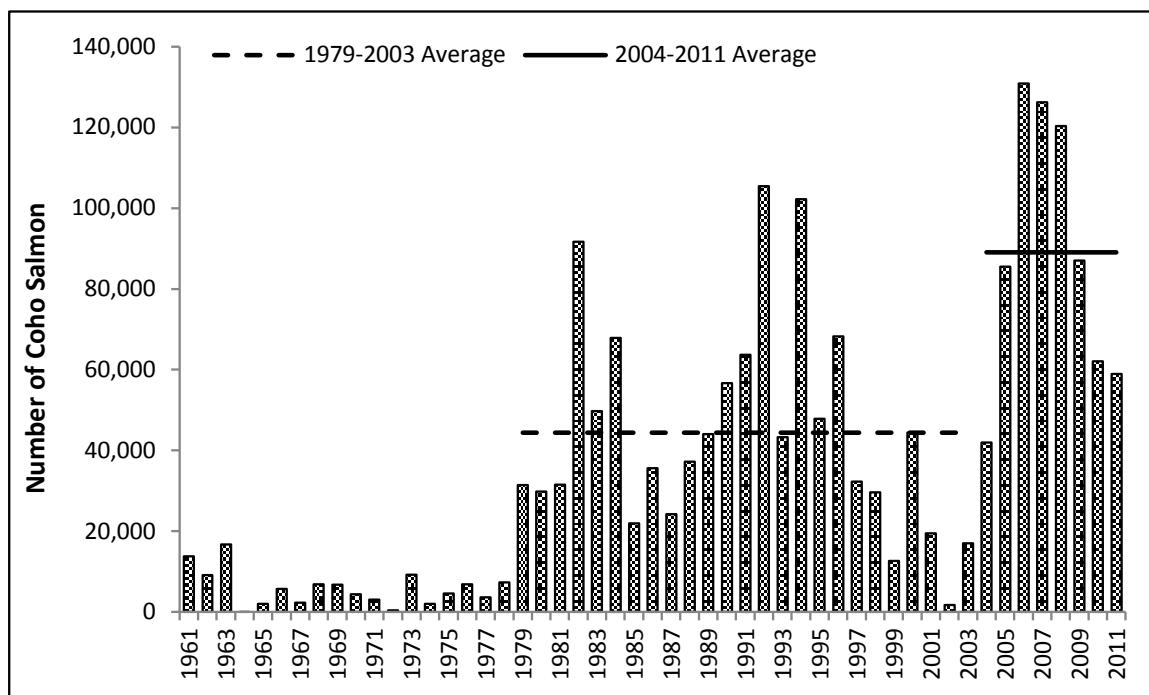


Figure 4.—Annual commercial coho salmon harvest (numbers of fish) compared to 1979–2003 average and 2004–2011 average harvests, Norton Sound District, 1961–2011.

2012 Coho Salmon Fisheries

Precipitation in late July led to flood events that knocked out most Norton Sound escapement projects for several days, particularly in northern Norton Sound. The flooding made it impossible to accurately assess coho salmon abundance in northern Norton Sound in early August because of so few coho salmon counted before the high water event. Kwiniuk River remained operational but escapement counts of coho salmon were at an all-time low for early August. Niukluk River tower did not resume counting operations until August 6. On August 11, aerial surveys were flown of Niukluk River to ground truth tower count estimates in light of the recent high water events and to monitor inriver abundance of coho salmon in the lower reaches of the Tubutulik and Kwiniuk Rivers near Elim. A total of 970 coho salmon were observed on the Niukluk River above the tower site, which was not surprising considering that salmon passage was not enumerated for 7 days due to high water levels from July 30 to August 5. By August 11, projected escapement to the Niukluk River based on tower counts improved to 3,200 coho salmon. While below average, this projection was above the lower end of the tower-based SEG range of 2,400–7,200 coho salmon.

Similarly, a record low 500 coho salmon had been counted at the Kwiniuk River tower, but normal run-timing projections resulted in a conservative projected escapement estimate of 1,700 coho salmon and indicated the aerial survey SEG range of 650–1,300 coho salmon would most likely be achieved. Additionally, over 2,900 coho salmon were observed during the aerial survey at the neighboring Tubutulik River from the mouth to Clear Creek. The mid-August Tubutulik River aerial count was higher than previous years surveys conducted during peak spawning stage. As mentioned previously, the blockage to the Kwiniuk River slough may have changed the relative distribution of all salmon, including coho salmon in the Kwiniuk and Tubutulik River drainages in 2012 which may explain the large number of coho salmon observed in the Tubutulik River. From August 12 to Sept 1, there were four directed coho salmon fishing periods issued for Golovnin Bay Subdistrict and five periods issued for Elim Subdistrict ranging from 24 hours to 72 hours in length. However, there was very little effort in either subdistrict due to recurrent storms and high surf conditions keeping fishermen on the beach.

Unlike northern Norton Sound, decent early projections of coho salmon escapement to southern Norton Sound could be made based on North River tower passage. By August 1, projected escapement at North River tower was between 4,100 and 7,400 coho salmon based on normal to late run-timing models. Fishery managers set individual periods of 48–72 hours in duration for Subdistricts 4–6 through August 6, but were not willing to commit to a commercial schedule until more certain projections of escapement could be made.

By August 7, projected escapement of coho salmon to North River was 6,000 fish, which suggested that the North River aerial survey SEG range of 550–1,100 coho salmon would easily be achieved. Additionally, projected Unalakleet River drainagewide escapement based on North River tower counts and historical radiotelemetry data improved to 40,000–75,000 coho salmon. This level of inriver abundance was more than sufficient to provide for escapement and subsistence harvests. Considering the improved projections, effective August 12, Subdistricts 5 and 6 were placed on a schedule of two 48-hour periods per week for the remainder of the season. Norton Bay Subdistrict was also placed on this schedule effective August 15 because of above average catches of coho salmon from August 5 to August 11. The commercial fishery closed by regulation on September 7.

The 2012 overall commercial coho salmon harvest in Norton Sound was 37,056 fish, which ranked 22 out of 52 years of harvests and was 145% below the recent 5-year average harvest of 90,896 coho salmon and 17% below the 1979–2011 average harvest of 44,394 coho salmon (Table 5). Norton Bay Subdistrict had its 2nd highest harvest on record with 4,378 coho salmon harvested, but harvests in all other subdistricts were below their respective recent 4- or 5-year and long-term (1979–2011) average harvests. Southern Norton Sound subdistricts accounted for 93% of the harvest taken in Norton Sound (Table 5).

Table 5.—The 2012 coho salmon harvest (numbers of fish) by subdistrict compared to 1979–2011 average and 2004–2011 average harvests, Norton Sound District.

Norton Sound Subdistrict	2012 Coho Salmon Harvest	Recent 4- or 5-year Average Harvest	1979-2011 Average Harvest	Rank
Subdistrict 2 (Golovnin Bay)	573	2,288	1,486	16
Subdistrict 3 (Elim)	2,003	7,722	3,870	14
Northern Norton Sound	2,576	9,552	3,616	16
Subdistrict 4 (Norton Bay)	4,378	2,189	1,508	2
Subdistrict 5 (Shaktoolik)	7,828	21,947	11,494	20
Subdistrict 6 (Unalakleet)	22,274	57,646	39,409	26
Southern Norton Sound	34,480	81,344	51,405	21
Norton Sound Total	37,056	90,896	44,394	22

Note: Recent 5-year average not available for Golovnin Bay and Norton Bay; recent 4-year average harvest was substituted.

The decrease in commercial coho salmon harvests in 2012 can mostly be attributed to weather during the month of August, rather than abundance. For example, coho salmon harvests in Norton Bay Subdistrict through August 11 were well above average, but fishing was precluded by high surf conditions from August 15–22. Shaktoolik Subdistrict, a major contributor to coho salmon harvests, was hit especially hard by southerly storms and fishing was not possible for three periods between July 25 and August 19. High surf conditions only diminished for brief periods during many scheduled openings in August, which caused several permit holders to lose interest and pursue other endeavors. The few brief fishable weather windows in August made it extremely difficult for the buyer to plan logistics for buying operations in remote subdistricts.

2012 Coho Salmon Escapements

As a consequence of the severe weather, reliable estimates of coho salmon escapement could not be obtained at any project in 2012. However, solid projections of escapement made after the historical quarter passage points at the North, Kwiniuk, and Niukluk Rivers suggested that aerial survey SEG ranges for those systems would have been achieved. A second major and more severe high water event in mid-August effectively shut down all Norton Sound escapement counting projects for the remainder of the season. In fact, the Kwiniuk River tower camp had to be evacuated a full three weeks earlier than normal due to coastal flooding in camp, which made staying there unsafe. Additionally, flooding damaged the department's test net in the lower Unalakleet River and project was inoperable for several days, for the first time since 1994.

2012 SOCKEYE SALMON RUN

Norton Sound-Port Clarence Area Sockeye Salmon Stocks

Glacial Lake, in the northwestern portion of the Nome Subdistrict, and Salmon Lake which empties into the Pilgrim River in the Port Clarence District, support the northernmost sockeye salmon populations of significant size in North America. Subsistence harvest rates of sockeye salmon in the Sinuk River, which drains Glacial Lake, have historically been low due to difficulties navigating this shallow, boulder-laden river. In contrast, sockeye salmon harvests in the Pilgrim River are much higher as it is more easily traveled and several beach seining and set gillnet fishing locations are accessible via the Kougarok Road emanating from Nome. In addition, Pilgrim River sockeye salmon are harvested in mixed stock marine gillnet fisheries in proximity to the villages of Brevig Mission and Teller in Port Clarence.

In 1966, a commercial salmon fishery was established in the Grantley Harbor/Tuksuk Channel area of the Port Clarence District. It was closed later that same season due to small salmon runs and concerns from local residents about impacts to area subsistence salmon fisheries. In 2007, the board re-established by regulation a Port Clarence District commercial salmon fishery. The board also established an inriver run goal of $\geq 30,000$ sockeye salmon as a trigger point to allow a commercial fishery. The inriver run goal assumes approximately 20,000 sockeye salmon are needed for escapement and 10,000 sockeye salmon are needed to meet Pilgrim River subsistence harvest needs.

2012 Sockeye Salmon Forecast

A commercial fishery for sockeye salmon was not expected to occur in the Port Clarence District because sockeye salmon abundance was not expected to exceed the Pilgrim River inriver goal of 30,000 fish. However, based on the 2011 escapement and sockeye salmon smolt outmigration data, the department was anticipating the 2012 run to be slightly better than the 2011 run. It was hoped that sockeye salmon run abundance would be sufficient to avoid subsistence net-fishing restrictions.

Norton Sound-Port Clarence Area Sockeye Salmon Run Performance Trends

From 2003–2007, record runs of sockeye salmon were observed at the Pilgrim River weir. From 2003–2008, Pilgrim River weir sockeye salmon counts ranged from 20,452 in 2008 to 85,417 fish in 2004. However, the Pilgrim River sockeye salmon run crashed in 2009 with only 953 fish through the weir and the second worst escapement of 1,654 sockeyes followed in 2010. Escapement improved substantially in 2011 when 8,449 sockeye salmon were enumerated at the weir. Interestingly, Glacial Lake sockeye salmon runs have exhibited a very similar pattern of record-level abundance in the mid 2000s followed by a major downturn in production from 2009–2011. However, the Glacial Lake trend lags by one year when compared to the Pilgrim River, presumably due to the majority of Glacial Lake sockeye smolts spending 3 years rearing in freshwater before emigrating from the lake. This life history pattern differs from that of Salmon Lake smolt, which inhabit the lake for 1 or 2 years during the rearing phase.

2012 Sockeye Salmon Harvest

There were 100 sockeye salmon harvested in the Norton Sound commercial fishery (Subdistricts 2–6) for a total of \$1,001 with an additional 34 sockeye salmon retained for personal use. The Pilgrim River subsistence net fishery was closed from July 20 to August 5 until the aerial survey SEG range was projected to be reached. Despite the closure, preliminary subsistence harvest

based on 111 permits returned from the Pilgrim River is 552 sockeyes, which is already 55% above the 2011 harvest of 356 sockeyes (Table 6). However, the 2012 preliminary harvest is 596% below the 2003–2008 average harvest of 3,846 sockeyes when the record runs occurred. Sockeye salmon subsistence harvest data for the Nome Subdistrict and Port Clarence District are not available at the time of this writing because permits are not due until October in order to fully capture coho and fall chum salmon harvests.

Table 6.—Pilgrim River and Salmon Lake subsistence salmon harvest compared to the 2003–2008 average harvest, 1992–2012.

Year	Permits Issued	Number of Salmon Harvested					
		Chum	Pink	King	Coho	Sockeye	Total
1991	26	98	25	8	34	110	177
1992	9	7	1	0	0	12	13
1993	8	0	0	0	0	0	0
1994	4	0	0	0	0	6	6
1995	14	6	0	4	6	99	109
1996	3	0	0	0	0	0	0
1997	13	16	2	7	0	29	38
1998	9	1	3	1	0	30	34
1999	33	91	0	28	20	180	228
2000	11	2	12	2	36	31	81
2001	19	0	0	3	0	165	168
2002	26	13	4	18	20	165	207
2003	101	89	141	57	67	1,421	1,686
2004	223	53	222	57	50	3,546	3,875
2005	210	132	176	13	42	4,835	5,066
2006	198	313	100	26	22	5,556	5,704
2007	201	218	36	27	20	5,266	5,349
2008	255	88	426	17	27	2,451	2,921
2009	190	49	35	7	1	694	737
2010	146	55	219	6	3	234	462
2011	133	65	10	1	28	356	395
2012	188	166	15	5	5	552	577
2003-2008 Average	198	149	184	33	38	3,846	4,100

Note: 2012 harvest preliminary as only 111 permits out of 188 permits have been returned at the time of this writing.

2012 Sockeye Salmon Escapement

In 2012, an estimated 1,636 sockeye salmon were counted at Glacial Lake weir and 7,117 sockeye salmon were enumerated at the Pilgrim River weir (Figure 5). The Glacial Lake weir count in 2012 was similar to the 1,697 sockeyes counted in 2011. The 2012 Pilgrim weir count would likely have been higher had the weir been fish tight during the entire target operational period. An August 20 aerial survey count of 5,830 sockeyes was greater than the 5,144 sockeye salmon observed during the 2011 aerial survey; 2012 marks the 2nd consecutive season in which the Grand Central River/Salmon Lake aerial survey SEG range of 4,000–8,000 was reached.

Aerial surveys were not conducted of Glacial Lake in 2012 due to a combination of inclement weather and limited helicopter time. This is the 2nd consecutive season in which the Glacial Lake aerial survey SEG range (800–1600 sockeye salmon) has not been evaluated.

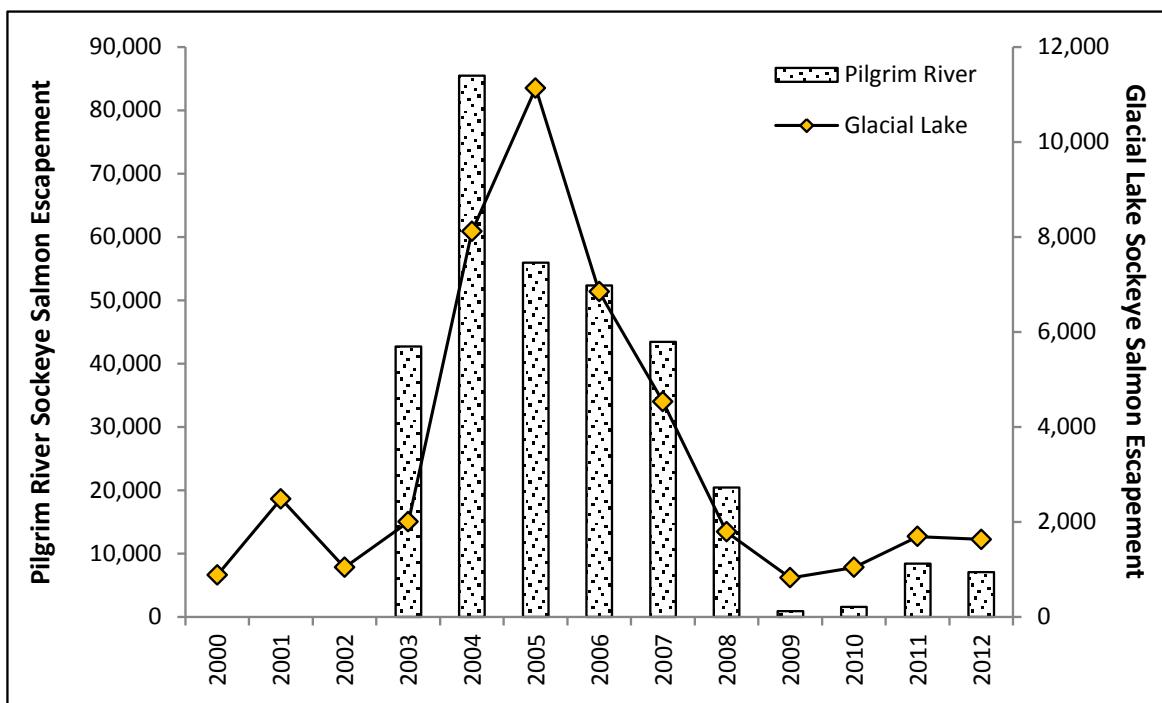


Figure 5.—Annual sockeye salmon escapement at Glacial Lake (2000–2012) and the Pilgrim River (2003–2012) weirs, Norton Sound-Port Clarence Area.

OTHER PILGRIM RIVER SALMON ESCAPEMENTS

The NSEDC-operated Pilgrim River weir project ran from June 26 to August 20 in 2012 when the weir eventually succumbed to persistent August flood events nearly two weeks before the end of the target operational period. Additionally, salmon passage was also unmonitored for a brief period during the early morning hours of July 25 when three bears dislodged several weir panels. Counts of all species at the Pilgrim River weir should therefore, be considered minimum counts due to weir damage and high water leading to several days with missed and partial weir counts.

In addition to sockeye salmon, there were 64 Chinook salmon, 46,135 pink salmon, 25,529 chum salmon and 95 coho salmon enumerated at the Pilgrim River weir (Table 7). Chum salmon escapement ranked 4th highest out of 14 years of estimates. Chum salmon escapement was also 8% above the 2003–2011 average count of 23,657 chum salmon despite the weir becoming inoperable at the 85% percentile of the chum salmon run. Pink salmon escapement was 85% above the 2003–2011 average escapement of 24,995 pink salmon and the 3rd best for even-numbered years. Chinook salmon passage was above passage estimates from 2009–2011 but was the 5th lowest in 14 years of estimates and 457% below the average count of 357 Chinook salmon. Escapement of coho salmon was 268% below the long-term (2003–2011, excluding 2004) average count of 350 coho salmon, but the weir became inoperable very early in the run.

Table 7.—Historical migration of salmon at Pilgrim River counting tower, 1997, 1999–2000 and 2002 and weir 1996 and 2003–2012.

Year	Operating Period	Chinook	Chum	Pink	Coho	Sockeye
1997	July 12 - Aug 21	356	15,619	^a 5,557	452	15,619 ^a
1999	July 13 - Aug 06	6	2,617	35,577	104	4,650
2000	July 05 - Aug 18	72	861	374	21	12,141
2002	July 04 - Aug 04	150	5,590	3,882	246	3,888
2003	June 21 - Sept 14	1,016	15,200	14,100	677	42,729
2004	June 21 - Sept 14	925	10,239	50,760	1,573	^b 85,417
2005	June 24 - Sept 05	216	9,685	13,218	304	55,951
2006	June 30 - Sept 09	275	45,361	17,701	973	52,323
2007	June 29 - Sept 10	501	35,334	3,616	605	43,432
2008	June 25 - Sept 01	137	24,550	92,471	260	20,452
2009	June 26 - Aug 31	52	5,427	483	18	953
2010	June 24 - Sept 01	44	25,379	29,239	272	1,654
2011	June 28 - Sept 01	44	41,740	3,364	269	8,449
2012	June 26 - Aug 20	64	25,529	46,135	95	7,117
2003-2011 Average		357	23,657	24,995	550	34,596

^a Chum and sockeye escapements were combined due to species identification problems during 1997.

^b Coho were misidentified. Nearly 30% of scale samples in 2004 were actually sockeye.

EXVESSEL VALUE

Exvessel value in 2012 was \$758,908 and 40% above the recent 10-year (2002–2011) average of \$542,001 without adjusting for inflation (Figure 6).

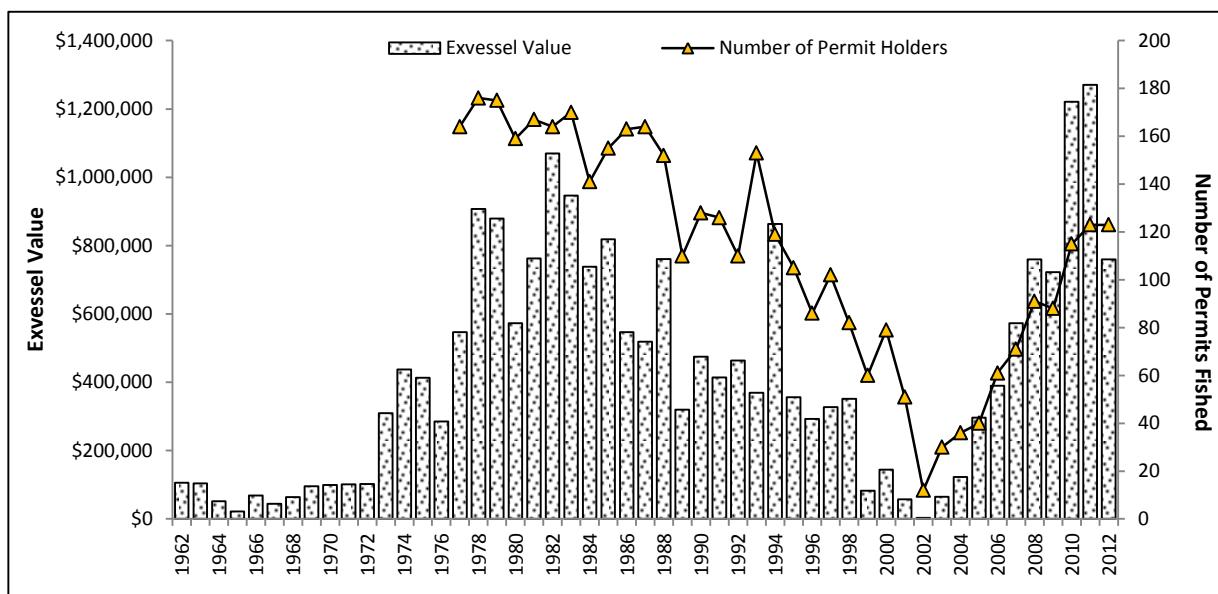


Figure 6.—Commercial salmon fishery exvessel value compared to number of permits fished, 1961–2012, Norton Sound District.

This was the 6th consecutive season that salmon fishery exvessel value has exceeded \$500,000. However, average value per permit holder in 2012 (\$6,169) dropped by approximately 40% from the \$10,323 per permit that occurred in 2011. As in 2011, there were 123 unique permits fished in 2012.

Record fishery values from 2010–2011 were largely the result of strong chum salmon harvests and high grounds prices paid for salmon, particularly coho salmon. The decrease in exvessel value in 2012 was due mainly to reductions in chum and coho salmon harvests and decreases in dock prices for these species. In 2011, the grounds price per pound by species was \$3.01, \$0.68, \$1.70, \$0.25, and \$1.04 for Chinook, chum, coho, pink, and sockeye salmon, respectively. In 2012, prices paid at the dock dropped for chum salmon to \$0.52/lb. and for coho salmon prices dropped to \$1.47/lb. Conversely, dock prices improved in 2012 to \$0.36/lb. for pink salmon and \$1.45/lb. for sockeye salmon. NSSP elected to not purchase Chinook salmon incidentally harvested in directed chum and coho salmon fisheries in 2012. However, there were 197 Chinook salmon retained for subsistence purposes that were caught incidentally in the directed chum salmon fishery. Chum, coho, and pink salmon harvests accounted for \$221,611, \$361,283, \$175,011 of the overall value, respectively.

ACKNOWLEDGEMENTS

Norton Sound-Port Clarence Area ADF&G staff would like to thank the many ADF&G and NSEDC technicians and biologists that worked on salmon stock assessment projects during 2012. This year was exceptionally challenging due to high water events; crew members and project leaders kept a positive attitude to make this salmon season safe and as successful as it could be under the circumstances. As in previous years, NSEDC operated several important enumeration projects used for management of salmon fisheries and provided technicians to work at ADF&G-operated salmon escapement projects.