

Recent Canadian Enhanced Salmonid Production and Commercial Kept Catch Estimates
(1979-2012)

By

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Introduction

The purpose of this document is to update Canadian hatchery release information and commercial catch estimates for Pacific salmon (*Oncorhynchus* spp.) from those provided in Irvine et al. (2012) and Sandher et al. (2012).

The Salmonid Enhancement Program (SEP) was initiated in British Columbia, Canada in 1977 primarily to rebuild depressed stocks and increase catch through the expanded use of enhancement technology. The program was designed to increase fishing opportunities, involve the public and raise awareness, create jobs and increase economic development in coastal and First Nations communities, and improve understanding of salmonid populations. SEP currently comprises approximately 150 projects throughout British Columbia that produce Chinook (*O. tshawytscha*), coho (*O. kisutch*), chum (*O. keta*), pink (*O. gorbuscha*), and sockeye (*O. nerka*) salmon, as well as small numbers of steelhead (*O. mykiss*) and cutthroat trout (*O. clarkii*). Locations of larger facilities are shown in Figures 1a, 1b and 1c.

The Department of Fisheries and Oceans Canada (DFO) generates estimates of kept salmon in commercial fisheries (DFO 2009) as well as catch estimates for recreational and aboriginal fisheries. Updated estimates from recreational and aboriginal fisheries were not available in time to include in this report. Commercial estimates are derived using a variety of information including sale slips, log books, interview and observer information.

Results

Releases from all Ecosystem Management Branch (EMB, formerly known as the Oceans, Habitat and Enhancement Branch) facilities were provided by release year (Table 1). Releases in 2012 are broken down by area (Table 2). Data for 2012 are preliminary and may be updated in future reports.

Total releases peaked in the early 1990's at almost 600 million fish, with chum and sockeye constituting the majority of releases. Numbers subsequently declined and then stabilized at about 300 million fish released annually in the last five years (Fig. 2, Table 1).

Pink, sockeye, and chum salmon historically have been the most important species in the commercial catch (Table 3, Fig. 3). There has been a distinct reduction in the Canadian commercial catch in recent years, along with more variability. Although pink salmon continue to dominate catches during odd-numbered years, catches of chum and sockeye salmon have been variable, and catches of Chinook and especially coho salmon greatly reduced.

References Cited

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- Sandher, J., C. Lynch, D. Willis, R. Cook and J. R. Irvine. 2012. Canadian enhanced salmonid production during 1977-2011 (1976-2010 brood years). NPAFC Doc. 1420. 10 pp.

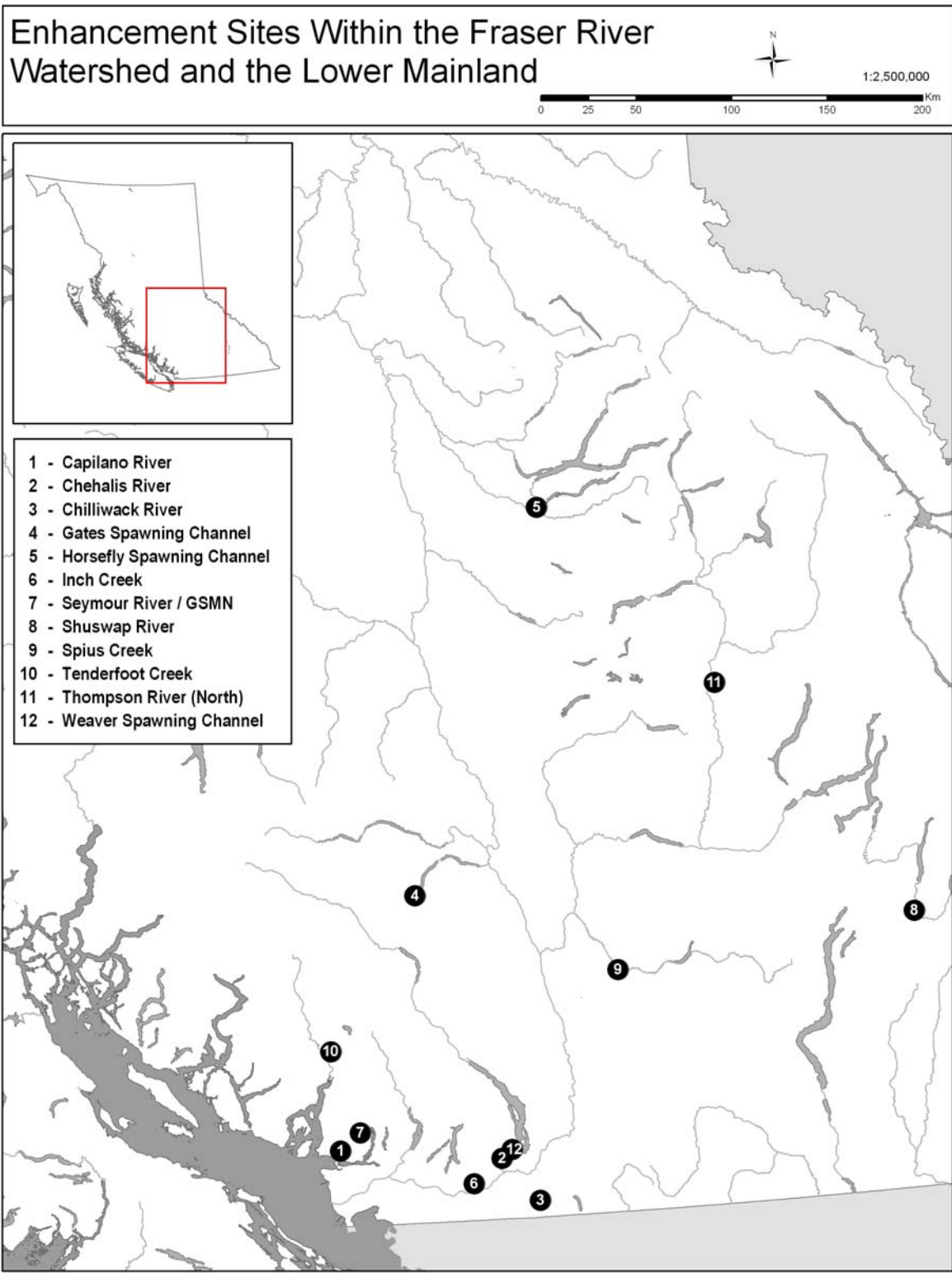


Figure 1a Locations of hatcheries and manned spawning channels operated by EMB staff or contracted to community and native groups within British Columbia’s Fraser River watershed and lower mainland

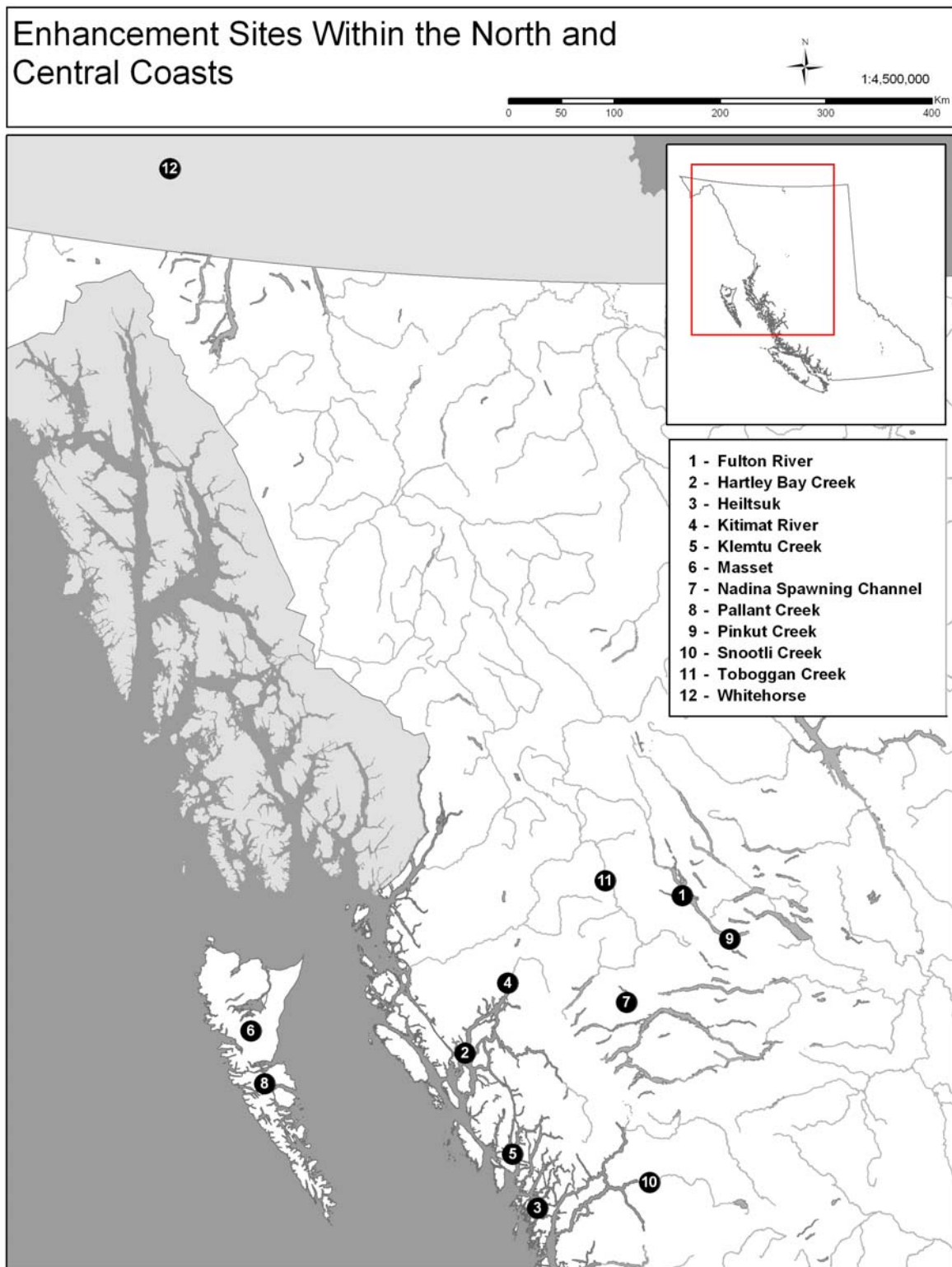


Figure 1b Locations of hatcheries and manned spawning channels operated by EMB staff or contracted to community and native groups within British Columbia's North and Central Coast Regions.

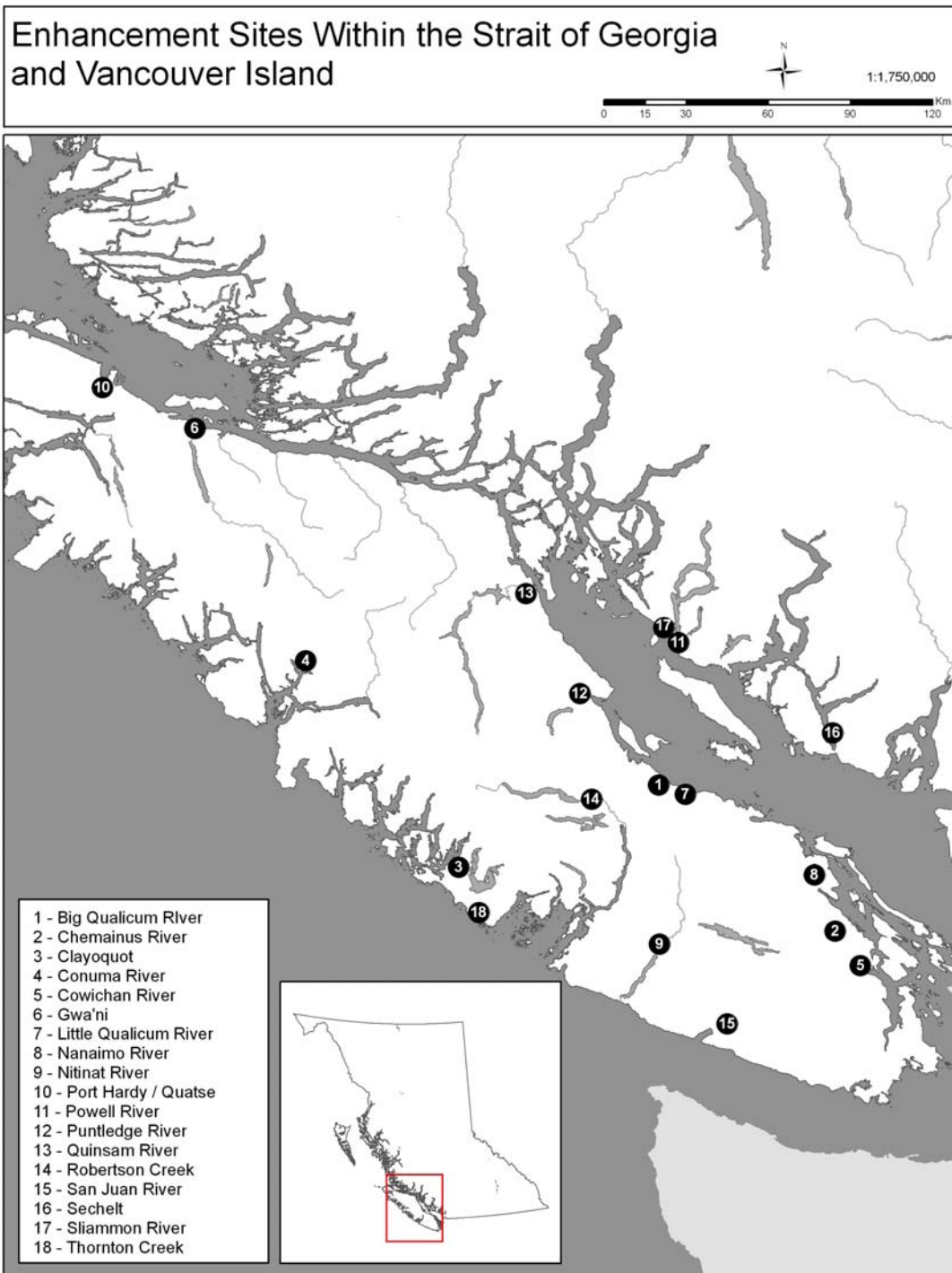


Figure 1c Locations of hatcheries and manned spawning channels operated by EMB staff or contracted to community and native groups within British Columbia's Strait of Georgia and Vancouver Island.

Releases from Enhancement Facilities in British Columbia and the Yukon, Canada

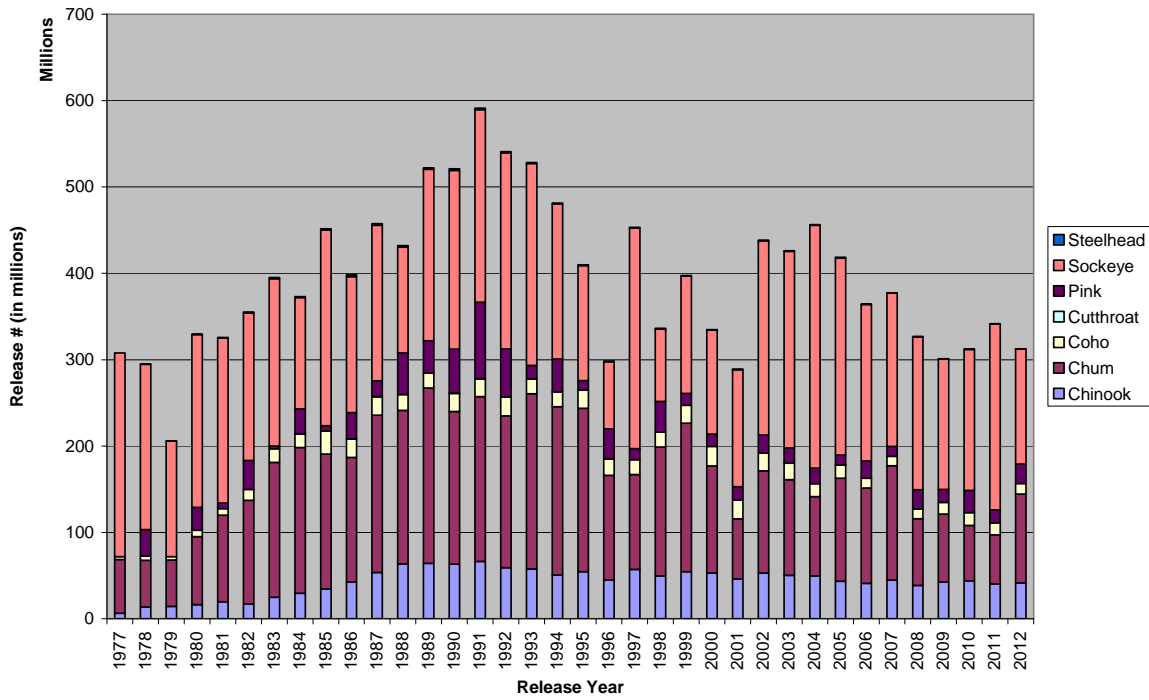


Figure 2. Canadian hatchery releases 1977-2012 in millions of fish.

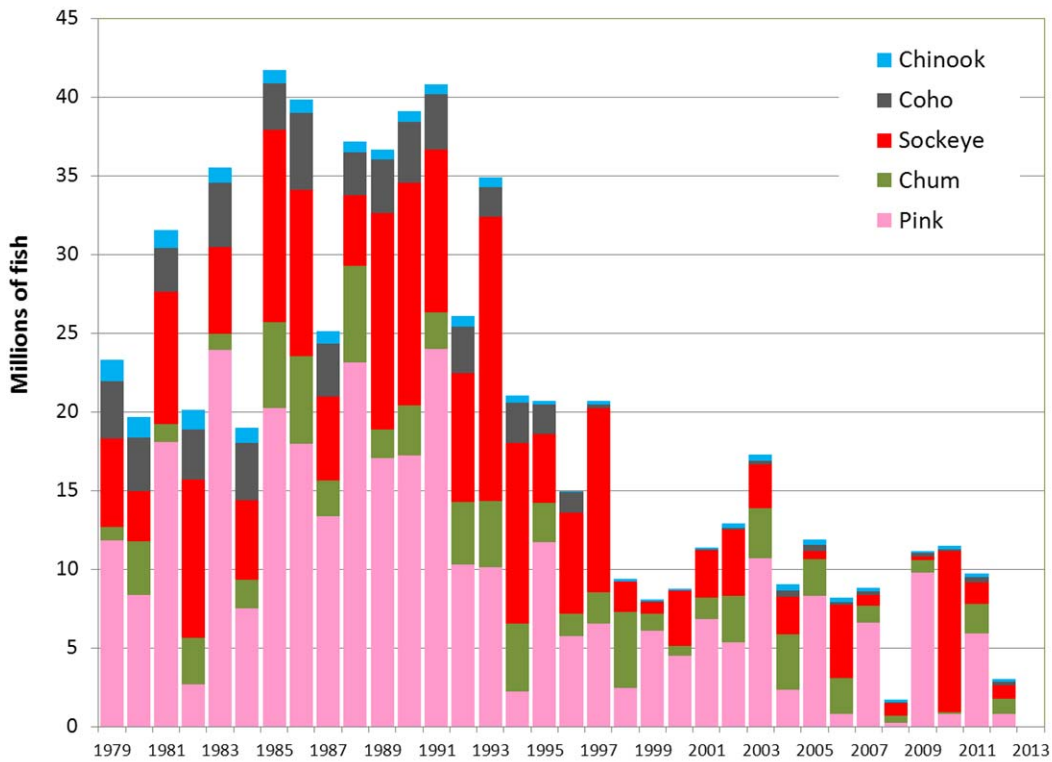


Figure 3. Canadian commercial kept catch estimates 1979-2012 in millions of fish

Table 1. Juvenile salmon releases by release year from EMB hatcheries and manned channels in British Columbia and the Yukon, Canada.

Release Year	Chinook	Chum		Coho		Pink		Sockeye	Cutthroat	Steelhead
		Unfed	Fed	Fry	Smolt	Unfed	Fed			
1979	14,273,266	48,218,296	5,535,566	1,012,721	2,985,263	750		133,739,000	682	290,453
1980	16,370,618	69,550,228	9,191,947	3,656,819	3,741,951	26,145,904	358,639	200,179,521	2,000	355,750
1981	19,818,676	70,604,678	29,684,300	2,449,038	4,963,264	4,705,834	1,859,631	191,071,400	5,700	500,275
1982	17,482,160	50,709,042	68,980,710	7,293,522	5,229,572	33,113,088	492,034	170,814,370	13,608	976,734
1983	24,875,258	86,930,258	69,365,130	10,767,984	4,907,184	2,510,301	423,038	194,054,919	37,913	1,191,999
1984	29,377,307	83,266,067	85,579,589	8,930,958	6,881,907	27,341,916	1,521,896	128,964,333	24,658	1,285,719
1985	34,453,016	52,525,108	103,779,630	13,094,103	13,576,282	3,783,368	2,296,285	226,572,635	92,728	1,329,526
1986	42,832,059	41,608,091	102,464,677	9,276,105	12,098,441	25,432,597	5,057,021	157,434,930	110,507	2,201,706
1987	53,503,630	96,273,382	85,842,800	11,804,226	9,775,056	11,585,712	4,509,098	180,077,635	162,435	1,889,935
1988	63,564,731	101,661,010	75,979,751	8,177,303	10,118,075	43,221,480	4,807,689	122,480,753	191,794	1,810,897
1989	64,288,432	110,287,223	88,028,664	7,836,404	9,555,691	13,504,123	2,827,349	198,639,174	180,270	1,775,285
1990	63,440,015	84,537,150	92,214,006	9,878,700	11,260,130	47,373,147	2,884,163	206,749,382	158,512	1,937,098
1991	66,605,831	95,715,249	94,759,699	8,834,612	11,772,691	16,427,839	1,023,076	223,152,651	184,025	1,626,254
1992	59,092,678	76,557,826	96,839,355	9,329,859	12,445,245	46,709,818	1,584,525	227,135,058	180,389	1,305,798
1993	57,893,499	113,382,987	89,286,432	6,489,488	10,959,542	12,982,461	1,781,339	233,649,779	162,443	1,160,008
1994	50,666,759	101,494,402	93,400,165	6,571,925	11,098,333	36,575,827	1,576,168	179,704,118	148,498	1,067,623
1995	54,661,601	85,189,766	103,998,196	6,379,202	10,870,824	8,576,269	1,981,042	133,196,977	116,773	937,798
1996	45,240,596	33,223,312	87,665,483	6,980,359	10,772,207	32,317,111	2,001,615	78,186,811	133,910	704,430
1997	57,146,540	16,662,042	93,102,003	5,798,532	11,719,718	9,804,380	1,472,567	255,261,453	137,033	877,610
1998	50,209,950	45,104,033	104,106,311	5,202,188	11,912,953	33,138,850	1,640,496	83,807,632	85,887	779,410
1999	54,817,607	80,420,855	91,590,252	9,114,222	11,774,958	13,594,789	150,482	135,637,678	126,087	686,211
2000	53,447,868	45,515,245	78,461,142	8,367,707	14,560,240	10,588,053	3,198,637	120,566,525	97,965	650,146
2001	46,453,300	16,468,059	59,336,149	8,734,094	13,035,509	12,193,240	999,207	135,628,510	74,831	657,904
2002	53,229,474	73,981,946	81,389,064	7,866,302	12,816,870	16,885,480	2,550,411	225,113,140	48,488	721,861
2003	50,541,264	55,510,125	82,166,643	5,574,418	13,795,760	14,589,187	1,161,483	227,522,171	81,654	725,279
2004	50,307,626	50,478,858	54,680,148	4,662,462	10,527,153	15,624,437	1,423,758	281,353,125	77,460	687,476
2005	43,624,454	60,027,487	71,727,783	4,584,333	10,822,437	10,521,438	998,000	228,273,931	39,476	723,286
2006	41,061,485	35,582,315	85,574,610	3,012,427	8,768,845	17,066,080	3,064,252	181,140,066	35,135	527,777
2007	44,708,031	70,431,961	71,287,217	2,937,718	8,049,621	10,130,010	1,419,281	177,316,435	41,890	424,057
2008	38,472,785	47,526,845	34,233,178	3,420,803	7,896,667	18,966,850	3,264,501	177,018,938	38,111	555,070
2009	41,816,943	36,064,862	42,664,672	4,409,160	9,091,571	12,173,274	2,724,687	150,900,526	29,208	561,911
2010	44,085,255	29,730,394	34,611,664	5,765,944	9,244,677	20,635,440	5,049,262	162,962,389	30,164	460,593
2011	38,667,841	17,694,025	39,174,052	6,715,876	7,290,554	12,621,366	2,169,796	214,883,811	17,409	387,198
2012	41,489,724	49,581,494	53,419,197	4,573,822	7,582,538	20,119,445	2,412,208	133,141,503	21,703	407,036

Table 2. Juvenile salmon releases by area in 2012 from EMB hatcheries and manned channels in British Columbia and the Yukon, Canada.

Area	Stat Area	Chinook	Chum	Coho	Pink	Sockeye	Cutthroat	Steelhead
Yukon	120							
	Total							
Nass R	03			170				
	Total			170				
Skeena R	04	318,316		70,006		82,516,003		
	Total	318,316		70,006		82,516,003		
North Coast	03							
	04	37,159		49,206				
	06	1,987,994	2,214,441	842,431				45,434
	Total	2,025,153	2,214,441	891,637				45,434
Queen Charlotte Is	01	118,686		75,340				
	02E		57,370	76,376				
	Total	118,686	57,370	151,716				
Central Coast	07		3,423,361	108,005		102,544		
	08	2,040,566	6,872,727	40,485		78,100		
	09	321,088		16,458				
	Total	2,361,654	10,296,088	164,948		180,644		
West Coast Vancouver Is	22	4,542,845	25,303,286	247,686				
	23	5,976,973	752,888	537,767				95,437
	24	716,525		106,600				
	25	2,906,438	1,897,091	133,068				
	27			82,290				
	Total	14,142,781	27,953,265	1,107,411				95,437
Johnstone Strait	11	225,640	56,846	218,796	2,137,017			29,888
	12		95	8,231				
	Total	225,640	56,941	227,027	2,137,017			29,888
Strait of Georgia	13	4,057,843	237,366	1,014,711	5,067,564			
	14	9,546,733	46,071,432	2,335,877	6,103,459			
	15	804,734	1,698,694	346,327				
	16	246,977	92,781	204,418	567,522	972,198		
	17	713,460	476,607	273,162	1,128,784			
	18	739,361	1,765	12,255				
	19	130,946	190,554	88,119				
	20	689,200		363,498				
	28	1,679,082	739,552	1,263,263	2,122,032			46,994
	Total	18,608,336	49,508,751	5,901,630	14,989,361	972,198		46,994
Lower Fraser R	29B	246,802	322,162	410,536	85,915			5,019
	29C	72,605	752,812	344,715	804,000	2,467,732		
	29D	447,515	10,326,747	1,267,637	4,512,283	38,009,407	21,703	65,008
	29E	1,414,895	1,512,114	1,169,402	3,077	27,432		119,256
	Total	2,181,817	12,913,835	3,192,290	5,405,275	40,504,571	21,703	189,283
Upper Fraser R	29F	414,466		139,959		5,515,083		
	29G					1,600,000		
	29I					1,009,204		
	29J			83,994				
	29K	943,838		194,015				
	Total	1,358,304		417,968		8,124,287		
Okanagan	31					843,800		
	Total					843,800		
Total All Areas		41,340,687	103,000,691	12,124,803	22,531,653	133,141,503	21,703	407,036

Table 3A. Annual commercial catch by Canada of pink, chum, sockeye, coho and chinook salmon from 1979 to 2012 in millions of fish (2012 catches are preliminary).

Year	Total	Pink	Chum	Sockeye	Coho	Chinook
1979	23.29	11.81	0.85	5.67	3.63	1.33
1980	19.65	8.36	3.41	3.19	3.42	1.27
1981	31.55	18.07	1.12	8.41	2.82	1.13
1982	20.10	2.68	2.97	10.06	3.17	1.23
1983	35.52	23.94	1.00	5.50	4.13	0.95
1984	19.01	7.49	1.84	5.07	3.60	1.01
1985	41.73	20.22	5.47	12.22	2.95	0.87
1986	39.82	17.98	5.58	10.55	4.90	0.81
1987	25.10	13.35	2.27	5.37	3.35	0.77
1988	37.20	23.12	6.17	4.45	2.74	0.72
1989	36.68	17.05	1.81	13.75	3.43	0.65
1990	39.08	17.22	3.18	14.15	3.87	0.66
1991	40.81	23.98	2.35	10.34	3.51	0.64
1992	26.07	10.26	4.01	8.17	2.96	0.68
1993	34.92	10.13	4.22	18.06	1.89	0.62
1994	21.01	2.21	4.32	11.50	2.55	0.43
1995	20.68	11.73	2.48	4.41	1.87	0.19
1996	14.95	5.72	1.44	6.42	1.32	0.06
1997	20.67	6.56	1.95	11.70	0.23	0.23
1998	9.39	2.42	4.86	1.93	0.01	0.17
1999	8.07	6.07	1.07	0.77	0.02	0.13
2000	8.76	4.49	0.60	3.56	0.02	0.09
2001	11.36	6.83	1.36	3.03	0.02	0.12
2002	12.91	5.33	2.95	4.21	0.14	0.29
2003	17.26	10.72	3.15	2.79	0.25	0.35
2004	9.04	2.35	3.48	2.44	0.36	0.41
2005	11.89	8.28	2.36	0.49	0.42	0.34
2006	8.16	0.78	2.32	4.65	0.15	0.27
2007	8.81	6.61	1.06	0.66	0.28	0.20
2008	1.69	0.23	0.46	0.77	0.08	0.16
2009	11.16	9.81	0.76	0.21	0.24	0.14
2010	11.46	0.78	0.13	10.23	0.14	0.18
2011	9.73	5.91	1.91	1.35	0.33	0.24
2012	3.01	0.78	0.99	0.86	0.22	0.16

Table 3B. Annual commercial catch by Canada of pink, chum, sockeye, coho and chinook salmon from 1925 to 2012 in thousands of metric tonnes (2012 catches are preliminary).

Year	Total	Pink	Chum	Sockeye	Coho	Chinook
1979	66.42	26.92	5.09	15.75	11.21	7.46
1980	59.82	15.23	18.75	8.53	10.01	7.29
1981	85.69	41.64	6.66	22.76	8.18	6.45
1982	71.27	4.26	16.43	32.78	10.07	7.72
1983	81.28	43.18	5.33	15.52	11.39	5.87
1984	54.68	13.08	9.80	13.97	11.00	6.83
1985	116.94	41.15	25.75	34.29	9.78	5.96
1986	112.99	32.06	27.44	33.57	14.45	5.46
1987	72.55	29.41	11.97	16.32	9.14	5.72
1988	95.16	35.13	32.98	12.93	7.68	6.43
1989	96.34	33.70	10.15	37.31	9.49	5.68
1990	104.82	28.64	18.71	40.33	11.48	5.67
1991	93.11	38.16	11.15	27.38	10.93	5.50
1992	72.10	16.14	19.56	22.66	7.96	5.79
1993	92.36	17.55	18.81	46.10	4.68	5.22
1994	71.39	3.71	22.13	33.36	8.33	3.86
1995	52.84	21.55	13.19	11.24	5.23	1.62
1996	36.51	8.35	7.25	16.83	3.67	0.40
1997	50.39	12.12	8.48	27.20	0.76	1.84
1998	32.08	3.92	21.09	5.52	0.03	1.52
1999	18.06	9.54	5.61	2.04	0.05	0.81
2000	20.49	7.43	3.12	9.30	0.07	0.57
2001	28.76	12.28	6.91	8.70	0.06	0.81
2002	38.49	8.60	14.89	12.40	0.54	2.06
2003	42.41	16.82	14.87	7.24	0.96	2.52
2004	30.46	3.83	16.05	6.29	1.38	2.91
2005	31.81	15.08	11.88	1.28	1.53	2.04
2006	26.90	1.50	11.49	11.32	0.58	2.00
2007	21.88	12.55	5.32	1.80	0.76	1.45
2008	5.85	0.39	2.21	1.87	0.33	1.06
2009	20.44	14.35	3.61	0.55	0.88	1.04
2010	30.30	1.25	0.64	26.69	0.52	1.20
2011	24.77	10.70	8.23	3.21	1.09	1.53
2012	10.04	1.14	4.98	2.15	0.74	1.02