

# **2016 Kotzebue Sound Salmon Fisheries Management Plan**

by

**Jim Menard**

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May 2016

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code		all standard mathematical signs, symbols and abbreviations	
deciliter	dL		AAC		
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H <sub>A</sub>
hectare	ha			base of natural logarithm	<i>e</i>
kilogram	kg	all commonly accepted		catch per unit effort	CPUE
kilometer	km	professional titles	e.g., Dr., Ph.D., R.N., etc.	coefficient of variation	CV
liter	L			common test statistics	(F, t, $\chi^2$ , etc.)
meter	m	at	@	confidence interval	CI
milliliter	mL	compass directions:		correlation coefficient (multiple)	R
millimeter	mm	east	E	correlation coefficient (simple)	r
<b>Weights and measures (English)</b>		north	N	covariance	cov
cubic feet per second	ft <sup>3</sup> /s	south	S	degree (angular )	°
foot	ft	west	W	degrees of freedom	df
gallon	gal	copyright	©	expected value	<i>E</i>
inch	in	corporate suffixes:		greater than	>
mile	mi	Company	Co.	greater than or equal to	≥
nautical mile	nmi	Corporation	Corp.	harvest per unit effort	HPUE
ounce	oz	Incorporated	Inc.	less than	<
pound	lb	Limited	Ltd.	less than or equal to	≤
quart	qt	District of Columbia	D.C.	logarithm (natural)	ln
yard	yd	et alii (and others)	et al.	logarithm (base 10)	log
		et cetera (and so forth)	etc.	logarithm (specify base)	log <sub>2</sub> , etc.
<b>Time and temperature</b>		exempli gratia		minute (angular)	'
day	d	(for example)	e.g.	not significant	NS
degrees Celsius	°C	Federal Information Code	FIC	null hypothesis	H <sub>0</sub>
degrees Fahrenheit	°F	id est (that is)	i.e.	percent	%
degrees kelvin	K	latitude or longitude	lat. or long.	probability	P
hour	h	monetary symbols		probability of a type I error	
minute	min	(U.S.)	\$, ¢	(rejection of the null hypothesis when true)	$\alpha$
second	s	months (tables and figures): first three letters	Jan.,...,Dec	probability of a type II error	
<b>Physics and chemistry</b>		registered trademark	®	(acceptance of the null hypothesis when false)	$\beta$
all atomic symbols		trademark	™	second (angular)	"
alternating current	AC	United States		standard deviation	SD
ampere	A	(adjective)	U.S.	standard error	SE
calorie	cal	United States of America (noun)	USA	variance	
direct current	DC	U.S.C.	United States Code	population sample	Var var
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm	U.S. state	use two-letter abbreviations		
parts per thousand	ppt, ‰		(e.g., AK, WA)		
volts	V				
watts	W				

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**2016 KOTZEBUE SOUND SALMON FISHERIES MANAGEMENT PLAN**

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# TABLE OF CONTENTS

	Page
LIST OF TABLES.....	I
LIST OF FIGURES.....	I
ABSTRACT .....	1
INTRODUCTION.....	1
Historical Fishing Effort.....	1
Subsistence Fishery .....	1
Commercial Fishery.....	1
2016 RUN OUTLOOK .....	2
Management Strategies.....	3
Escapement Objectives.....	3

## LIST OF TABLES

Table	Page
1. Kotzebue District chum salmon fishery historical information, 1962–2015.....	6

## LIST OF FIGURES

Figure	Page
1. Kotzebue Sound salmon subdistricts.....	7



## ABSTRACT

This management plan provides the expected 2016 run outlooks and harvest strategies for Kotzebue Sound salmon fisheries. Chum salmon *Oncorhynchus keta* are the dominant salmon species in the Kotzebue District most of which are produced in the Kobuk River and Noatak River drainages. Based on the chum salmon run outlook no closures in subsistence fishing are expected and there will be a surplus for commercial harvest. Because of a limited amount of cargo space on airplanes to move the catch to processing facilities the department will open the commercial fishery based on the buyer capacity. The department will restrict commercial fishing time if commercial catches or test fish catches indicate a weak run or if a more orderly fishery is necessary to prevent waste.

Key words: Kotzebue Sound, Kobuk, Noatak, chum salmon, *Oncorhynchus keta*, subsistence, commercial, fishing, escapement, management strategy.

## INTRODUCTION

This Kotzebue District salmon fisheries management plan is to inform fishermen, processors and other interested people of the management strategies for the commercial salmon fishery. The Kotzebue District includes all waters from Cape Prince of Wales to Point Hope. The Kotzebue District is divided into three subdistricts. Subdistrict 2, near the mouth of the Noatak River is closed to commercial fishing by regulation. Most fishing occurs in Subdistrict 1, which is subdivided into six statistical areas to help managers determine catch location (Figure 1). Within the Kotzebue District chum salmon *Oncorhynchus keta* are the most abundant anadromous fish. Other salmon species (Chinook *O. tshawytscha*, pink, *O. gorbuscha*, coho, *O. kisutch*, and sockeye *O. nerka*) occur in lesser numbers, as do Dolly Varden *Salvelinus malma*, and sheefish (inconnu) *Stenodus leucichthys*.

## HISTORICAL FISHING EFFORT

### Subsistence Fishery

Subsistence fishing has long been an important food gathering activity for people of the Kotzebue Sound drainages. The most recent subsistence survey of salmon harvests in 2012, excluding city of Kotzebue residents, estimated a total of 18,879 chum salmon were harvested from the Kobuk River and 7,814 chum salmon were harvested from the Noatak River. Over 90% of the subsistence salmon harvests are chum salmon. Subsistence salmon surveys were done in 2013 and 2014, but the results are not yet available. Previous surveys in the 2000s indicate that Kotzebue residents harvest approximately the same amount of salmon as all the other villages combined.

### Commercial Fishery

The historical commercial chum salmon harvests are listed in Table 1. Commercial chum salmon harvests during the 20 years when there was a major buyer (1982–2001) ranged from 55,907 to 521,406 fish, the 20-year average being 220,720. The 5-year (1997–2001) average catch was 141,741. This significant decrease reflects the lack of demand for salmon on the open market that began in the mid-1990s as buyers began to purchase less salmon. Fishing effort during 1982–2001 ranged from 45 to 199 fishermen. The 20-year average was 129 fishermen; the 5-year average from 1997–2001 was 61 fishermen. The decrease in participation was likely due to substantial price declines and declining market.

In 2002, the last significant buyer in the commercial fishery decided to not purchase fish in Kotzebue. Because there was no major buyer only 3 permit holders fished in 2002. Likewise, in 2003 there were only 4 permit holders. In both 2002 and 2003, one permit holder became a licensed agent for a buyer outside of Kotzebue, and worked with other permit holders to provide product for that market.

Beginning in 2004 one buyer provided a limited market for permit holders. From 2004–2008 there were less than 50 permit holders participating in the commercial fishery each year with the average being 44 permit holders. The fishing effort was approximately one-third the fishing effort of 20 years prior to this time period. In 2009 there was an increase to 62 permit holders participating in the fishery and in 2010, 67 permit holders fished. In 2011, because of runway closures at the Kotzebue airport due to construction, the buyer switched to evening and overnight fishing periods. Although the price of \$0.40 per pound for chum salmon was the same as the previous year there was a much larger fishing effort in 2011 when 89 permit holders fished. The increase in fishing effort was likely the result of the evening fishing hours allowing those with day jobs to participate in the fishery. The buyer decided to continue with evening fishing periods in 2012 because of the increased fishing effort compared to previous years. There was a slight drop in fishing effort with 83 permit holders participating in the 2012 commercial fishery and this may have been attributable to the chum salmon price of \$0.32 per pound that was a 20% decrease from the price paid in 2011. The 2012 catch of 227,965 chum salmon was below the previous 2 years, but was the fourth highest commercial catch in 20 years. In 2013, a second buyer purchased salmon late in the season, but a further decrease of nearly 20% of the chum salmon price per pound to \$0.27 likely contributed to only 66 permit holders fishing.

One of the best chum salmon runs in history in 2014 combined with three major buyers resulted in the price peaking early in the season at \$0.78 per pound and an average price of \$0.56 per pound. The harvest of 636,187 chum salmon was the second greatest on record and the 94 permit holders fishing was the highest in 20 years.

However, there was only one major buyer in 2015 and because of capacity issues the buyer had daily catch limits for the fishermen and chose not to buy some days during the peak fishing weeks. The average of \$0.33 per pound was a nearly 40% drop from the previous year. However, participation by 103 permit holders in the fishery was the highest number since 1994 when 109 permit holders sold fish. The highest fishing effort occurred on August 11 when 72 permit holders fished. This was the greatest number of permit holders to participate during one fishing period since 1994. One difference was that period length in 1994 was 36 hours compared to 6 hours in 2015 (Table 1).

## **2016 RUN OUTLOOK**

The outlook for the 2016 season is based on the parent-year escapements and returning age classes observed in the commercial fishery and in the test fish samples from the Kobuk River in 2015. The 4-year-old component of the run is expected to be average based on the 3-year-old return in 2013. The 5-year-old component of the run is expected to be above average based on the 4-year-old return last year. The 3-year-old and 6-year-old age classes are much smaller components of the run and are expected to be average. The commercial harvest is expected to fall within the range of 300,000 to 500,000 chum salmon, if market conditions can accept that level of harvest and at least one major buyer is present in 2016.



## **MANAGEMENT STRATEGIES**

No subsistence fishing restrictions are expected in 2016. Primary commercial fishery management objectives are to provide adequate chum salmon passage through the commercial fishery: (1) to ensure sustained runs by allowing adequate escapement, and (2) to meet subsistence harvest uses. Fishery management will be dependent on comparing period and cumulative season catch rates to prior years and test fishing results on the Kobuk River, and the Noatak River if test fishing occurs there.

Age composition of commercial salmon catches will be monitored to determine the strength of age classes in the run. If there is a low abundance of older salmon, which tend to migrate into freshwater first, catch rates will likely be weak early in the season. A strong 4-year-old return may cause midseason catches to rise.

Demand for chum salmon is unknown at this time, but the major buyer and one minor buyer from last year have confirmed that they plan to return for 2016 season.

If the commercial fishery is similar to last year there will be 6 to 12 hour fishing periods on any day of the week, except Saturday in the first 2 weeks of July and likely shorter fishing periods as the peak of the run comes in. If buyers opt for longer fishing periods similar to the 12-hour periods in the late 1990s and early 2000s then there will likely be a 1-day closure midweek unless the run is strong enough to allow fishing periods 6 days per week. However, if the buyers have fishermen on catch limits the department in agreement with the buyers could open commercial fishing continuously and let the buyers decide when their fleet would fish.

The department intends to open the commercial fishery anytime after July 9 when the buyers are ready or permit holders indicate they are ready to fish and a market is available. By regulation the commercial season closes after August 31.

If poor run strength necessitates fishing restrictions, the department will establish periodic closures of the fishery. The department will confer with buyers if concern arises about salmon runs and the need to reduce commercial fishing time.

If commercial catches indicate a weak run, and are in agreement with test fish catches in the Kobuk River, the department will consider reducing fishing time in late July to two short duration periods per week or less. If commercial catches indicate sufficient run strength the department will allow commercial fishing to continue based on market conditions and escapement indicators. Likewise, in August as the Noatak River chum salmon run passes through the district the department will consider restrictions if commercial catches indicate a weak run.

## **ESCAPEMENT OBJECTIVES**

Inseason escapement-based management will consist of one test fish project on the Kobuk River, possible limited test fishing on the Noatak River, and reports from subsistence fishermen. The test fishing project on the Kobuk River, in the vicinity of Kiana, will provide an inseason index of chum salmon passage. The department has an index objective of 600 for the season at the test fish project. If the index is projected to fall short of 600, then a restriction in commercial fishing time will be necessary to make sure adequate escapement is moving into the Kobuk River. Test fishing may occur in August on the Noatak River and comparisons made to previous season's catches. If there are poor test fish catches on the Noatak River or there are poor catches in the commercial fishery, then a restriction in commercial fishing time may be necessary.

Aerial surveys may be attempted beginning in September. Aerial surveys are not a direct count or estimate of the salmon population, but are used as an index for comparison with surveys both in season and in prior years. Surveys are conducted too late to affect present year fisheries decisions, but do provide useful information in evaluating management decisions and help project future salmon returns. Aerial survey data are utilized to: (1) evaluate initial run strength while salmon are traveling to the spawning grounds, and (2) document peak salmon abundance on the spawning grounds as an index to total escapement. These enumeration techniques are best initiated during times of low river water levels, high water clarity, and good sunlight penetration. Unfortunately, these conditions are not always available.

One of the primary fishery management strategies is to provide for escapement within sustainable escapement goal ranges (SEG) for each river system. These ranges developed in 2007 are based on an analysis of historical harvest and escapement information of specific index areas within major drainages. These aerial survey escapement objectives are: (1) subject to continued review, (2) intended to evaluate escapement trends between years, and (3) are not a total count of the salmon escapement. The Noatak and upper Kobuk Rivers are flown annually if personnel and weather conditions permit and other rivers are flown on an opportunistic basis. The chum salmon escapement goals are as follows: Noatak River (mouth to Kelly Bar, including the Eli River) — 42,000 to 91,000, Squirrel River — 4,900 to 10,500, Salmon River — 3,300 to 7,200, Tutuksuk River — 1,400 to 3,000, and upper Kobuk River — 9,700 to 21,000.

## **TABLES AND FIGURES**

Table 1.–Kotzebue District chum salmon fishery historical information, 1962–2015.

Year	Total Catch	Number of Permits <sup>a</sup>	Average Catch per Permit Holder	Gross Value of Catch to Permit Holders <sup>1</sup>
1962	129,948	84	1,547	\$4,500
1963	54,445	61	893	\$9,140
1964	76,449	52	1,470	\$34,660
1965	40,025	45	889	\$18,000
1966	30,764	44	699	\$25,000
1967	29,400	30	980	\$28,700
1968	30,212	59	512	\$46,000
1969	59,335	52	1,141	\$71,000
1970	159,664	82	1,947	\$186,000
1971	154,956	91	1,703	\$200,000
1972	169,664	104	1,631	\$260,000
1973	375,432	148	2,537	\$925,000
1974	627,912	185	3,394	\$1,822,784
1975	563,345	267	2,110	\$1,365,648
1976	159,796	220	726	\$580,375
1977	195,895	224	875	\$1,033,950
1978	111,494	208	536	\$575,260
1979	141,623	181	782	\$990,263
1980	367,284	176	2,087	\$1,446,633
1981	677,239	187	3,622	\$3,246,793
1982	417,790	199	2,099	\$1,961,518
1983	175,762	189	930	\$420,736
1984	320,206	181	1,769	\$1,148,884
1985	521,406	189	2,759	\$2,137,368
1986	261,436	187	1,398	\$931,241
1987	109,467	160	684	\$515,000
1988	352,915	193	1,829	\$2,581,333
1989	254,617	165	1,543	\$613,823
1990	163,263	153	1,067	\$438,044
1991	239,923	142	1,690	\$437,948
1992	289,184	149	1,941	\$533,731
1993 <sup>c</sup>	73,071	114	641	\$235,061
1994	153,452	109	1,408	\$233,512
1995	290,730	92	3,160	\$316,031
1996	82,110	55	1,493	\$56,310
1997	142,720	68	2,099	\$187,978
1998	55,907	45	1,242	\$70,587
1999	138,605	60	2,310	\$179,781
2000	159,802	64	2,497	\$246,786
2001	211,672	66	3,207	\$322,650
2002	8,390	3	2,797	\$7,572
2003	25,763	4	6,441	\$26,377
2004	51,077	43	1,188	\$64,420
2005	75,971	41	1,853	\$124,820
2006	137,961	42	3,301	\$229,086
2007	147,087	46	3,198	\$243,149
2008	190,550	48	3,970	\$385,270
2009	187,562	62	3,025	\$376,554
2010	270,343	67	4,035	\$860,125
2011	264,321	89	2,970	\$867,085
2012	227,965	83	2,747	\$567,665
2013	319,062	66	4,834	\$689,165
2014	636,252	94	6,769	\$2,879,016
Average	209,646	109	2,132	\$636,950
2015	306,174	103	2,973	\$825,500

<sup>a</sup> During 1962–1966 and 1968–1971 figures represent the number of vessels licensed to fish in the Kotzebue District, not the number of fishermen.

<sup>b</sup> Some estimates between 1962 and 1981 include only chum value which in figures represent over 99% of the total value. Figures after 1981 represent the chum value as well as incidental species such as Dolly Varden, whitefish and other salmon.

<sup>c</sup> Includes 2,000 chum salmon and \$3,648 from the Sikusuilaq Springs hatchery terminal fishery.

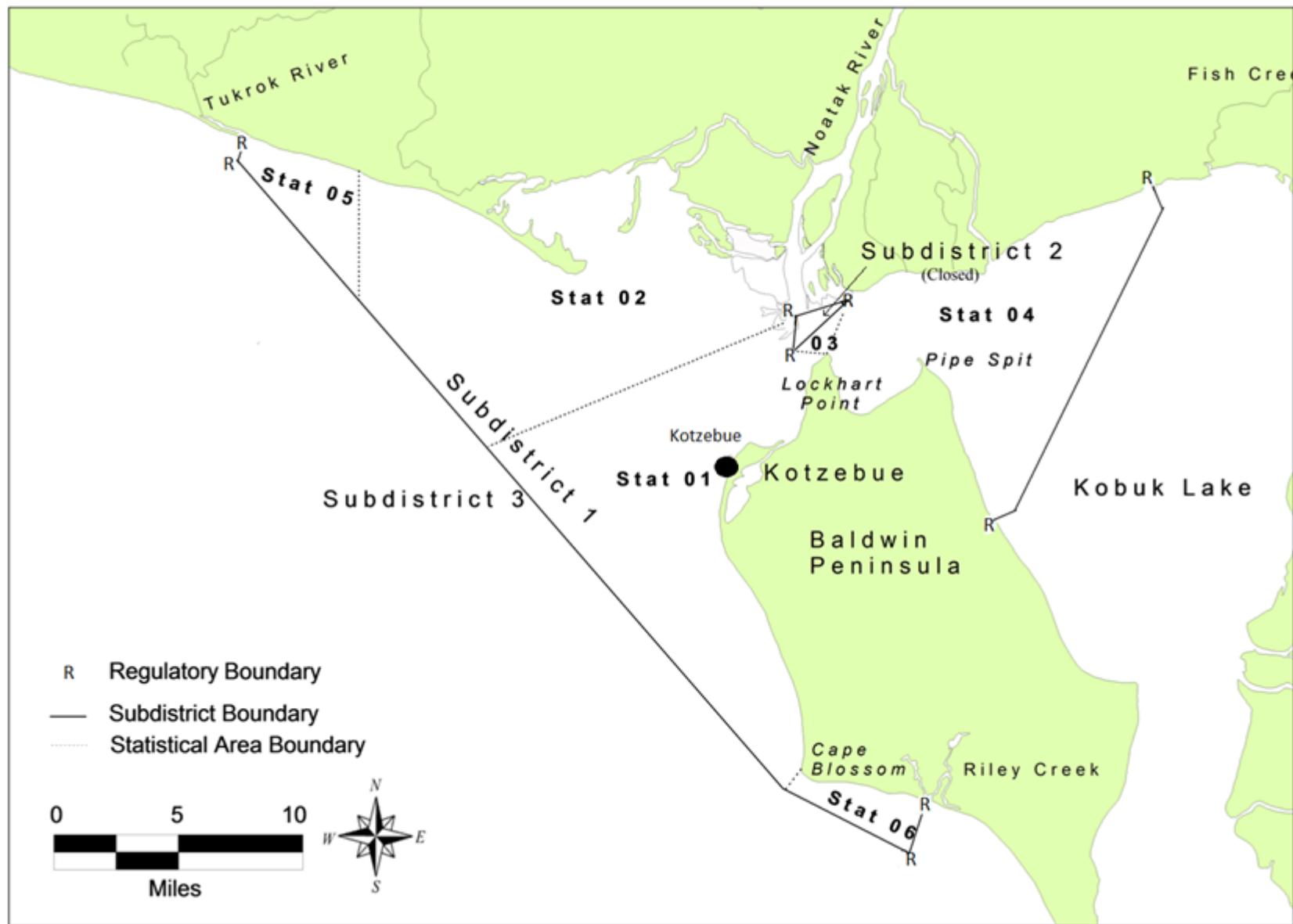


Figure 1.—Kotzebue Sound salmon subdistricts.