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Department of fish and Game

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M E M O R A N D U M

TO: Members
Alaska Board of Fisheries

DATE: October 7, 2022

FROM: Samuel Rabung Director SR
Division of Commercial Fisheries

and

David Rutz, Director
Division of Sport Fish

SUBJECT: Bristol Bay Management Area Stock of Concern Recommendations

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The *Policy for the Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222) directs the Alaska Department of Fish and Game (department) to report to the Alaska Board of Fisheries (board) on the status of salmon stocks and identify any stocks that present a concern related to yield, management, or conservation during regular board meetings. This memorandum summarizes the results of the stock of concern (SOC) evaluation for the Bristol Bay Management Area (BBMA) salmon stocks for the 2022/2023 board regulatory cycle. The evaluation includes input from headquarters, regional, and area management staff from both fishery divisions.

Currently there are 13 sustainable escapement goals, one optimal escapement goal, and two inriver goals in the BBMA (Table 1). Counting towers are used to monitor the majority of the sockeye salmon stocks that have escapement goals in the BBMA. Within the BBMA, sonar is used to assess Nushagak River sockeye, as well as king, chum, coho, and pink salmon spawning escapements.

Escapement goals have been achieved or exceeded for nearly all stocks in the BBMA, annually, for many years (Table 1). For this review, staff focused on Nushagak River stocks of king and chum salmon, where estimates of spawning escapements have fallen short of their escapement and inriver goals in some recent years.

The department recommends Nushagak River king salmon be designated a stock of management concern. The *Policy for the Management of Sustainable Salmon Fisheries* defines "management concern" as "a concern arising from a chronic inability, despite the use of specific

management measures, to maintain escapements for a salmon stock within the bounds of the SEG, BEG, OEG, or other specified management objectives for the fishery." Recent assessments of Nushagak River king salmon using sonar indicate this stock has failed to achieve the inriver goal of 95,000 king salmon in five of the last six years. Staff have previously expressed concerns regarding the ability of the sonar project to accurately enumerate king salmon passage (2019 and 2021 in particular). Because of uncertainty in the assessment, failure to achieve the inriver goal was the primary criterion staff used to quantify a chronic inability to achieve a specified management objective as the inriver goal was not achieved by a substantially higher degree. Additionally, the sustainable escapement goal (SEG) of 55,000–120,000 was likely not met in three or more years in the last six. Similarly, harvests for this stock have been lower than the historical average since 2008 (Table 2). The decline in harvest is attributable to reduced productivity, as well as the lack of a directed king salmon commercial fishery since 2014, and the use of specific management measures in the sport and commercial fisheries to reduce king salmon harvest. Given the uncertainty of the assessment, using the SEG as the metric for SOC status is less clear. However, when combined with the chronic inability to meet the inriver goal, even with specific management measures, staff consensus was that this warrants stock of management concern status.

The department intends to work with the Bristol Bay Science and Research Institute (BBSRI) to develop and implement an expanded stock assessment program for Nushagak River king salmon for 8–10 years to address the weaknesses of the existing assessment projects and provide information sufficient to determine when the Nushagak River king salmon is no longer a stock of management concern. Funding for the research will come in part from BBSRI, the fishing industry, and from a 5-year, $3.75 million Direct Legislative Grant provided by the State of Alaska to BBSRI in 2022.

The department considered but does not recommend Nushagak River chum salmon be designated a stock of management concern. The majority of Nushagak River chum salmon exhibit a life cycle/generation time that spans four years. In many recent years this stock exhibited high escapements that were well above the current lower-bound SEG of 200,000 (Table 1). However, from 2020–2022 escapement estimates for this stock were below the lower-bound SEG. Assessing whether there exists a chronic inability to achieve an escapement goal is key in the decision of whether to recommend a salmon stock for stock of concern status, or not. The *Policy for the Management of Sustainable Salmon Fisheries* defines "chronic inability" as the "continuing or anticipated inability to meet escapement thresholds over a four to five year period, which is approximately the generation time of most salmon species." The department acknowledges the decrease in Nushagak River chum salmon harvest (Table 3) and escapement estimates in the last three consecutive years. This stock has consistently met its SEG every year prior to 2019 and chum salmon stocks have shown a similar pattern throughout Western Alaska. But because this stock met its SEG twice within the last five years, and chum salmon chum stocks in Western Alaska have historically shown rapid recovery after periods of low productivity, staff consensus was that Nushagak River chum salmon does not warrant stock of concern status.

Literature Cited

Munro, A.R., and R.E. Brenner. 2022. Summary of Pacific salmon escapement goals in Alaska, with a review of escapements from 2013 to 2021. Alaska Department of Fish and Game, Fisheries Manuscript Series No. 22-02, Anchorage.

Table 1.– Bristol Bay Management Area king, chum, coho, pink, and sockeye salmon escapement goals, inriver goals, escapements, and inriver abundance estimates from 2013 to 2022 (modified from Munro and Brenner, 2022). Shaded cells indicate escapements below the goal.

	2022 Goal range			Initial	Escapement									
System	Lower	Upper	Type	year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022[a]
KING SALMON														
Nushagak River	55,000	120,000	SEG	2013	104,794	62,679	91,090	118,077	52,297	91,354	41,258	40,313	50,792[a]	<44,434
	95,000		Inriver[b]	2013	113,709	70,460	98,019	125,368	56,961	97,239	46,763	43,032	55,222	44,434
CHUM SALMON														
Nushagak River[c]	200,000		LB SEG	2013	604,540	493,821	288,929	419,810	415,488	735,628	514,339	110,592	124,419	116,692
COHO SALMON														
Nushagak River	60,000	120,000	SEG	2013	207,222	478,198	NS	NS	NS	111,455	51,852	NS	NS	NS
	70,000	130,000	Inriver[b]		207,222	478,198	NS	NS	NS	111,455	51,852	NS	NS	NS
PINK SALMON														
Nushagak River (even years)	165,000		LB SEG	2013	NA	2,281,831	NA	NS	NA	628,069	NA	NS	NA	NS
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SOCKEYE SALMON														
Kvichak River	2,000,000	10,000,000	SEG	2010	2,088,576	4,458,540	7,348,572	4,462,728	3,163,404	4,398,708	2,371,242	4,030,968	4,703,520	4,224,882
Alagnak River[d]	210,000		LB SEG	2019	1,095,950	189,452	5,452,026	1,677,769	2,041,824	1,581,426	820,458	2,386,518	3,236,904	1,668,222
Naknek River[e]	800,000	2,000,000	SEG	2015	938,160	1,474,428	1,920,954	1,691,910	1,899,972	2,221,152	2,911,470	4,112,160	2,796,534	1,921,296
Egegik River	800,000	2,000,000	SEG	2015	1,113,630	1,382,466	2,160,792	1,837,260	2,600,982	1,608,357	2,340,210	2,389,728	1,832,196	1,786,152
Ugashik River	500,000	1,400,000	SEG	2015	898,110	640,158	1,564,638	1,635,270	1,186,446	1,167,792	1,547,748	1,745,940	2,859,930	1,436,784
Wood River	700,000	1,800,000	SEG	2015	1,183,348	2,764,614	1,941,474	1,309,707	4,274,224	7,507,254	2,073,276	2,243,886	4,410,156	3,747,612
Igushik River	150,000	400,000	SEG	2015	387,036	340,590	651,172	469,230	578,700	770,772	256,074	323,814	878,952	377,760
Nushagak River	260,000	760,000	OEG	2013	894,148	618,477	796,684	680,512	2,852,308	1,247,460	709,431	1,228,059	4,697,299	3,457,752
	370,000	900,000	SEG	2015										
Togiak River	120,000	270,000	SEG	2010	128,118	151,934	218,700	200,046	195,330	511,770	351,846	261,126	280,836	239,646

Note: SEG = sustainable escapement goal; LB SEG = lower-bound SEG; OEG = optimal escapement goal; NA = not applicable; NS = no survey

[a] Preliminary data.

[b] Inriver goals for Nushagak king and coho salmon are assessed by the Nushagak River sonar project at Portage Creek.

[c] Escapement goal for Nushagak River chum salmon is based on sonar count through July 20. Fish counts past July 20 are not included in this table.

[d] 2013 to 2016 Alagnak River sockeye salmon escapements estimates were expanded from aerial survey estimates.

[e] Naknek River has an OEG of 800,000–2,000,000 sockeye salmon when the Naknek River Special Harvest Area is open to fishing.

Table 2.– Historical escapement and harvest estimates for Nushagak River king salmon, 1980–2022.

Year	Sonar Estimate	Escapement Estimate	Harvest Above Sonar	Harvest Below Sonar	Total Harvest	Harvest Rate
1980	293,366	289,040	4,326	73,189	77,515	0.21
1981	312,091	307,527	4,565	201,616	206,181	0.40
1982	305,849	300,656	5,194	204,017	209,211	0.41
1983	336,497	331,270	5,227	145,699	150,926	0.31
1984	168,404	163,544	4,861	68,699	73,560	0.31
1985	240,768	236,899	3,869	73,666	77,535	0.25
1986	91,663	82,777	8,887	74,286	83,173	0.50
1987	175,414	169,562	5,853	56,039	61,891	0.27
1988	118,397	113,006	5,392	23,511	28,902	0.20
1989	162,916	158,551	4,365	24,729	29,093	0.16
1990	133,065	126,747	6,318	23,598	29,916	0.19
1991	217,114	210,346	6,768	29,604	36,372	0.15
1992	172,374	166,965	5,409	59,729	65,138	0.28
1993	203,508	197,098	6,411	79,885	86,295	0.30
1994	199,643	190,121	9,522	134,964	144,485	0.43
1995	178,146	173,014	5,132	92,981	98,113	0.36
1996	108,456	102,348	6,108	84,686	90,793	0.47
1997	170,610	165,062	5,548	76,718	82,265	0.33
1998	244,461	235,845	8,617	127,177	135,793	0.37
1999	129,686	123,906	5,781	19,562	25,342	0.17
2000	117,288	110,682	6,607	20,756	27,362	0.20
2001	191,988	184,317	7,671	21,318	28,989	0.14
2002	181,307	174,704	6,603	48,178	54,781	0.24
2003	166,507	158,307	8,200	59,087	67,287	0.30
2004	242,183	233,422	8,761	114,057	122,818	0.34
2005	234,123	223,950	10,173	73,578	83,751	0.27
2006	124,683	117,364	7,319	94,178	101,497	0.46
2007	60,459	50,960	9,499	64,976	74,475	0.59
2008	97,330	91,364	5,966	31,422	37,388	0.29
2009	81,480	74,781	6,699	36,456	43,155	0.37
2010	60,185	56,092	4,093	34,060	38,153	0.40
2011	108,278	101,995	6,283	36,954	43,237	0.30
2012	174,085	167,589	6,496	21,021	27,517	0.14
2013	113,709	104,794	8,915	19,073	27,988	0.21
2014	70,460	62,679	7,781	26,179	33,960	0.35
2015	98,019	91,090	6,929	62,694	69,623	0.43
2016	125,368	118,077	7,291	42,172	49,463	0.30
2017	56,961	52,297	4,664	45,122	49,786	0.49
2018	97,239	91,354	5,885	50,768	56,653	0.38
2019	46,763	41,258	5,505	33,655	39,160	0.49
2020	43,032	40,313	2,719	14,936	17,655	0.30
2021	55,222	50,792	4,430	11,715	16,145	0.24
2022	44,434	--	--	--	--	--
1980-2022						
Mean	152,408	148,630	6,348	62,779	69,127	0.32
SD	77,634	79,091	1,954	46,640	47,011	0.12
Median	133,065	142,527	6,195	53,403	59,272	0.30
No. of Years	43	42	42	42	42	42

Note: Harvest estimates are not yet available for 2022.

Table 3.– Historical escapement and commercial harvest estimates for Nushagak River chum salmon, 1980–2022.

Year	Escapement Index [a]	Commercial Harvest	Harvest Rate
1980	415,727	NA	
1981	182,021	NA	
1982	262,597	NA	
1983	107,780	NA	
1984	450,031	NA	
1985	245,797	396,740	0.62
1986	203,810	488,375	0.71
1987	175,551	416,476	0.70
1988	217,772	371,199	0.63
1989	461,456	523,910	0.53
1990	373,126	375,631	0.50
1991	350,186	463,780	0.57
1992	383,303	398,691	0.51
1993	272,278	505,799	0.65
1994	467,930	328,267	0.41
1995	266,432	390,158	0.59
1996	279,406	331,494	0.54
1997	76,034	185,647	0.71
1998	369,447	208,634	0.36
1999	296,408	170,806	0.37
2000	173,712	114,456	0.40
2001	646,984	526,739	0.45
2002	509,106	276,787	0.35
2003	375,175	740,372	0.66
2004	332,347	458,916	0.58
2005	569,034	966,069	0.63
2006	661,002	1,240,235	0.65
2007	161,483	953,285	0.86
2008	326,300	492,341	0.60
2009	438,481	745,161	0.63
2010	273,914	424,234	0.61
2011	248,278	296,909	0.54
2012	395,162	272,163	0.41
2013	628,134	586,117	0.48
2014	525,797	242,403	0.32
2015	288,929	502,981	0.64
2016	419,810	397,757	0.49
2017	415,488	804,900	0.66
2018	735,628	1,020,624	0.58
2019	514,339	856,035	0.62
2020	110,592	138,380	0.56
2021	124,419	108,076	0.46
2022[b]	116,692	172,300	0.60
1980-2022			
Mean	345,300	470,864	0.56
SD	163,604	297,872	0.12
Median	332,347	407,584	0.58
No. of Years	43	38	38

[a] DIDSON conversion factor of 1.27 applied to all years prior to 2005. Escapement estimate for 2005 used strata- and species-specific correction factors applied to the Bendix north bank counting stratum. Counts from 2006 through 2015 are uncorrected DIDSON counts.

[b] Note: 2022 harvest estimate is preliminary.