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ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF COMMERCIAL FISHERIES

MEMORANDUM

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SUBJECT: Upper Cook Inlet stocks of concern recommendation

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The Sustainable Salmon Fisheries Policy (SSFP; 5 AAC 39.222) directs the department to provide the Alaska Board of Fisheries (BOF), at regular meetings, with reports on the status of salmon stocks and identify any salmon stocks that present a concern related to yield, management, or conservation. In the Upper Cook Inlet (UCI) Management Area no stocks have been identified as such. However, this memorandum does provide the department's assessment of the Yentna River sockeye salmon run, which has had difficulty in recent years in reaching its SEG range.

Yentna River sockeye salmon

Stock Assessment

The Susitna River sockeye salmon run is thought to be a large contributor to major sockeye salmon runs in Upper Cook Inlet. During 1976-2001, estimated total UCI sockeye salmon runs ranged from 1.8-12.1 million, while estimated Susitna River sockeye salmon runs ranged from 280 thousand to 773 thousand, and averaged 492 thousand (Tobias and Willette 2001). Management of the Susitna River sockeye salmon run is based upon sonar estimates on the Yentna River, which is thought to be a major producer of sockeye salmon in the Susitna drainage and an indicator of run strength in the mainstem Susitna River. Technical challenges currently preclude operation of sonar on the lower main-stem Susitna River. Since 1981, based upon sonar estimates, the number of Yentna River spawners has ranged from approximately 37 thousand to 181 thousand sockeye salmon.

How well the sonar indexes total escapement has not been verified. The Yentna River is a large, dynamic glacial river that is difficult to assess using sonar, mid-river sections are not ensonified, and significant runs of other salmon species occur where fishwheels must be used to apportion the total sonar count by species. Any one of these issues will create biases in the estimation of species-specific escapement. Whether any of these biases are significant, or if they vary seasonally or annually, is unknown.

Currently, the Yentna River sockeye salmon escapement goal, 90,000 to 160,000 fish, is a sustainable escapement goal (SEG) that was adopted in 2002 (Bue and Hasbrouck *Unpublished*). An SEG is a level of escapement that is known to provide for sustained yield over a 5 to 10 year period and is used in situations where a biological escapement goal (BEG) cannot be estimated due to a concern about the spawner-return data (lack of age composition estimates and/or concern with stock-specific catch allocation) or there is a lack of information on stock productivity. In 2005, the Alaska Board of Fisheries defined an optimal escapement goal of 75,000-180,000 fish in the Yentna River that applies when the run of Kenai River sockeye salmon exceeds 4 million fish (5AAC21.358).

In January 2007, an interdivisional salmon escapement goal review team, including staff from the Division of Commercial Fisheries and Sport Fish Division, was formed to comprehensively review the existing salmon escapement goals in the Upper Cook Inlet Management Area based on the SSFP and the Policy for Statewide Salmon Escapement Goals (5 AAC 39.223). While this review is ongoing, the recommendation of the escapement goal review team is that the

current Yentna River sockeye salmon escapement goal should remain unchanged. Results of this escapement goal review will be available in a written report published by December 1, 2007.

Regulatory History

At this time, five of the last seven years of sonar escapement estimates of sockeye salmon into the Yentna River have fallen below the lower end of the SEG (Figure 1). This issue has been addressed in the immediate term by placing restrictions on fisheries that harvest this stock. For the last seven seasons the Northern District set gillnet fishery has been closed for one or more periods, except in 2000.

The drift gillnet fishery has also been restricted each year since 2001 for one or more periods in an attempt to meet the Yentna River sockeye salmon escapement goal. Additionally, in 2005, the department implemented a more conservative fishing schedule with the drift fleet than was allowed in regulation to conserve Northern District fish, including Yentna River sockeye salmon stocks. Restrictions to the drift fleet included: 1) closing areas where Yentna River sockeye salmon were thought to be; and 2) not exercising a third commercial opening that was allowed by the Central District Drift Gillnet Fishery Management Plan (5 AAC 21.353). In addition the Northern District set gillnet fishery was closed for five regular fishing periods from July 21 through August 4. Actions taken in the drift fishery may not be observed or realized until 10 to 14 days later and actions taken in the Northern District may not be realized for 7 to 10 days. Once the effects of the first actions are observed it is generally too late to take further corrective actions. The subsistence fishery in the Yentna River has not been restricted.

The sport fishery was also restricted in each of the last four seasons by closing the fishery to retention of sockeye salmon.

Stock of Concern Recommendation

Given the recent pattern of low sockeye salmon escapements to the Susitna River drainage, the department is working to resolve two uncertainties regarding this stock. The first uncertainty is our understanding of stock structure, and the harvest of these stocks in the mixed stock fishery. An ongoing comprehensive study includes processing genetic material to develop a DNA genetic baseline. Sockeye salmon caught in the drift and set gill net fisheries of Upper Cook Inlet will continue to be sampled and DNA analysis conducted to determine river of origin. The second uncertainty concerns the overall sockeye salmon escapement into the Susitna River. We currently have a sonar assessment project on the Yentna River to estimate escapement but it is uncertain how well the sonar indexes escapement in the Yentna River and what contribution escapement in the Yentna River makes to the overall Susitna River sockeye salmon escapement.

The ADF&G, with participation from Cook Inlet Aquaculture Association, is estimating adult sockeye salmon abundance within the entire Susitna River during 2006, 2007, and 2008. A mark-recapture and radio telemetry study will provide an estimate of sockeye salmon escapement in the Susitna River drainage (Yentna River and mainstem Susitna River) to compare with the existing Yentna River sonar and allow the identification of potential spawning areas in the drainage. Such abundance estimates will allow: 1) estimation of the total annual run of Susitna River sockeye salmon, when abundance estimates and genetics-based harvest allocation

estimates are combined, 2) evaluation of the accuracy of the Yentna River sonar estimate, and 3) the proportion of Yentna River sockeye salmon in the entire Susitna River sockeye salmon escapement. The uncertainties in the Yentna River sonar estimate and contribution of Yentna River sockeye salmon to the entire Susitna River escapement has questioned our assumptions of Susitna River drainage sockeye salmon productivity used in managing this mixed-stock fishery.

Additionally, the department is evaluating the current sockeye salmon escapement assessment tool, a Bendix single beam sonar system, with a more advanced and proven hydroacoustic system known as DIDSON. The transition from Bendix sonar to DIDSON is occurring throughout the Cook Inlet management area. The first full season comparison between the two sonar systems for the Yentna River began in 2006.

In summary, the department does not believe the sustainability of the Yentna River sockeye salmon stock, as defined by the *Sustainable Salmon Fisheries Policy* (5 AAC 39.222), is jeopardized despite the failure to reach escapement goals in five of the last seven years. As defined in this policy, sustained yield means an average annual yield that results from a level of salmon escapement that can be maintained on a continuing basis; a wide range of average annual yield levels is sustainable; a wide range of annual escapement levels can produce sustained yields. However, the department is treating the persistently low escapements of sockeye salmon to the Yentna River as a serious issue. This issue has been addressed in the short term by placing restrictions on fisheries that harvest this stock, and in the longer term by a suite of research programs intended to: 1) answer key questions regarding the productivity of the stock and 2) improve our knowledge of where and how many sockeye salmon from this stock are harvested through genetic studies.

Partial and preliminary information from these studies will be available to the Board at the next regular Cook Inlet cycle meeting in February 2008. However, the majority of the findings and conclusions from these studies will not be available until the 2010-2011 Cook Inlet Board meeting. This information will help determine if stock specific fishing strategies may be developed for Upper Cook Inlet, as well as guide the implementation of any such fishing strategies to better assure achievement of the Yentna River sockeye salmon escapement goal.

Literature Cited

Bue, B. G., and J. J. Hasbrouck. *Unpublished.* Escapement goal review of salmon stocks of Upper Cook Inlet.. Alaska Department of Fish and Game, Report to the Alaska Board of Fisheries, November 2001 (and February 2002), Anchorage.

Tobias, T., and T.M. Willette. 2001. An estimate of total return of sockeye salmon to upper Cook Inlet, Alaska 1976-2001. Alaska Department of Fish and Game, Susitna River Aquatic Studies Program, Anchorage, Alaska. Regional Information Report No. 2A01-06.

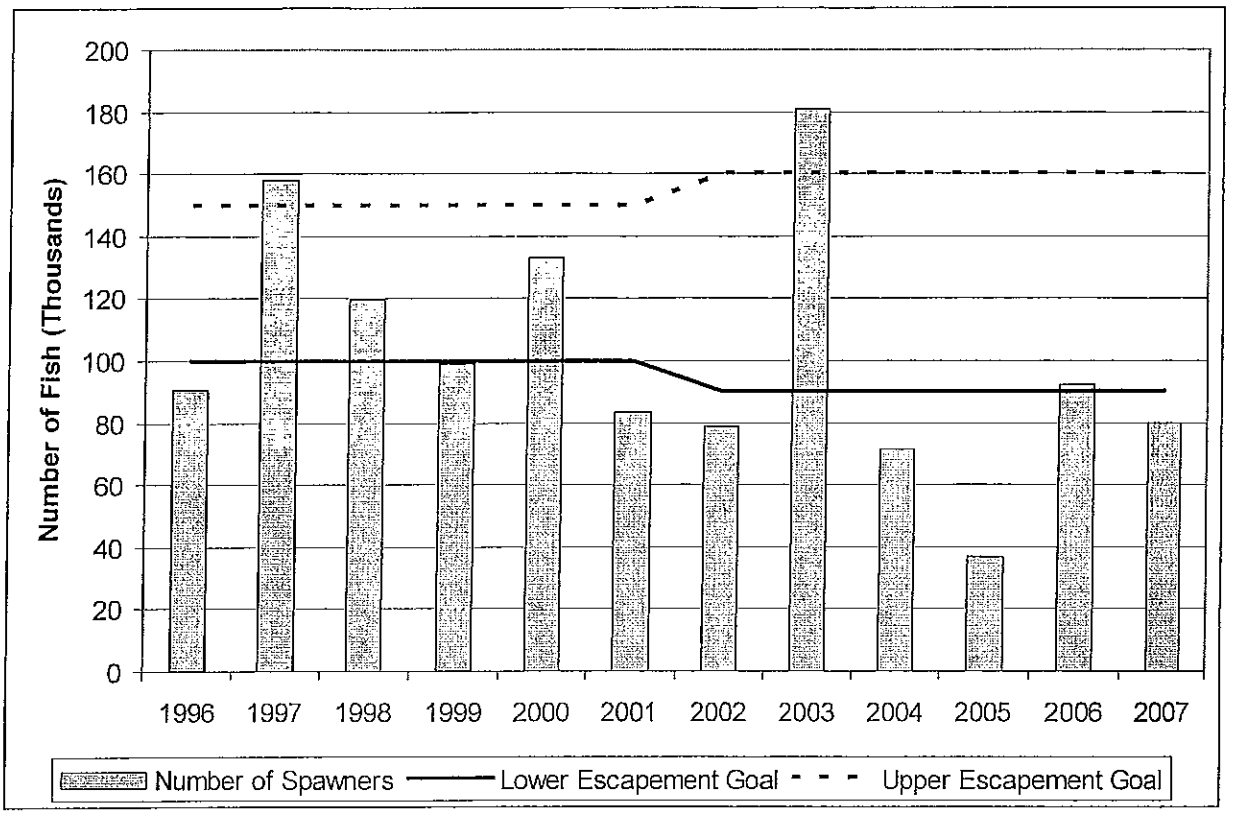

Figure 1. Yentna River sockeye salmon escapement goal range and number of spawners, 1996-2007.