


MEMORANDUM

TO: Council, SSC and AP Members

FROM: Clarence G. Pautzke
Executive Director 

DATE: January 25, 1999

SUBJECT: BSAI Crab FMP

ESTIMATED TIME 1 HOURS

ACTION REQUIRED

Receive progress report on *C. bairdi* rebuilding plan analysis.

BACKGROUND

(a) *C. bairdi* Rebuilding Plan

The Bering Sea Tanner crab (*C. bairdi*) stock will be declared "overfished" based on the minimum stock size thresholds (MSST) proposed for crab under Amendment 7 to the BSAI king and Tanner crab FMP. The national standard guidelines require a rebuilding plan for any overfished stock, with a rebuilding period less than 10 years unless dictated otherwise by life history characteristics. In October 1998, the Council voted to move forward with an aggressive rebuilding plan for this stock. Since that time, the Crab Plan Team has been working on the rebuilding plan analysis. Minutes from Plan Team's last meeting are attached as Item D-3(a).

Scientific data suggest that the *bairdi* stock may actually be comprised of two separate stocks east and west of a dividing line in the vicinity of 168° W (just east of the Pribilof Islands), based on differences in growth, size frequencies, size at maturity, and genetic work. The Team will need to develop new overfishing, MSST, and MSY definitions for each stock, as well as develop two separate rebuilding plans.

The plans will be composed of three parts: a new harvest strategy, evaluation of bycatch control measures, and habitat protection. ADF&G is developing a new harvest strategy for Tanner crabs, on which the Board of Fisheries will act in March. ADF&G is analyzing a stairstep harvest rate and associated thresholds, along the lines of the strategy developed two years ago for Bristol Bay red king crab. The approach was recommended by the plan team and advocated by NMFS.

The second part of the rebuilding plan is an evaluation of bycatch control measures in both the crab and groundfish fisheries (the scallop fishery does not have high bycatch of *bairdi*). The *opilio* crab fishery may be prohibited from fishing in areas with high bycatch rates of *bairdi*. New research indicates that mortality of *bairdi* may be high when subjected to windchill in freezing temperatures. For groundfish fisheries, new bycatch limits or zones may be proposed based on stock separation.

Habitat protection will also be considered. Unlike red king crab, Tanner crab do not seem to require well defined habitat types for settlement. Survey data, groundfish observer data, and crab observer data will be examined for any "hotspot" habitat areas for *C. bairdi*. Protection of important habitat areas could range from designation as a habitat area of particular concern to year-round or seasonal closure to specific or all gear types.

Staff will discuss proposed contents of the plan and a timeline for analysis. The analysis may be ready for initial review in April.

**DRAFT Minutes of the
Bering Sea/Aleutian Islands Crab Plan Team
Meeting, November 30 - December 1, 1998**

Members Present:

Doug Pengilly (ADF&G, chair)
Gretchen Harrington (NMFS, vice chair)
Mark Herrmann (UAF)
Al Spalinger (ADF&G)

Rance Morrison (ADF&G)
Bob Otto (NMFS)
Jack Turnock (NMFS)
Tom Shirley (UAF)
Dave Witherell (NPFMC)

The Bering Sea/Aleutian Islands (BSAI) Crab Plan Team met on November 30- December 1 in Anchorage. The Team meeting was conducted based on the following agenda:

Introductions, Agenda, Meeting Minutes
Election of Officers (Chair and Vice-chair)
Review SSC comments on SAFE report
Review LBA model for Bristol Bay red king crab
Review progress on Bering Sea *C. bairdi* rebuilding plan
Review opilio crab bycatch limits in the scallop fishery
Other issues for discussion.

Following introductions and a review of the agenda, several items of news were discussed. The interagency king, Tanner and snow crab research meeting has been scheduled for December 16-18 in Anchorage. The focus issue for this year's meeting will be development of new management plans for Tanner crab. Team members were encouraged to attend. A meeting of the Councils Ecosystem Committee has been tentatively scheduled for January 21-22 in Anchorage. Additionally, the next crab plan team meeting has been tentatively scheduled for January 13-14.

Since the last team meeting, Peggy Murphy has moved on to work with the Pacific States Marine Fisheries Commission on their AKFIN program. This change necessitated election of a new chairman. Given the huge workload projected for the coming year, the Team agreed to elect both a chair and a vice chair. Doug Pengilly was elected chair and Gretchen Harrington was elected vice chair; both for one year terms.

SAFE Report

The Team discussed the SSC's concerns with the SAFE report. It was decided that for next year, the team would provide a summary section to the SAFE that would include information necessary to quickly evaluate stock status and whether or not the stock is below MSST, along with other assessment information. Additionally, details of the modeling methodology for assessments (where applicable) would be included.

Review of LBA Model

In October, the Council requested that the crab plan team review the LBA model for Bristol Bay red king crab at a regularly scheduled meeting. ADF&G Fish Scientist Gordon Kruse and LBA expert Jie Zheng graciously provided detailed presentations on the background and development of the model, and details on internal

workings of the model, model outputs, and computer simulations for evaluating harvest strategies. The role of the LBA is to smooth-out measurement error in the area-swept abundance estimates. Over 4 hours were devoted to review of the LBA model. Team members and public had ample opportunity to question the presenters. Bob Otto suggested that Jie try running the model using a maturity ogive rather than a knife edge maturity for females. It was noted that this was the third time the Team has reviewed the LBA model.

The Team agreed that the LBA model represents the best scientific assessment of the Bristol Bay red king crab stock. Additionally, the Team believes that the current 10%/15% harvest rates are appropriate for this stock.

Tanner Crab Rebuilding

In October, the Council approved the plan team's approach to developing a rebuilding plan for the Bering Sea Tanner crab stock(s). The Council requested that protection of habitat also be considered as part of the plan. If all goes according to schedule, a draft EA/RIR will be ready for initial review in February. This would allow the Board an opportunity to have input into the plan, as they meet jointly with the Council at the February meeting. Final action could then be taken by the Council in April or June, after the Board has adopted a harvest strategy for the *C. bairdi* fishery.

There are 3 parts to the rebuilding plan: a crab harvest strategy, bycatch management, and habitat protection. Gordon Kruse provided an overview of the harvest strategy being developed by ADF&G. The state is considering a stairstep harvest rate and associated thresholds, along the lines of the strategy developed two years ago for the Bristol Bay red king crab stock. This approach was recommended by the plan team and is also advocated in the NOAA Technical Manual (Restrepo et al. 1998). Three alternative harvest strategies are being considered, and they are as follows:

1. Harvest rate X legal male abundance (status quo)
2. Harvest rate X "exploitable legal male abundance" (100% of newshell and 32% of oldshell males > 5.5")
3. Harvest rate X "molting mature males" (100% of newshell and 15% oldshell males > 4.4")

Tanner crab fishery management would change if managers considered two stocks with different size limits. Scientific information suggests that the *C. bairdi* stock should be managed as two separate stocks east and west of a dividing line in the vicinity of 168° (Note: a dividing line at 168° would be consistent with the Area T boundary). The evidence for two separate stocks comes from differences in growth, size frequencies, size at maturity, and genetic work. If two stocks were considered by managers, and different size limits were needed for each stock, then options considered could include a *C. bairdi* fishery on the eastern stock coincident with the red king fishery in Bristol Bay, a fishery on the western stock coincident with the *C. opilio* fishery or depending on size of the western stock, harvest as bycatch in the *C. opilio* fishery. From the standpoint of EA/RIR analysis, we will need to develop new overfishing, MSST, and MSY definitions for each stock, as well as developing two separate rebuilding plans.

Splitting out *C. bairdi* into two separate stocks could also have implications for directed crab fisheries and groundfish fisheries. Currently, bycatch limits for groundfish fisheries in Zone 2 (the Pribilof area) are two to three times the Zone 1 (the Bristol Bay area) bycatch limit. Yet the Pribilof stock of *C. bairdi* may be relatively more depressed than the Bristol Bay stock. We will need to compare stock specific bycatch numbers with population size to determine if bycatch in each zone is affecting the recovery of the Pribilof or Bristol Bay *C. bairdi* stock. If mortality due to bycatch is relatively high, the team will propose and analyze reduced bycatch limits for *C. bairdi* in either zone or in both zones and may consider defining bycatch zones that are more appropriate to the distribution of *C. bairdi* stocks. This may require additional economic analysis, as the cost to crab fisheries and groundfish trawl fisheries could be substantial.

Habitat protection will also be considered as a component to the rebuilding plan. Unlike red king crab, Tanner crab do not seem to require well defined habitat types for settlement. We will examine three sources of information to see if there are any "hotspot" habitat areas for *C. bairdi*. First, survey information will be examined to see if there are consistent hotspot areas for juvenile or adult Tanner crab. Observer data from groundfish, crab, and scallop fisheries will be examined to see if there are areas showing consistently high bycatch rates. It was suggested that these data be examined on a seasonal basis to see if there were changes. Observer data from the crab catcher-processor fleet will also be examined to see if there are areas of high bycatch rates of *C. bairdi* in *C. opilio* fisheries. Protection of important habitat areas could range from designation as a habitat area of particular concern to year-round or seasonal closure of the area to specific or all gear types. As with any proposed closure area, additional economic analysis would be required.

TASKING: A very tight schedule for the analysis has been proposed, and will require tasks to be completed in a timely manner. Prior to the next meeting, Bob, Doug, and Jack will be plotting their data on catch and bycatch locations. Bob will provide population estimates east for each bairdi stock based on survey data. Gretchen will request NMFS inseason managers to supply bycatch data east and west of 168°. Doug, Jie, and Gordon will supply the stock split summary, population model, harvest policy discussion section. Dave will continue to prepare the boilerplate language and habitat and bycatch information.

Bycatch Limits for the Scallop Fishery

Al Spalinger provided an overview of proposed crab bycatch limits for the Bering Sea scallop fishery. Under Amendment 3, all aspects of fishery management (except limited access) were deferred to the state. So the State has discretion to change bycatch limits. The approach being considered would establish an overall bycatch limit of 260,000 *C. bairdi*, 275,000 "other Tanner" (i.e., opilio and hybrid) crabs, and 5,000 red king crabs for the Bering Sea scallop fishery. If any of the crab stocks are below MSST, the PSC limits would be reduced by 50%. If the stock was at such a low level that no directed crab fishery was allowed, PSC limits would be reduced by 75%.

The team discussed the proposed limits relative to the potential impacts on crab populations and noted that even at the highest levels, the bycatch would comprise a very small proportion of the crab populations. Additionally, the team felt that PSC reductions when the stocks were at low levels was worthwhile. As such, the Team endorses this approach. The team did have concerns about unobserved and delayed mortality on crabs, and potential effects on habitat caused by dredging. This should be highlighted as an area for future research.

Other Issues

Tom Shirley provided a summary of recent laboratory work on the effects of windchill on discard mortality of Tanner crabs. The Tanner crab fishery in Alaska occurs during winter months and discarded sublegal male and female crabs may receive aerial exposure to harsh conditions during deck sorting. A recent laboratory study by Shirley (1998) investigated the effects of cold wind chill temperatures on mortality, limb loss and activity for sublegal male Tanner crabs exposed for five minutes to 12 wind speed (0, 4, 8 and 16 m/sec) and temperature (-2.5, -5.0 and 7.5 C) combinations. Significant inverse relationships were found between wind chill at subfreezing temperatures and crab mortality, limb loss and activity. Crabs exposed to extreme wind chill values suffered 90% mortality, while even modest exposures had pronounced effects upon the ability of the crabs to right themselves. The reference is:

Shirley, T. C. 1998. Crab handling mortality and bycatch reduction. Appendix D, pp. 1-11 in Kruse, G.H. (Ed.), King and Tanner Crab Research in Alaska: Annual Report for July 1, 1997 through June 30, 1998. Regional Information Report No.5J98-07.

Others in attendance were: Tom Casey, John Gauvin, Chris Oliver, Gordon Kruse, Jie Zheng, Steve Ganey, and Pete Probasco.