DETERMINATION OF A COMMERCIAL FISHERY FAILURE
AFFECTING THE 2000 BERING SEA SNOW CRAB
(CHIONOECETES OPILIO) FISHERY

A precipitous decline in the Bering Sea snow crab abundance has occurred in the eastern Bering Sea. The Governor of the State of Alaska, as well as the Pribilof Island communities of St. George and St. Paul, have petitioned the Secretary of Commerce (Secretary) to make the determination, pursuant to section 312(a) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), that a commercial fishery failure has occurred in the Bering Sea snow crab fishery due to a fishery resource disaster. In addition, representatives from Pribilof communities also expressed concern that other Bering Sea crab stocks, such as red and blue king crab, Tanner crab, and hair crab are suffering a resource disaster.

Section 312(a) of the Magnuson-Stevens Act, 16 U.S.C. 1861a, authorizes the Secretary to exercise discretion in determining whether there is a commercial fishery failure due to a fishery resource disaster as a result of:

a. natural causes;
b. man-made causes beyond the control of fishery managers to mitigate through conservation and management measures; or
c. undetermined causes.

Determination of a fishery resource disaster

The National Marine Fisheries Service (NMFS) 1999 summer trawl survey of the Bering Sea indicated the biomass of both male and female snow crabs declined significantly from levels observed during the 1998 survey. The 1999 estimate of male crabs 4 inches (industry-standard minimum size) and larger dropped 63% from the prior year and all other components of the stock also declined significantly. Currently, the stock is 60% of the minimum stock size threshold, which represents one half the long-term average mature biomass as defined in the Federal Fishery Management Plan for the Bering Sea and Aleutian Inlands King and Tanner Crab (FMP).

Collapse of the Bering Sea snow crab stocks, as evidenced by severe lack of recruitment into the population, precipitated a guideline harvest level reduction of over 85% in the snow crab fishery in the year 2000. The 2000 guideline harvest level for

snow crab was established at 28.5 million pounds compared to the 1999 harvest level of 196 million pounds. Owing to the low biomass of mature crabs, NMFS classified the snow crab stock as "overfished" in 1999 and a rebuilding plan is being prepared by the North Pacific Fishery Management Council. The prospects for a 2001 fishery are uncertain.

Bristol Bay red king crab (Paralithodes camtschaticus) is not suffering a fishery resource disaster. The abundance index of legal male red king crabs was 11.0 million crabs, representing a 49% increase from last year and is near the 20-year average. During 1996-1999, the Bristol Bay red king crab fishery yielded 8.4, 8.9, 14.3, 11.2 million pounds worth $33.5, $28.9, $37.3, and $70 million in ex-vessel values, respectively. Thus, this stock is supporting a productive fishery.

King crab fisheries off St. Matthew and Pribilof Islands were closed in 1999 owing to low stock size and associated high degree of uncertainty. In 1999, the abundance of Pribilof Islands blue king crabs (P. Platypus) continued an ongoing decline and fell below the threshold established for this fishery. On the other hand, estimates of red king crabs in the Pribilof Islands area increased significantly from 1998; however, most red king crabs were captured in a single tow, making the reliability of that estimate extremely low. Historically, red king crab have not been abundant in the Pribilof Islands and landings taken incidentally during the blue king crab fishery. Survey estimates for St. Matthew Island blue king crabs indicated dramatic declines of both male and female crabs in all size categories in 1999. Owing to the low biomass of mature crabs, the St. Matthew blue king crab stock was classified as "overfished" in 1999 and a rebuilding plan is being prepared. The decline in abundance for these red and blue king crab stocks constitutes a fishery resource disaster.

The Tanner crab (Chionoecetes bairdi) fishery has been closed since 1997 due to depressed stock conditions. The estimated spawning biomass of this stock is low and the stock is considered "overfished" under the Magnuson-Stevens Act. A rebuilding plan is under public review. Over the past few decades, this stock appears to have experienced a 13-14 year recruitment cycle. The NMFS survey revealed high abundance of juvenile Tanner crabs in 1999, suggesting that an apparent strong recruitment event may soon promote stock rebuilding. Once the stock exceeds the fishery threshold for two consecutive years, fishing will be resumed, perhaps as soon as January 2002.

Hair crab[1] (Erimacrus isenbeckii) abundance index for large males declined from 1981-1992, increased from 1992 to 1995, and is now declining again. The abundance index of 2.3 million large males is 22% lower than last year. Hair crabs constitute a small fishery in the Bering Sea. In 1998, 0.3 million pounds were taken. As with many crab stocks, recruitment is periodic. Lack of recent recruitment has led to chronic stock declines in recent years, and harvests have been cut accordingly. During 1995-1999, commercial catches were 1.9, 0.8, 0.8, 0.3, 0.2 million pounds worth $5.2, $1.6, $1.6, $1.0, and $0.9 million, respectively. This decline is a serious concern when added to other problems with Bering Sea crab stocks.

Therefore, I find that a fishery resource disaster occurred in the Bering Sea in 2000 that significantly reduced the abundance of snow crab; St. Matthew blue king crab; and Pribilof Islands blue king crab; resulting in a considerable reduction in the harvests. Low abundances of Tanner and hair crab have contributed to the overall reduction in available resources for the fishery.

Determination of the cause of the fishery resource disaster

Insufficient evidence exists to determine the cause of the snow crab, St. Matthew blue king crab, and Pribilof Islands blue king crab declines. However, the evidence highly suggests the causes are natural. The crab fisheries only harvest the large male crabs, however, the 1999 NMFS trawl survey showed dramatic declines in all segments of population of these crabs. Recruitment for crab species appears to be linked to environmental factors rather than biomass, so trends in recruitment are difficult to predict.

A period of low recruitment is thought to be the reason for the decline in snow crab. These events are quite possibly triggered by corresponding events in the physical environment, such as the regime shift and warm Bering Sea conditions in 1997 and 1998. Furthermore, it was suggested that the reproductive capacity of these populations is related to the abundance or biomass of mature females, which are not affected to any great extent by the crab and groundfish fisheries. Temperature is likely to be important to snow crab population dynamics. Warmer temperatures hasten growth, but they likely have a negative effect on reproduction as faster growing males have fewer mating

[1]Hair crab is not a Federally managed species under the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. The State of Alaska has management authority for hair crab.

opportunities prior to attaining harvestable size. On the other hand, crab larvae feed primarily on copepod nauplii, which we think are favored by warmer water in the Bering Sea. Crab megalopa settle out of the water column at very specific temperatures and depths. Therefore, survival may be favored by cooler, warmer or intermediate temperatures depending on what life stage one considers. In 1997 and 1998, water temperatures were at record high levels, triggering unusual plankton blooms and contributing to salmon run failures. Beyond temperature, we suspect advection of larvae by ocean currents to the nursery areas and cannibalism within the limited nursery areas from older crab cohorts are contributors to recruitment success or failures.

Recruitment to the St. Matthew and Pribilof Islands blue king crab stocks has been declining for several years, but the sharp decline in all sizes of crabs suggest large survey measurement errors, a large increase in natural mortality, or some combination of both. The causes of the decline in recruitment into these blue king crab stocks is unknown, however, its presumed to be environmental.

NMFS conducts annual assessments with a multi-species trawl survey, and the State of Alaska Department of Fish and Game administers onboard observer and dockside sampling programs. Little additional biological information is available to predict the population abundance. The full geographic distribution of these species is uncertain. Most basic biological productivity parameters have never been studied.

Gear selectivity, crab handling mortality, and other potential effects are virtually unknown. These uncertainties are urgently needed to be addressed so that crab stock productivity can be better understood. Better understanding will allow harvest strategies to be adjusted accordingly to promote stock rehabilitation and to diminish risks of future fishery collapses.

Therefore, I find that the cause of the fishery resource disasters are undetermined, but probably due to natural conditions.

Determination of a commercial fishery failure

The impacts of the snow crab decline and the early sea ice advance on communities are dramatic. St. Paul processes over 40 percent of the snow crab harvest, generating $8 million in municipal taxes in 1999. This year, crab tax revenues are projected to be 66 to 90 percent below recent averages. St. George projects a revenue shortfall of $900 thousand and the

inability to make bond payments for harbor completion.

Reduced revenues for both communities have already resulted in reduced plane service, reduced municipal and health care services, increased food costs, and the inability to continue capital projects. Fisheries closures for St. Matthew and Pribilof Islands blue king crab as well as Tanner crab may compound the fisheries failure experienced by these communities with the decline of the snow crab stock.

Therefore, I find that the apparent collapse of the Bering Sea snow crab in 2000 has resulted in a commercial fishery failure due to a fishery resource disaster as provided under section 312(a) of the Magnuson-Stevens Act. This determination is supported by the Governor of Alaska's declaration of a commercial fishery failure for the snow crab fishery.

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5/11/00
Date