



THE STATE
of **ALASKA**
GOVERNOR MICHAEL J. DUNLEAVY

Department of Fish and Game

Westward Region – Division of Commercial Fisheries
351 Research Court Kodiak AK, 99615
Main: 907.486.1825
Fax: 907.486.1841

To: Lorna Wilson
Statewide PNP Hatchery Coordinator
Commercial Fisheries – HQ, Juneau

Date: July 1, 2026

From: Mark Stichert
Regional Management Coordinator
Commercial Fisheries – Kodiak

Telephone: (907) 486-1842
Fax: (907) 486-1824

Subject: Management Feasibility
Analysis for Saint Paul
King Crab Hatchery

As specified by **5 AAC 40.130. Management Feasibility Analysis**, the following management feasibility analysis (MFA) has been prepared for the Bering Sea Fisheries Research Foundation (BSFRF) concerning a king crab hatchery under development on Saint Paul Island.

Regulation identifies the following six items to be addressed by this analysis:

- 1) potential contributions to common property fisheries,
- 2) potential size and location of special harvest area,
- 3) special management considerations or need for additional studies,
- 4) potential broodstock sources,
- 5) assessment of production potential for each species, and
- 6) additional relevant factors considered.

Background Information

BSFRF has requested an MFA for rearing Bristol Bay Red King Crab (BBRKC) at a newly established crab hatchery facility on Saint Paul Island in the central Bering Sea. A completed MFA must be included when submitting a private nonprofit hatchery (PNP) permit application to ADF&G. In the MFA request, BSFRF documented that Saint Paul king crab hatchery development is a proof-of-concept program funded by a three-year grant from the United States Congress administered through NOAA/NMFS and the Alaska Fisheries Development Foundation (AFDF). Project funding began in 2025, and the program is now in the second year of funding and first year of operations.

Red king crab have a complex life history. Fecundity is a function of body size and mature female crab each produce tens of thousands to hundreds of thousands of eggs annually. Male and female crab mature across a range of ages (5–12 years) and individual crab may live more than 20 years. Male and female crab attain a maximum size of around 9 inches and 7.5 inches carapace width respectively. Juvenile RKC molt multiple times per year until age 3 or 4; thereafter, molting continues annually in females for life. Male molting frequency declines after attaining functional maturity.

BBRKC are jointly managed by ADF&G and NOAA Fisheries under a [Fishery Management Plan \(FMP\)](#)¹ developed by the North Pacific Fishery Management Council (NPFMC). Primary management objectives for BBRKC include maintaining a population level that ensures reproductive viability and long-term sustained harvests. To meet these objectives, ADF&G annually establishes a harvest limit for the commercial fishery coupled with size-sex-season restrictions. Only male crab equal or greater than 6.5 in carapace length may be retained during the fishery. Seasons are structured to avoid directed fishing during sensitive molting and mating periods.

BBRKC biomass has followed a pattern of general decline for the past two decades before stabilizing and showing some signal of increases in mature sized crab in recent years. However, estimates of recruitment remain very low. The commercial fishery closed for two seasons (2021-2023) due to low abundance and although the fishery has since reopened, recent commercial harvests are among the lowest in the history of the fishery. The biological and associated economic decline in the BBRKC fishery likely contributed to this effort to further stabilize and enhance the stock.

Alaskan hatchery development has historically centered on salmon and the review process for a BBRKC hatchery will differ because salmon and crab life histories and management practices deviate considerably. Notably, crab hatchery governance primarily differs from salmon hatchery models in that there are no crab planning regions and production potential for BBRKC is largely unknown which confounds the ability to estimate hatchery contributions to the overall stock. Although hatchery development is explicitly guided by the state, crab fishery enhancement planning may also differ by receiving comments from the federal fishery management process. The federal crab FMP establishes a shared management structure that delegates many fishery management measures to the state with federal oversight. To meet goals and objectives of the FMP, the NPFMC appoints a Crab Plan Team (CPT), mostly comprised of state, federal, and university staff who have technical expertise in Alaskan crab management, biology, and population dynamics. This expertise may allow the CPT to comment on this and other crab/shellfish hatchery permit applications.

1. Potential Contributions to Common Property Fisheries

Due to the remote location of the BBRKC stock, subsistence and recreational removals are nominal relative to stock size. Thus, stock enhancement would predominantly benefit commercial stakeholders that participate in the rationalized fishery.

At this phase of hatchery development, BBRKC production potential and its downstream contribution to common property fisheries is largely unknown but expected to be generally neutral when compared to existing wild stock productivity. After larval release, survival to maturity is dependent on natural mortality, which is variable and difficult to quantify. In general, survival of larval king crab from the time of release to when they settle on the ocean floor as post-larvae (known as C1 stage) is believed to be very low in the wild (~1-2%). In contrast, target survival during this same developmental period in the hatchery is 50%. Thus, the objective and largest contribution from hatchery rearing is achieving lower natural mortality during the first several months of larval crab development.

It is unlikely initial hatchery releases of larval BBRKC will offset high natural mortality and impact overall productivity of the stock. However, potential contributions from the hatchery can be estimated by applying some documented assumptions on survival rates relative to expected release numbers. Assuming a 5% survival rate from release to maturity, releases of 250,000 and 1,000,000 C1 crab would yield 12,500 to 50,000 total mature animals. Assuming a 50/50 male:female sex ratio, final yield could result in ~6,000 to 25,000 hatchery origin mature females and harvestable males. This contribution is likely negligible on a population-level and commercial fishery scale. However, any

¹ Available online: <https://files.npfmc.org/fmp/Crab/CrabFMP.pdf> (accessed 6/24/2026).

relative increase in mature female abundance due to stock enhancement is notable when abundance levels are at or near minimum regulatory thresholds necessary for a commercial fishery opening. Additionally, at recent exvessel prices (~\$25/lb), even modest contributions to harvestable surplus could have net-positive economic gains for commercial users.

When considering the relative contribution of brooding mature female BBRKC in the hatchery versus the contribution of those same females in the wild, this hatchery effort could have meaningful conservation value should future female crab abundance decline to a level where the population is at risk of maintaining reproductive viability.

2. Potential Size and Location of Special Harvest Area

BBRKC undergo both ontogenetic and seasonal migrations likely in response to changes in bottom temperature and other environmental factors. Hatchery crab will be released at sites of known wild stock juvenile BBRKC habitat. There is no evidence to indicate that hatchery origin crab will segregate across time or space or behave differently than wild stock crab. Additionally, methods to mark or otherwise differentiate hatchery origin from wild stock crab are limited.

A special harvest area was not requested in the application and the utility of a special harvest area for crab is unknown at this time. Future consideration for a BBRKC special harvest area and/or program cost recovery in general will require further review and development beyond this MFA.

3. Special Management Considerations or Need for Additional Studies

Evaluating success depends on the ability to identify released individuals from wild individuals. Crustaceans molt making external physical tags ineffective. Internal tags can be used; however, they require the animals to reach a minimum size to accommodate for the tag. This minimum size requirement is problematic for cold water species that have slow growth such as red king crab. The size at release is 2 mm carapace width, a size too small for a physical tag. Genetic tagging may have utility; however, the ability to use genetic marks has not been developed for red king crab. The development of tagging methods should be subject for future research.

Further, to determine effectiveness of hatchery releases, it must be determined that targeted populations are recruitment limited, and if so, where in the life cycle the population bottleneck occurs. Field experiments are needed to estimate specific ecological parameters of released crabs such as post-release survival, movement of hatchery crabs, growth of hatchery crabs, etc. For example, pilot releases in small, enclosed bays should be conducted to estimate post-release survival and emigration rates.

In general, maintaining high genetic diversity is important because it allows populations to adjust to environmental changes such as climate change or disease. Reducing that diversity puts the population at risk. Future research should focus on genetic stock structure to guide broodstock collection numbers and release strategies.

4. Potential Broodstock Sources

Initial red king crab hatchery broodstock will originate from Bristol Bay (Registration Area T) as defined in 5 AAC 34.800.

5. Assessment of Production Potential

At this stage in program development BBRKC hatchery production potential is largely unspecified. The stated objective of collecting and brooding 30–50 mature female crab to produce and release 250,000 to 1,000,000 juvenile C1 stage crab appears achievable. Environmental forcing and predation

pressures on BBRKC are variable across time, space, and crab life stage, and are difficult to assess. It is currently unknown to what degree stock enhancement can meaningfully change fishery or population level outcomes.

6. Additional Relevant Factors Considered

This MFA primarily focuses on the initial proof of concept phase for the newly established Saint Paul king crab hatchery.