

Findings and Results from an Optimum Numbers Study on the Kodiak Food and Bait Trawl Herring Fishery

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Commercial Fisheries Entry Commission
8800 Glacier Highway #109
P.O. Box 110302
Juneau, Alaska 99811-0302
(907) 789-6160

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4. (FAX) 907-465-6078

For information on alternative formats and questions on this publication, please contact the following:

Commercial Fisheries Entry Commission (CFEC)

Research Section

8800 Glacier Highway, Suite 109

P.O. Box 110302

Juneau, Alaska 99811-0302

(907) 789-6160 phone

(907) 789-6170 fax

DFG.CFEC.Research@alaska.gov

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Abstract

This document helps inform regulatory adjustments aimed at ensuring the economic sustainability and viability of the Kodiak herring food and bait fishery by determining the optimum number of trawl permits that can participate. The Kodiak herring food and bait fishery is managed as a single fishery by Alaska Department of Fish and Game (ADFG) management biologists but is split into two permitted gear groups by CFEC - gillnet/seine permits and trawl permits. The optimum number of limited entry trawl permits for this fishery is defined by balancing both its management and economic optimum numbers. Since the introduction of permit limitations in 2002, this trawl permit fishery has had no participation. ADFG management biologists have stated they would be hesitant to allow trawl gear due to the potential for overharvest. Overharvest presents a substantial risk, given the low guideline harvest level of herring allocated to the fishery and the efficiency of trawl gear in harvesting forage fish species such as herring. This lack of harvest opportunity means the management optimum number of limited entry permits is effectively zero. Likewise, with no commercial harvests on record, no economic data exists for the fishery, rendering the economic optimum number of limited entry permits effectively zero. Since both the management and economic optimum numbers are found to be zero, it is appropriate to set the optimum number of limited entry trawl permits for the Kodiak herring food and bait fishery to zero.

Prepared by Reid Johnson

Acknowledgements

Special thanks to Daniel Strong and Sally Kohlhase for their insights and contributions to this document.

Introduction

On October 2, 2023, the Commercial Fisheries Entry Commission (CFEC) received a petition from two Kodiak Sac Roe herring permit holders requesting the issuance of additional seine/gillnet permits for the Kodiak Food and Bait herring fishery (Appendix A). This optimum numbers study was conducted and published as CFEC report number 24-05N¹. In addition to the results of the optimum numbers study, CFEC report number 24-05N also includes a history of Kodiak herring fisheries over the last 100 years; individuals that want to know more about the history of this fishery should refer to 24-05N.

The Alaska Department of Fish and Game (ADFG) manages the herring food and bait fishery with no distinction between gear types, although per regulations found in 20 AAC 05.310(m) and (n) CFEC issues permits for two distinct gear types. The ADFG definition of this fishery encompasses a nautical area, a time frame, and the specific fishery resource in question - herring harvested for food and bait. ADFG does not distinguish in their management strategy or through management actions between gear groups². The CFEC definition of a fishery encompasses a specific nautical area, a specific gear type, and a specific fishery resource. As ADFG manages all gear types in the fishery together as one unit, it is impossible for CFEC to conduct an optimum numbers study for one participating gear group without doing so for the other. This optimum numbers study follows the optimum numbers previously conducted for the Kodiak food and bait fishery for the seine/gillnet gear group and defines the optimum number of limited entry permits for the trawl gear group.

The petition received on October 2, 2023, made two arguments for increasing the number of permits in the limited entry Kodiak food and bait seine/gillnet fishery:

1. The current distribution of limited entry permits contravened constitutional provisions regarding access to Alaska shared commercial fisheries resource. The Alaska State Constitution prohibits authorization of an exclusive right to fish, except that the state has the power to limit access for either conservation or economic health. The petitioners argue that since all seine/gillnet permits are registered to a single vessel, this counts as an exclusive right to fish.
2. Herring markets have changed drastically over time, and it is no longer appropriate for most of the herring available for harvest to be allocated to sac roe. In the past, herring sac roe was a lucrative fishery, but market dynamics have since changed, and more individuals should be given the opportunity to harvest herring for food and bait as herring is now more valuable when harvested for food and bait instead of sac roe.

It should be noted that the ADFG, the organization responsible for managing the Kodiak food and bait fishery, consistently states that they would close the fishery if more than one vessel participated at a time^{3,4}. The existing permit distribution likely arose as a direct result of the ADFG mandate that only one vessel fish at a time or the fishery be closed. Questions about the legality of the permit distribution have been forwarded to the Alaska Department of Law (DOL).

The second argument presented in the petition relates to how herring markets evolved over time. Over the last 100 years, multiple herring markets have come and gone. The sac roe market is the latest market to do so. The sac roe market began in the 1960s and grew exponentially in the 1970s and 1980s, before starting a decline in the 1990s that continues today (Figure 1). During the same period, the food and bait markets,

¹ Johnson, 2024

² 5 AAC 27.535

³ Emergency Order #4-FH-K-13-23

⁴ Fuerst, 2023

although much smaller in scale, remain relatively stable. When the Kodiak herring fisheries were initially limited, most of the value was in the sac roe market, which has since steeply declined. Given the change in markets since limitation in 2002, an optimum numbers study is warranted.

This report will not touch on the multiple herring fisheries that have come and gone over the last 100 years in Kodiak. Those looking for more detail on this subject should refer to CFEC report number 24-05N. This report focuses on determining the optimum number of limited entry permits in the Kodiak food and bait trawl fishery. This report will be brief in nature. Since limitation in 2002, there is no economic or harvest information about trawl permits in this fishery, which precludes any in-depth quantitative analysis. This report will instead depend upon qualitative arguments.

History

Commercial herring harvests in Kodiak began in 1912, primarily producing salted and cured herring for human consumption. Statewide herring harvests for food peaked in 1922, then slowly declined until the 1950s. As values fell, processing plants shifted production, producing fish meal and oil rather than food. In 1959, herring harvest efforts ceased, bringing an end to the first commercial herring fisheries in Kodiak⁵.

In the 1960s, Japan discovered quality herring sac roe in Alaska, kicking off the modern sac roe fishery. Herring harvested for sac roe in Kodiak began in 1964. The sac roe fishery peaked in the 1980s and early 1990s before declining in the late 1990s. Over the last 30 years, herring sac roe values have continued to decline (Figure 1).

Herring as a fishery resource in Kodiak was first limited in the 1980s. At that time, the herring fishery was split into two distinct fisheries based on the intended product: sac roe or food and bait. This separation was made because herring are managed differently depending on their harvest purpose and the time of year. Herring harvested for sac roe are typically taken in spring when they are ready to spawn, making them relatively local to the spawning area. Herring harvested for food and bait in the fall have spent the summer feeding and moving, making them less clearly connected to a local population. While the Kodiak sac roe fishery was limited, the food and bait fishery remained open entry⁶.

The modern Kodiak food and bait fishery began in 1964 and has always been small in scale^{7, 8}. Historically, most of the herring guideline harvest level (GHL) has been allocated to the sac roe fishery, with only a small portion allocated to food and bait. This fishery remained open access until 2001 and was limited in 2002 after petitions from the ADFG and local Kodiak participants in the food and bait fishery.

⁵ Mackovjak, 2022.

⁶ Malecha, 2000

⁷ Burkey and Reid, 1988.

⁸ Fuerst, 2023.

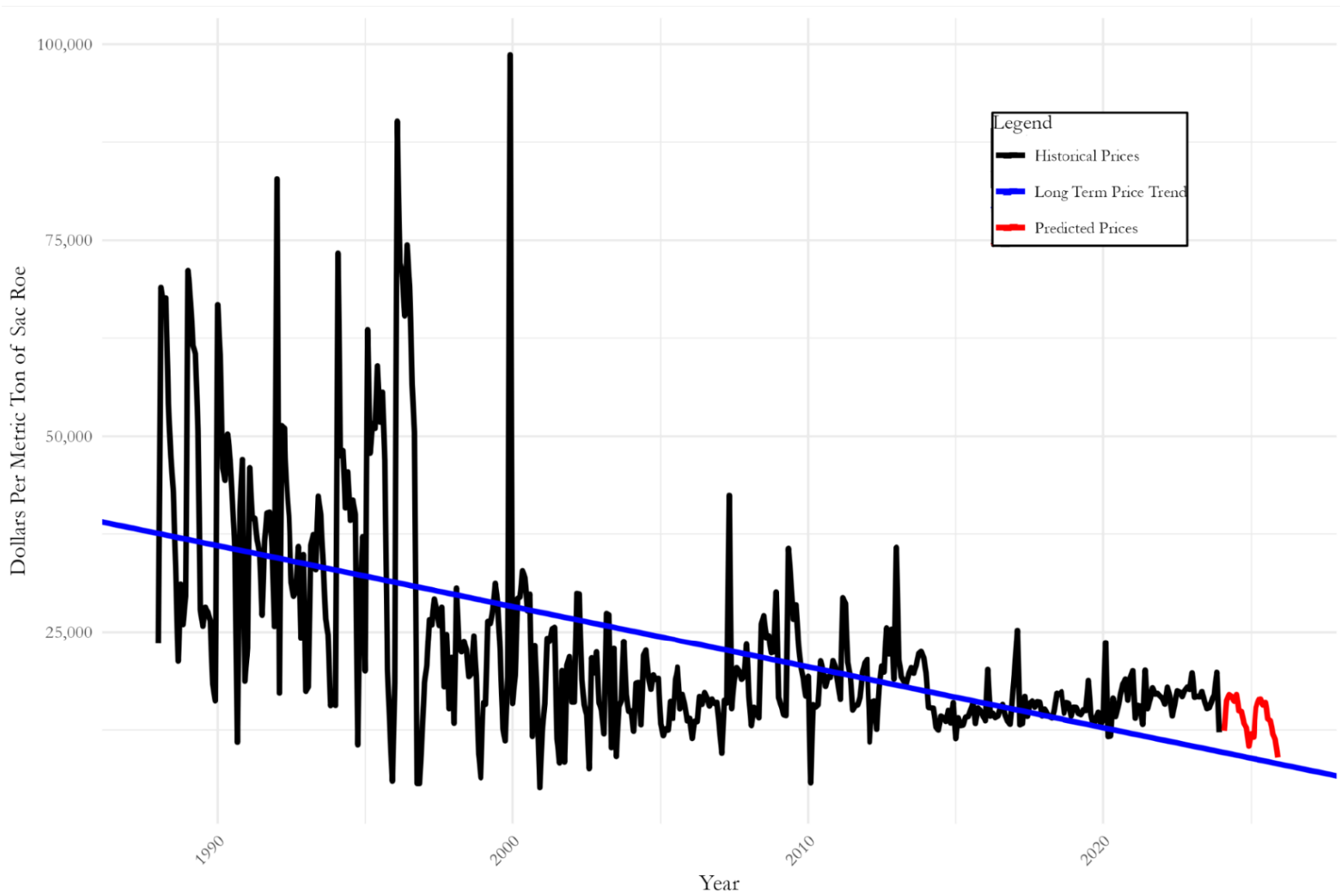


Figure 1: US Dollar per Metric Ton of Sac Roe Imported into Japan Over Time

Optimum Numbers Background

Statutory language specific to the establishment of an optimum number of limited entry permits can be found in Alaska Statute (AS) 16.43.290:

AS 16.43.290. Optimum number of entry permits. Following the issuance of entry permits under AS 16.43.270, the commission shall establish the optimum number of entry permits based for each fishery based upon a reasonable balance of the following general standards:

- (1) The number of entry permits sufficient to maintain an economically healthy fishery that will result in a reasonable average rate of economic return to the fisherman participating in that fishery, considering time fished and necessary investments in vessels and gear;
- (2) The number of entry permits necessary to harvest the allowable commercial take of the fishery resource during all years in an orderly, efficient manner, and consistent with sound fishery management techniques;
- (3) The number of entry permits sufficient to avoid serious economic hardship to those currently engaged in the fishery, considering other economic opportunities reasonably available to them.

Central to determining optimum numbers of limited entry permits is the definition of an economically healthy fishery. This definition can be found in AS 16.43.990 (2). An economically healthy fishery is one in which permit holders get sufficient economic return to provide for maintenance of vessel and gear, and the ability to experiment with new fishing techniques.

CFEC interprets AS 16.43.290 and AS 16.43.990 to mean that permit holders should be able to, when all expenses are accounted for, be gainfully employed. Item one of the regulations means that individuals should make more than they spend. Item two of the regulation is a management stipulation. Item three of the regulation means that they should be able to make a living considering other opportunities available to them. We equate “other opportunities” to mean, in general, forgone income from other employment available in the area local to the fishery- in other words, the median income of Kodiak. We also stipulate that due to AS 16.43.990 all costs of fishing must be accounted for before we can meet stipulations in AS 16.43.290. The median 2023 income in Kodiak is \$83,716 as reported by the US Census Bureau⁹.

Current Permit Distribution

The Kodiak food and bait fishery is composed of four different permit types which allow individuals to use specific gear and specific vessel sizes within the Kodiak management area (table 1).

CFEC regulations define a fishery as the unique combination of gear type, fisheries resource, and area. Herring food and bait fisheries are defined with fisheries resource code H, while Kodiak area fisheries are defined with area code K. Gear types are defined by either a one- or two-digit gear code, in this case 1 is for seine/gillnet gear, and a 7 is for trawl gear. CFEC regulations also define permits by vessel restrictions in some fisheries, and in this case the single character codes A – D define vessel length restrictions.

⁹ U.S. Census Bureau, 2024

Table 1: Kodiak Herring Food and Bait Permit Types

Permit Type	Resource Type	Gear Type	Vessel Restriction	Area Restriction	Number of Limited Entry Permits Issued
H1AK	Herring Food and Bait	Seine/Gillnet	80'	Kodiak	0
H1BK	Herring Food and Bait	Seine/Gillnet	75'	Kodiak	0
H1CK	Herring Food and Bait	Seine/Gillnet	70'	Kodiak	0
H1DK	Herring Food and Bait	Seine/Gillnet	60'	Kodiak	5
H7AK	Herring Food and Bait	Trawl	80'	Kodiak	0
H7BK	Herring Food and Bait	Trawl	75'	Kodiak	1
H7CK	Herring Food and Bait	Trawl	70'	Kodiak	1
H7DK	Herring Food and Bait	Trawl	60'	Kodiak	2

The seine and trawl fisheries are jointly managed under the same management plan, GHGs, and oversight by ADFG biologists. No separate trawl-specific management plan exists.

There are currently four active permits for trawl as a gear type in this fishery. None of these permits have ever posted a commercial delivery.

Economic Optimum Number

Previous optimum numbers studies have focused on determining costs and gross revenues for individual fishermen in a given fishery, with the idea that the net earnings in a fishery should, on average, be at least equal to the median income of the area in which the fishery is located when adjusted for the number of months devoted to the fishery. This is impossible for the Kodiak food and bait trawl fishery because there is no prior participation and no previous harvests.

Central to this discussion is the fact that ADFG has historically mandated only one vessel fish at a time to avoid overharvesting a small GHG. As a result of this one-vessel requirement, permit holders have chosen to form a cooperative, in which all participants receive some portion of the generated gross earnings from the harvest of the resource, while only one vessel partakes in the harvest. ADFG has also expressed hesitancy regarding the use of trawl gear in this fishery, remarking that the efficiency of trawl gear poses a high risk of overharvesting a small GHG. Moreover, ADFG has indicated that the number of permits able to participate could increase substantially if trawl gear were not allowed and the fishery were limited to seine or gillnets (appendix B). Even prior to the fishery’s limitation in 2002, participation by trawl permit holders was rare; in years when a cooperative did form post-limitation, only seine vessels ever participated.

The costs of operating a trawl vessel in this fishery are completely unknown because no trawl gear has ever operated. The earnings, however, are known since no harvests have ever been posted. The earnings are simply zero.

Given that there has been no participation and that earnings for this permit type have remained at zero each year, the de facto economic optimum number of limited entry permits is zero. While this number could change if barriers to trawl participation were removed or modified, we do not foresee any such developments—especially given that no trawl permit holder has participated since the mid-1990s. It has now been 27 years since trawl permits last generated revenue in the Kodiak food and bait fishery, and there is no indication this will change in the future.

Management optimum number

ADFG expressed reluctance to allow trawl gear in this fishery due to the low GHs and the efficiency of trawl vessels, which could easily result in overharvest. ADFG's concerns are documented in an attached memo (Appendix B), explaining that allowing trawlers to operate without restrictions would compromise the fishery's sustainability.

ADFG has recently removed the requirement for a cooperative agreement after confirming that vessel restrictions inherent to CFEC permits already prevent trawl participation¹⁰. The fact that ADFG is unwilling to risk even one trawl vessel fishing due to the potential for overharvest, and the fact that ADFG was willing to drop requirements for a cooperative to be formed when realizing that no registered trawl vessels exist in the Kodiak food and bait fishery, indicates that the optimum management number of trawl permits is zero.

Conclusions

1. **Economic Optimum Number**

The economic optimum number of trawl permits is zero. No trawl activity has occurred since the fishery's limitation, leaving no recent cost or revenue data. Earnings for trawl permits in this fishery have been non-existent for 27 years and we see no reason to expect this to change. The de facto economic optimum number of limited entry permits for this fishery is zero.

2. **Management Optimum Number**

ADFG has made it clear that it cannot effectively manage a fishery if trawl gear is allowed without significant restriction to fishing effort. ADFG has also removed the mandate that only one vessel fish at a time after confirming that no trawl permit holders for this fishery are currently capable of fishing due to CFEC vessel restrictions. The agency's position underscores that the management optimum number of trawl permits is zero.

Final Optimum Number

The optimum number of trawl permits is determined by balancing economic feasibility and management practicality. Given the lack of trawl participation and the fact that ADFG has relaxed vessel participation restrictions after realizing that no trawl permit holders are currently capable of participating, the economic and management optimum numbers align at zero. Trawl permit holders have not participated in the fishery since before 2002. The recommended optimum number of trawl permits for the Kodiak food and bait herring fishery is zero.

¹⁰ Emergency Order #3-FH-K-3-24

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Appendix A: Petition to Examine Kodiak Food and Bait Herring
Optimum Number of Limited Entry Permits

Appendix A: ADFG Response to Request for Management Optimum Numbers

Nathaniel Rose
CFEC ID: 826368
1812 Mission Rd
Kodiak, AK 99615



Darren Platt
CFEC ID: 206101
10708 Birch Cir
Kodiak, AK 99615



10/2/2023

CFEC Commissioner Glenn Haight

P.O. Box 110302
1255 W. 8th Street
Juneau, AK 99811
907-789-6150

Subject: Request for Issuance of Limited Entry Permits for the H1DK Herring Food/Bait Purse Seine Fishery in Kodiak, Alaska

Dear Commissioner Haight:

We are writing to express our concern regarding the current monopolization of the H1DK, Herring Food/Bait Purse Seine Fishery in Kodiak, Alaska, and to formally request the issuance of limited entry permits in accordance with the provisions set forth in Alaska Statutes AS.16.43.300 and AS.16.43.330.

According to the Alaska State Constitution Article VIII section 15: *“No exclusive right or special privilege of fishery shall be created or authorized in the natural waters of the State. This section does not restrict the power of the State to limit entry into any fishery for purposes of resource conservation, to prevent economic distress among fishermen and those dependent upon them for a livelihood and to promote the efficient development of aquaculture in the State.”*

The current H1DK permits are all registered under the same mailing address and the same vessel ADFG number despite the fact that some individuals listed as owners of those permits do not actually reside at that address, and it should be noted that for nearly two decades, a single vessel has participated in the fishery making deliveries to one of the 5 seafood processing companies in Kodiak despite a desire from other herring fishermen to participate in the fishery, and a demand from additional processors to have access to buy that bait/food herring. Additionally, since the initial issuance of permits for the food/bait and sac roe herring fisheries, the economics of the herring industry as a whole has shifted from the predominant value being in the sac roe herring fishery to the value now being in the bait herring fishery. The initial issuance of 5 total permits, which were easily

consolidated by a single entity, is now insufficient to meet the economic needs and potential productivity of this fishery.

It is imperative the CFEC address the pressing issue of exclusive right of access for the H1DK fishery in Kodiak. The current situation not only undermines the principles of fairness and access that underlie our state's fisheries management, but it also jeopardizes the economic stability and long-term health of our coastal communities. As a result of this consolidation of access, and lack of processor competition, fishermen participating in other fisheries such as the halibut, tanner crab, and pot cod fisheries are faced with paying hyper-inflated costs for bait herring, further exacerbating the economic difficulties in maintaining profitable fisheries businesses.

It should also be noted that the current biomass of herring in the Kodiak Management area is of a magnitude never seen before.

The limited entry system, as established by AS.16.43.330, was designed with the aim of preventing monopolization and ensuring a level playing field for all participants. It seeks to strike a balance between economic stability and preventing overcapitalization, while safeguarding the interests of local fishermen. By allowing one entity to exert undue control over this fishery, we risk the degradation of the herring population and the broader marine ecosystem, while also placing excess economic hardship on participants of other fisheries reliant on the bait herring product.

We are committed to adhering to the guidelines and regulations set forth by the Alaska Department of Fish and Game and the CFEC. We are prepared to provide any necessary documentation, demonstrate our readiness, and the readiness of our vessels to participate, and comply with all relevant regulations to demonstrate our dedication to responsible fishing practices. We understand that our request may seem unusual or extreme, but we believe that this is likely the only limited entry fishery in the state that is completely (and unconstitutionally) controlled by a single entity.

We kindly request your intervention and support in rectifying the current situation and facilitating the process for issuing additional limited entry permits for the H1DK Food/Bait Herring Fishery. It is our sincere hope that through your assistance, we can restore balance and equity to this vital fishery.

Thank you for your time and consideration of this pressing matter. We understand this letter should pass through the CFEC research section in order to validate claims of current participants in the H1DK fishery, and we look forward to the opportunity to speaking with you and hearing any concerns or answering any questions you may have.

Should you require any further information or clarification, please do not hesitate to contact us at:

Nate Rose: [REDACTED]

Darren Platt: [REDACTED]

Sincerely,

Nathaniel Rose and Darren Platt

Appendix B: ADFG Response to Request for Management Optimum
Numbers



THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

Department of Fish and Game

Division of Commercial Fisheries
Kodiak Office

351 Research Ct.
Kodiak, Alaska 99615
Main: 907.486.1825
Fax: 907.486-1841

Date: June 3, 2024

To: Glenn Haight, Chair/Commissioner

From: James Jackson,
Kodiak Commercial Salmon and Herring Area
Management Biologist
Alaska Department of Fish and Game, Kodiak, Alaska

Kodiak Food and Bait Herring Fishery:

The Commercial Fisheries Entry Commission (CFEC) has requested input from the Alaska Department of Fish and Game (department) regarding the optimum number of limited entry permits in the Kodiak food and bait herring fishery. The CFEC has given the department a series of hypothetical questions based on the maximum and minimum number of participants that could take place in that hypothetical fishery in an orderly and sustainable manner. Some of the questions are asked within the current regulatory framework of the Kodiak food and bait herring fishery. However, many of the questions would require Alaska Board of Fisheries (board) regulatory action.

There are many ways to restrict the harvest in fisheries other than limiting the entry of participants. Most of this is done through regulatory actions taken by the board. Examples of these regulations include gear restrictions, time and area restrictions, and gear allocations. Depending on the regulatory actions taken to limit the harvest in each fishery, the optimum number of limited entry permits may be very different.

Background

The current allocation for the Kodiak food and bait herring fishery Guideline Harvest Levels (GHLs) are calculated as 10% of the previous season's Kodiak sac roe herring GHL in short tons. However, the food and bait fishery is not prosecuted as an aggregate. Instead, district GHLs are established based on a 10% of the previous sac roe seasons district GHL. (5AAC 27.535(b)(c)). For example, if the prior season's sac roe herring GHL for the Uganik District was 2,200 tons, the Uganik District food and bait GHL would be 220 tons. Districts with smaller sac roe GHLs are often excluded from the food and bait fishery to prevent overharvest.

The 10-year average (2013 – 2024) Kodiak sac roe herring GHL is approximately 4,700 tons, with a low of 1,185 tons in 2018 and a high of 8,650 tons in 2023. The 10-year average Kodiak food and bait GHL is approximately 400 tons with a low of 91 tons in 2018 and a high of 815 tons in 2023.

With little to no funding for "on-site" management, past Kodiak food and bait fisheries were difficult to prosecute and the harvest of food and bait herring in the Kodiak Area grossly exceeded individual district GHLs. The CFEC has limited the entry of Kodiak food and bait herring permits to five seine/gillnet permits and 4 otter trawl permits.

Due to the difficulty in prosecuting a sustainable fishery, since the 2001, the food and bait fishery has only been allowed if all Kodiak food and bait herring CFEC permit holders agreed to form a combine and allow 1 purse seine vessel to participate, excluding trawl vessels from participating.

Looking at the past 30 purse seine vessels that have made Kodiak sac roe herring deliveries, the median capacity for a Kodiak sac roe seine vessel is approximately 35 tons, with a broad range between a low of 17 tons to a high of more than 100 tons. It is difficult to come up with an average capacity for otter trawl permits because none have made deliveries since 1997. Given the current vessels size restrictions for Kodiak food and bait trawlers (20 AAC 05.823(u)), it is likely only very small trawl vessels and larger 58-foot limit seine vessels would be able to utilize trawl gear. Based on this, the CFEC's assertion that a trawl capacity of approximately 120 tons per vessel is likely accurate.

The CFEC memo does not mention gillnets. Kodiak food and bait seine permits are seine/gillnet permits. The average capacity of a herring gillnet in the Kodiak Area is significantly less than both seine and trawl gear. Looking at past Kodiak sac roe gillnet deliveries since 1985, there is a broad range of delivery amounts. However, almost all gillnet herring deliveries did not exceed 30 tons. Most sac roe gillnet deliveries since 1985 were under one ton, but 44% were in the 1- to 15-ton range.

Kodiak food and bait otter trawl permits are currently only regulated based on vessel size. Kodiak herring purse seine vessels are limited to 58 feet. There are no vessel size restrictions for herring gillnet vessels. In general, Kodiak herring food and bait gear is less restrictive than the Kodiak sac roe herring gear. Kodiak sac roe purse seine permit holders can fish nets up to 18 fathoms deep and 100 fathoms in length. Kodiak food and bait purse seine permit holders can fish nets up to 1,625 meshes deep and 150 fathoms in length. Kodiak sac roe gillnet permit holders can fish nets up to 150 fathoms in length and up to 230 meshes deep. Kodiak food and bait gillnet permit holders can fish 150 fathoms in length nets with no depth restrictions.

Taking this information into account, the department has been tasked with answering the following hypothetical questions from the CFEC.

First CFEC question: *In 2022, the GHL for the Kodiak herring food and bait fishery was 760 tons, which is the largest GHL since 2001. What is the minimum number of seine permits that would be needed to harvest a GHL of 760 tons for the herring food and bait fishery in an orderly manner, assuming that only seine permits participate.*

This question is based on the existing fish and game regulatory structure of the Kodiak food and bait fishery. However, CFEC was to exclude trawl gear.

Assumptions:

- 1) The total 2022 Kodiak food and bait GHL was 760 tons.
- 2) The 2022 food and bait fishery was managed with six different district GHLs.
- 3) No board changes were made to the allocations between districts.
- 4) Only seine/gillnet gear can fish in this hypothetical situation, and the 4 trawl permits are excluded.
- 5) No board changes to the current seine/gillnet gear descriptions. Seine nets are 150 fathoms in length, 1,625 meshed deep; gillnets are 150 fathoms in length, no depth restriction.
- 6) Tenders are allowed.
- 7) No board or department changes to fishing times. The fishery opens by EO and remains open until a district GHL is harvested, and the department closes by EO.

Department answer to CFEC question 1: Again, the Kodiak food and bait herring fishery is not prosecuted as an aggregate but is instead broken up into several different district GHLS. For example, in 2022, the Kodiak herring food and bait GHL for the West Afognak District was 100 tons, the Eastside District was 280 tons, the South Afognak District was 40 tons, the Uganik District was 220 tons, the Alitak District was 40 tons, and the Uyak District was 80 tons.

Even if only seine permits were allowed to fish, the potential for overharvest in districts with smaller GHLS would be high given the lack of on-site management, particularly with some of the larger seine vessels with a capacity of 100 tons. Assuming a median purse seine vessel capacity of 35 tons, the **minimum number** of seine permits needed to not overharvest in smaller GHL districts in an orderly and sustainable fashion is **one seine vessel**.

More seine/gillnet vessels could be allowed in the future if board actions were taken to limit the harvest in districts with smaller GHLS. Changes in net sizes or allocating the smaller GHL districts as gillnet only could slow the pace of the fishery and allow for more vessels.

First CFEC question part (a): *CFEC currently issues four otter trawl permits for vessels that range in length from under 60 feet up to 75 feet. If all four otter trawl permits were to take part in the fishery, how does the answer to the above question change?*

This question is based on the existing fish and game regulatory structure of the Kodiak food and bait fishery and trawl gear was allowed to fish.

Assumptions:

- 1) The total 2022 Kodiak food and bait GHL was 760 tons.
- 2) The 2022 food and bait fishery was managed with six different district GHLS.
- 3) No board changes were made to the allocations between districts.
- 4) Both seine/gillnet and trawl gear can fish in this hypothetical situation.
- 5) No board changes to the current seine/gillnet gear descriptions. Seine nets are 150 fathoms in length, 1,625 meshed deep; gillnets are 150 fathoms in length, no depth restriction.
- 6) Tenders are allowed.
- 7) No board or department changes to fishing times. The fishery opens by EO and remains open until a district GHL is harvested, and the department closes by EO.

Department answer to CFEC question 1(a): Again, in this hypothetical example, the district with the smallest GHL would have been the South Afognak District at 40 tons. If all trawl permits were allowed to fish, assuming a trawl vessel capacity of 120 tons, the potential for overharvest in districts with smaller GHLS would be too great. The department would likely close the food and bait fishery due to conservation concerns.

Second CFEC question: *In 2018, the GHL for the Kodiak herring food and bait fishery was 91 tons, which is the lowest GHL since 2001. What is the **maximum** number of seine permits that could be fished in order to harvest a GHL of 91 tons for the herring food and bait fishery in an orderly manner? Given the harvest capacity of otter trawlers, CFEC assumes that 91 tons is too low of a GHL to allow any fishery if otter trawlers intend to participate in harvest activities.*

This question is based on the existing fish and game regulatory structure of the Kodiak food and bait fishery.

Assumptions:

- 1) The total 2018 Kodiak food and bait GHL was 91 tons.
- 2) The 2018 food and bait fishery was managed with three different district GHLs.
- 3) No board changes were made to the allocations between districts.
- 4) Only seine/gillnet gear can fish in this hypothetical situation, and the 4 trawl permits are excluded.
- 5) No board changes to the current seine/gillnet gear descriptions. Seine nets are 150 fathoms in length, 1,625 meshed deep; gillnets are 150 fathoms in length, no depth restriction.
- 6) Tenders are allowed.
- 7) No board or department changes to fishing times. The fishery opens by EO and remains open until a district GHL is harvested, and the department closes by EO.

Department answer to CFEC question 2: Using 2018 as an example, the smallest Kodiak food and bait herring district GHL was the South Afognak District at 19 tons. Assuming an average purse seine vessel capacity of 35 tons, the **maximum number** of seine vessels that would be needed to harvest 19 tons is **one seine vessel**.

Third CFEC question: *In 2018, the herring GHL was 1,276 tons for both herring fisheries combined. What is the **maximum** number of seine permits that could be fished in order to harvest a GHL of 1,276 tons in an orderly manner if we assume that the four otter trawl permits are participating*

This question is not based on the existing fish and game regulatory structure of the Kodiak food and bait fishery. This hypothetical example assumes that the board has made significant changes to the existing Kodiak Area herring fisheries and has allocated all the Kodiak herring to be caught in the food and bait fishery.

Assumptions:

- 1) The total 2018 Kodiak food and bait GHL would have been 1,276 tons.
- 2) The 2018 food and bait fishery would have been managed with six different district GHLs.
- 3) No board changes were made to the allocations between districts.
- 4) Both seine/gillnet gear and trawl gear can fish in this hypothetical situation.
- 5) No board changes to the current seine/gillnet gear descriptions. Seine nets are 150 fathoms in length, 1,625 meshed deep; gillnets are 150 fathoms in length, no depth restriction.
- 6) Tenders are allowed.
- 7) No board or department changes to fishing times. The fishery opens by EO and remains open until a district GHL is harvested, and the department closes by EO.

Department answer to CFEC question 3:

Using 2018 as an example, if we combined the Kodiak Area food and bait and sac roe GHLs by district, the smallest Kodiak food and bait herring district GHL would have been the South Afognak District at 201 tons. Assuming an otter trawl vessel capacity of 120 tons, if all four permits were allowed to fish, the **maximum number** of seine vessels that could be fished to harvest 201 tons in an orderly and sustainable fashion is **zero seine vessels**. For reasons of sustainability, the department would also be hesitant to allow 4 otter trawl permits to fish in districts with small GHL.

The department is neutral on any allocative proposals brought before the board. However, allowing commercial fishermen to harvest all Kodiak Area herring during the food and bait timeframe would likely have unforeseen consequences regarding the potential mixing of Kodiak Area and non-Kodiak Area herring stocks during the fall and winter months. The board could also take further regulatory action to limit the pace of the fishery and allow more permits to fish.

Third CFEC question part (a): *Additionally, we ask what is the maximum number of seine permits that could be fished in order to harvest that GHL if the four trawl permits were converted to seine permits?*

Again, this question is not based on the existing fish and game regulatory structure of the Kodiak food and bait fishery. This hypothetical example assumes that the board has allocated all the Kodiak herring to be caught in the food and bait fishery. This question also assumes that the CFEC has converted the 4 trawl permits to seine/gillnet permits.

Assumptions:

- 1) The total 2018 Kodiak food and bait GHL would have been 1,276 tons.
- 2) The 2018 food and bait fishery would have been managed with six different district GHLS.
- 3) No board changes were made to the allocations between districts.
- 4) Only seine/gillnet gear can fish in this hypothetical situation.
- 5) No board changes to the current seine/gillnet gear descriptions. Seine nets are 150 fathoms in length, 1,625 meshed deep; gillnets are 150 fathoms in length, no depth restriction.
- 6) Tenders are allowed.
- 7) No board or department changes to fishing times. The fishery opens by EO and remains open until a district GHL is harvested, and the department closes by EO.

Department answer to CFEC question 3(a):

Using 2018 as an example, if we combined the Kodiak Area food and bait and sac roe GHLS by district, the smallest Kodiak food and bait herring district GHL would have been the South Afognak Section at 201 tons. Assuming a median purse seine vessel capacity of 35 tons, the maximum number of seine vessels that could fish in an orderly and sustainable fashion to harvest 201 tons is approximately six vessels.

Again, more vessels could be allowed in the future if the board took actions to limit harvest in districts with smaller GHL. Also allowing commercial fishermen to harvest all Kodiak Area herring during the food and bait timeframe would likely have previously mentioned unforeseen consequences.

Fourth CFEC question: *In 2022, the herring GHL was 8,835 tons for both herring fisheries combined. What is the minimum number of seine permits that would be needed in order to harvest a GHL of 8,835 tons in an orderly manner if we assume that the four otter trawl permits are participating?*

This question is not based on the existing fish and game regulatory structure of the Kodiak food and bait fishery. This hypothetical example assumes that the board has allocated all the Kodiak herring to be caught in the food and bait fishery.

Assumptions:

- 1) The total 2022 Kodiak food and bait GHL would have been 8,835 tons.
- 2) The 2022 food and bait fishery would have been managed with at least six different district GHLS.
- 3) No board changes were made to the allocations between districts.
- 4) Both seine/gillnet gear and trawl gear can fish in this hypothetical situation.
- 5) No board changes to the current seine/gillnet gear descriptions. Seine nets are 150 fathoms in length, 1,625 meshed deep; gillnets are 150 fathoms in length, no depth restriction.
- 6) Tenders are allowed.
- 7) No board or department changes to fishing times. The fishery opens by EO and remains open until a district GHL is harvested, and the department closes by EO.

Department answer to CFEC question 4:

This hypothetical question could only take place if the board were to use its regulatory authority to reallocate all the herring harvested in the Kodiak area to just the food and bait fishery. Using 2022 as an example, if we combined the Kodiak Area food and bait and sac roe GHGs by district, the smallest Kodiak food and bait herring district GHG would have been the South Afognak District at 440 tons. Assuming a median purse seine vessel capacity of 35 tons, and an otter trawl capacity of 120 tons, the **minimum** number of seine vessels that would be needed to harvest 440 tons in an orderly and sustainable fashion is **zero seine vessels**. The potential for overharvest with the 4 trawl vessel permits would also be high. However, four trawl vessels would also likely have a challenging time harvesting the total food and bait GHG of 8,835 tons in an orderly fashion.

Again, more vessels could be allowed in the future if the board took actions to limit harvest in districts with smaller GHGs. Also allowing commercial fishermen to harvest all Kodiak Area herring during the food and bait timeframe would likely have previously mentioned unforeseen consequences.

Fourth CFEC question part (a): *And again, we ask what is the **minimum** number of seine permits that could fish in this scenario if the four trawl permits were converted to seine permits?*

This question is not based on the existing fish and game regulatory structure of the Kodiak food and bait fishery. This hypothetical example assumes that the board has allocated all the Kodiak herring to be caught in the food and bait fishery. This example also assumes the CFEC converted all 4 trawl permits to seine permits.

Assumptions:

- 1) The total 2022 Kodiak food and bait GHG would have been 8,835 tons.
- 2) The 2022 food and bait fishery would have been managed with at least six different district GHG's.
- 3) No board changes were made to the allocations between districts.
- 4) Only seine/gillnet gear can fish in this hypothetical situation.
- 5) No board changes to the current seine/gillnet gear descriptions. Seine nets are 150 fathoms in length, 1,625 meshed deep; gillnets are 150 fathoms in length, no depth restriction.
- 6) Tenders are allowed.
- 7) No board or department changes to fishing times. The fishery opens by EO and remains open until a district GHG is harvested and the department closes by EO.

Department answer to CFEC question 4(a):

Using 2023 as an example, if we combined the Kodiak Area food and bait and sac roe GHGs by district, the smallest Kodiak food and bait herring district GHG would have been the South Afognak District at 440 tons. Assuming a median purse seine vessel capacity of 35 tons, the **minimum** number of seine vessels that would be needed to harvest 440 tons in an orderly and sustainable fashion is **1 seine vessel**. However, 1 seine vessel would not be sufficient to harvest the hypothetical total Kodiak Area food and bait GHG of 8,835 tons in an orderly fashion, and some regulatory action would be needed to prosecute the fishery.

Conclusion:

It is important to point out that all these questions do not consider future board regulatory actions that could be used to control the pace of the fishery, including different net sizes, daily fishing times, gear restrictions, or future allocations. For example, Kodiak sac roe herring nets are significantly smaller than food and bait herring nets. Also, none of these scenarios consider whether gillnet vessels are allowed to fish. For example, districts with smaller food and bait GHGs could be made gillnet only, allowing for many more vessels to fish districts with significantly larger GHGs.

Appendix B: ADFG Response to Request for Management Optimum Numbers

The sac roe fishery has been in place for 40 plus years and in that time, the department has developed a harvest strategy that allowed them to manage the fishery regardless of the number of vessels. The sac roe fishery is a large volume, allocative, actively managed fishery that can accommodate a large number of permits, whereas the Kodiak food and bait fishery is a small volume, low-department cost, passively managed fishery that can only accommodate a small number of permits.

If the food and bait fishery were to change, there would need to be necessary changes made by both CFEC and the board regulations based on input from the department to enable managers to successfully manage an entirely different fishery. This would be based on department resources, biological differences in population dynamics, allocations between gear groups based on harvest ability, and many other factors. There are numerous other assumptions that could be made, however for the sake of brevity, the department limited assumptions.

Sincerely,

James Jackson
Kodiak Salmon and Herring
Area Management Biologist
1-907-486-1808

Cc: Doug Vincent-Lang, Commissioner, Department of Fish and Game
Sam Rabung, Director, Division of Commercial Fisheries
Nick Sagalkin, Regional Supervisor, Westward Region