

2022/23 BSAI crab catch and fishery performance

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Crab Plan Team Meeting

September 12-14, 2023

Seattle, WA

Directed fishery observer coverage

Mandatory catcher-vessel coverage requirements, per **5 AAC 39.645**.

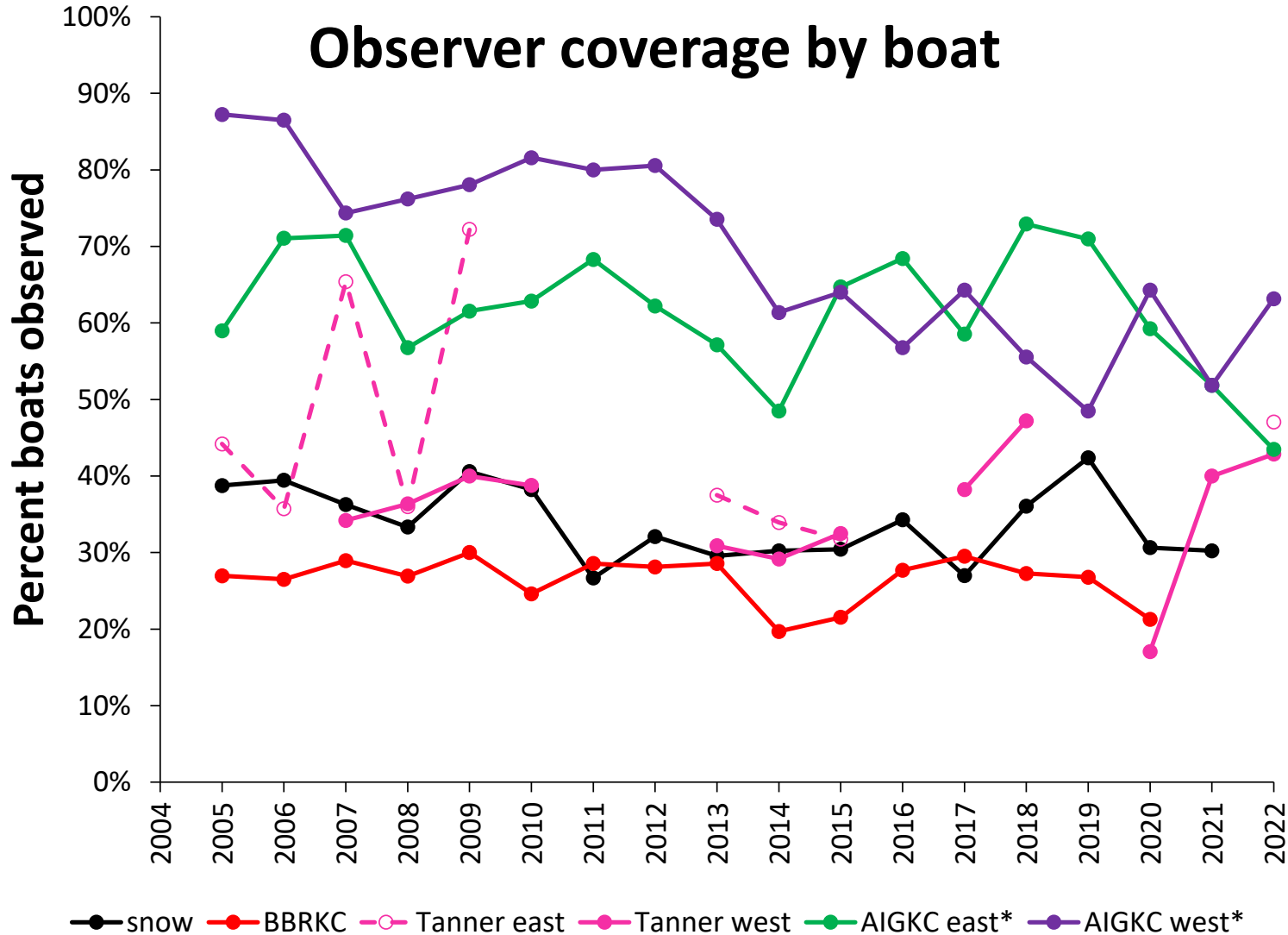
All vessels processing crab must carry observers.

Fishery	Coverage
Bering Sea snow crab	30-100% (a)
Bristol Bay red king crab	20% (a)
Bering Sea Tanner crab	30-100% (a)
Pribilof District red king crab	100%
Pribilof District blue king crab	100%
Saint Matthew Island blue king crab	100%
Norton Sound red king crab	Discretionary
Aleutian Islands golden king crab	50% (b)
Pribilof District golden king crab	100%
Adak red king crab	100%

^a Vessels required to carry observers are randomly selected.

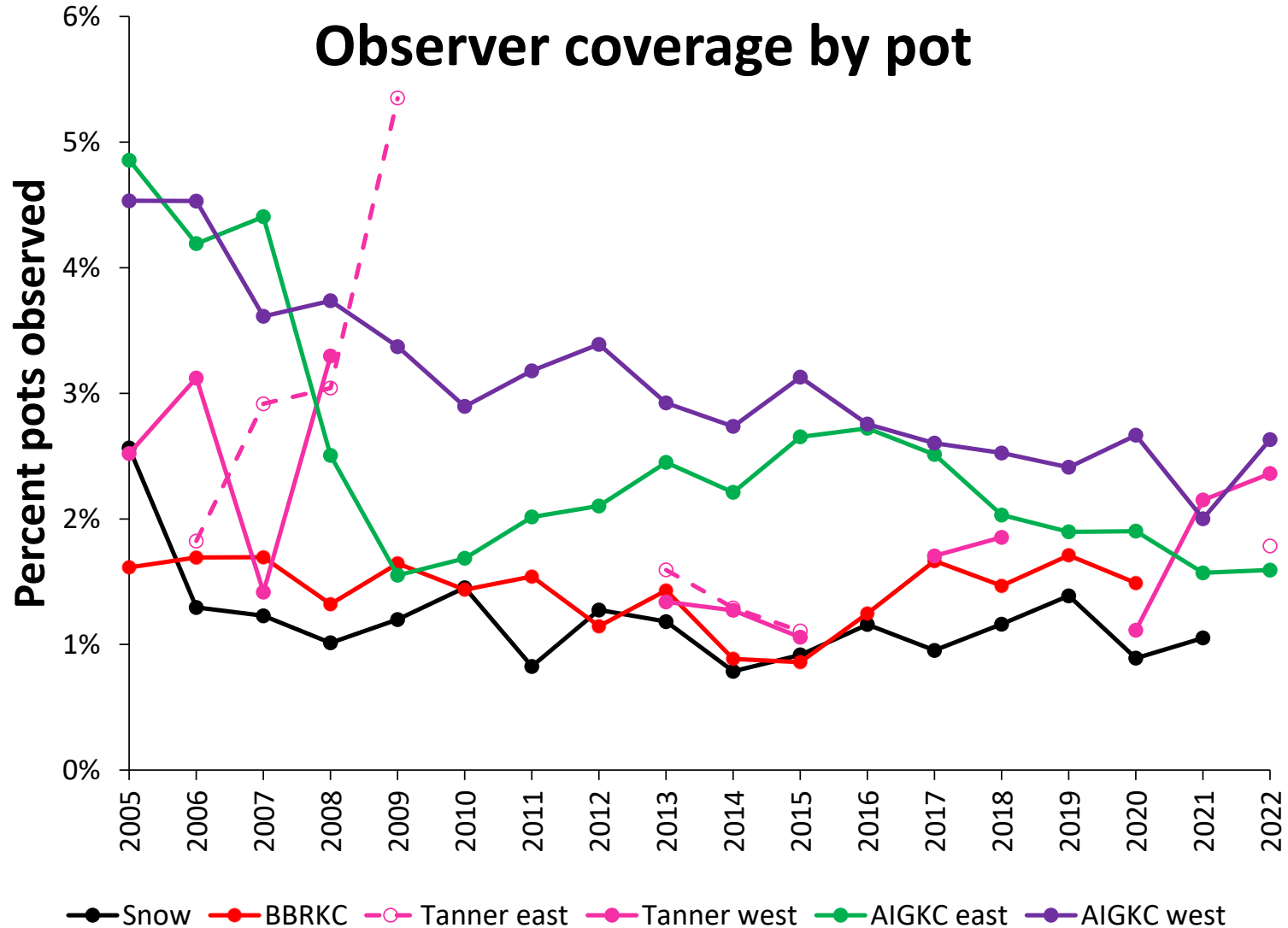
^b All catcher vessels must carry an observer during harvest of 50% of total landed catch weight in each three-month trimester of nine-month season Aug 1 – Oct 31; Nov 1 – Jan 31; Feb 1 – April 30.

Directed fishery observer coverage



*AIGKC calculated by trip because of trimester regulation

Directed fishery observer coverage



Groundfish Vessels in Full Coverage vs Partial Coverage

- **Full coverage vessels (1 or 2 observers 100% of the time)**
 - Catcher/Processors (limited exceptions for non-trawl CPs)
 - Motherships
 - AFA pollock catcher vessels delivering shoreside (unless participating in EM EFP)
 - Non-pollock BSAI trawl catcher vessels can opt for 100% coverage during all fishing
- **Partial Coverage**
 - Catcher Vessels fishing groundfish
 - Catcher Vessels fishing IFQ/CDQ halibut/sablefish
 - Non-trawl Catcher/Processors – They have to apply in advance
- **No selection for observer coverage**
 - Vessels using Electronic Monitoring (EM, 30% selection rate for pot and HAL gear, 100% for AFA pollock vessels delivering shoreside when participating in EFP)
 - 40 feet and under
 - Jig Catcher Vessels
 - No FFP (can only fish inside three miles)
 - State Guideline Harvest Level fisheries

Partial Coverage Groundfish Observer Rates

- In 2013 and 2014 partial observer coverage rates were the same for all gear types on vessels 57.5 feet and larger
 - 14.5% in 2013
 - 16% in 2014
- 2015 partial observer coverage rates were split by vessel size
 - 24% on vessels 57.5 feet and larger
 - 12% on vessels 40-57.5 feet

Year	EM	Trawl	Tender Trawl	HAL	Tender HAL	Pot	Tender Pot
2016	NA	28%	NA	15%	NA	15%	NA
2017	NA	18%	14%	11%	25%	4%	4%
2018	30%	20%	17%	17%	NA	16%	17%
2019	30%	24%	27%	18%	NA	15%	16%
2020	30%	20%	NA	15%	NA	15%	NA
2021	30%	16%	NA	15%	NA	15%	NA
2022	30%	30%	NA	19%	NA	17%	NA
2023	30%	23%	NA	18%	NA	17%	NA

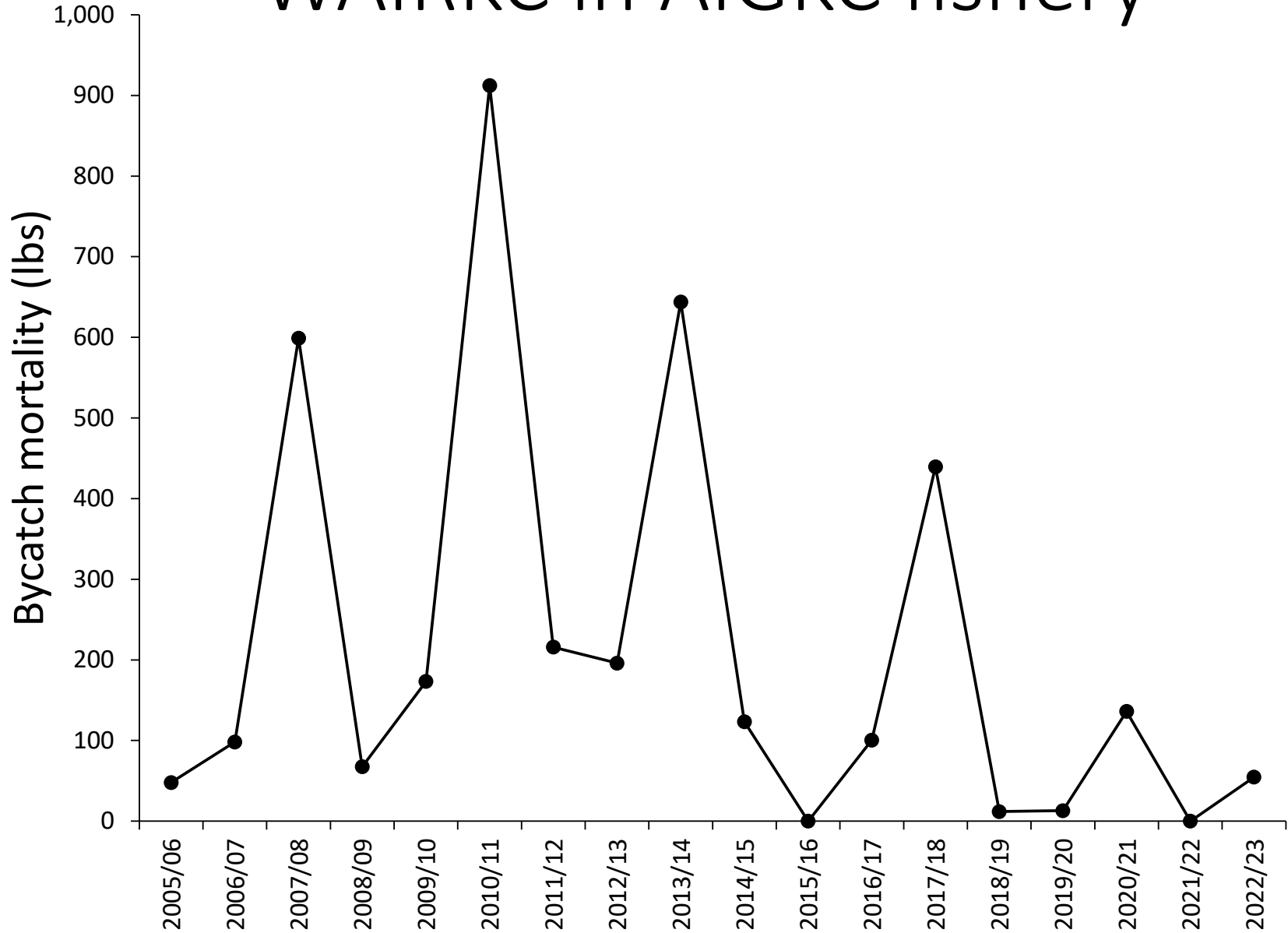
Crab Incidental Catch in Groundfish Fisheries

- All weights are in kilograms
- Mortality has been applied (50% for fixed gear and 80% for trawl gear)
- All weights are extrapolated from observer/EM data
- All weights came from AKFIN database
- Incidental catch data in this presentation are for the crab year (July 1 to June 30) except for Pribilof Island golden king crab and Norton Sound red king crab which are a calendar year
- Fixed gear includes pot, hook-and-line, and jig
- Trawl gear includes non-pelagic and pelagic trawl

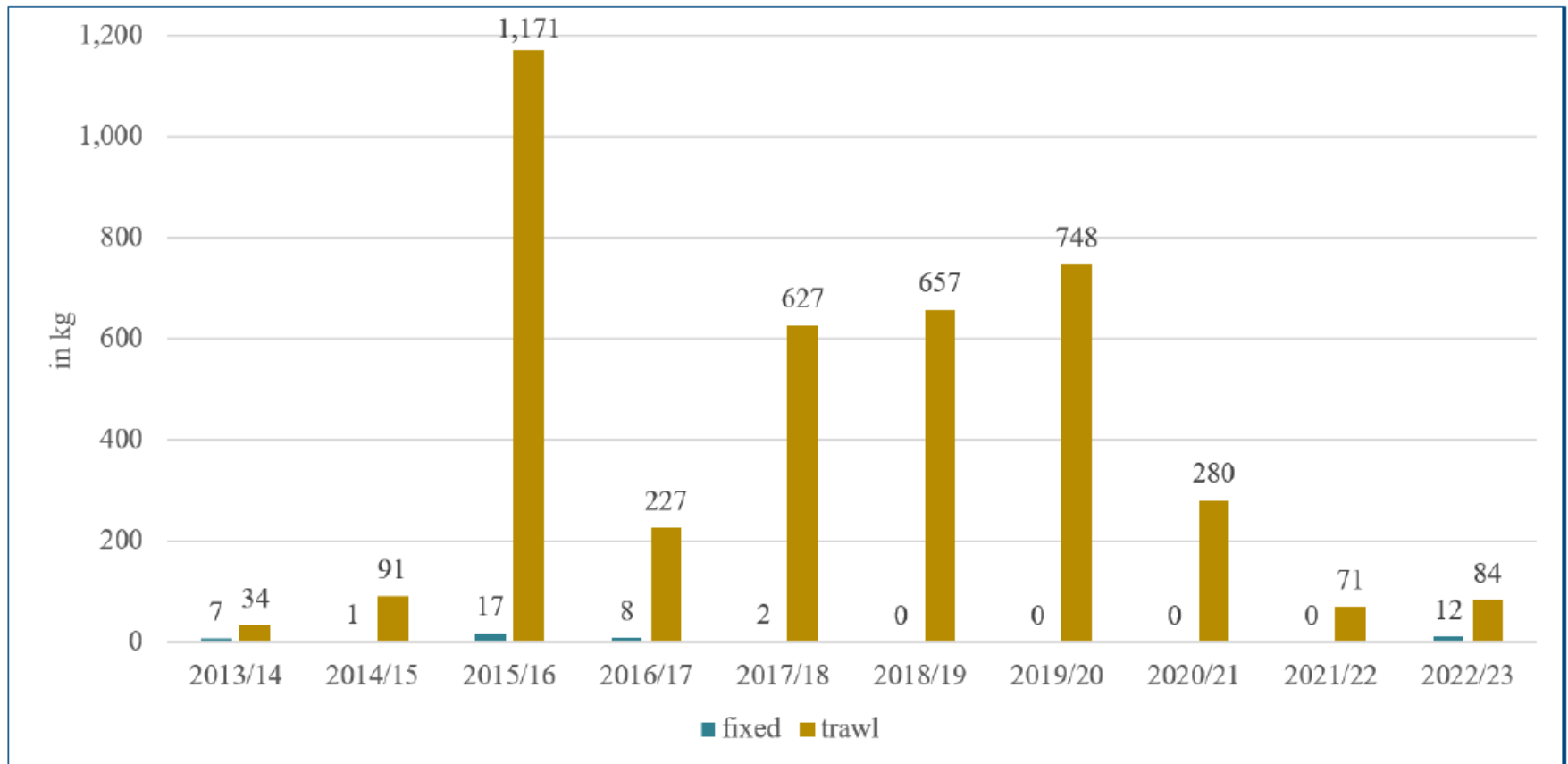


WAIRKC

WAIRKC in AIGKC fishery

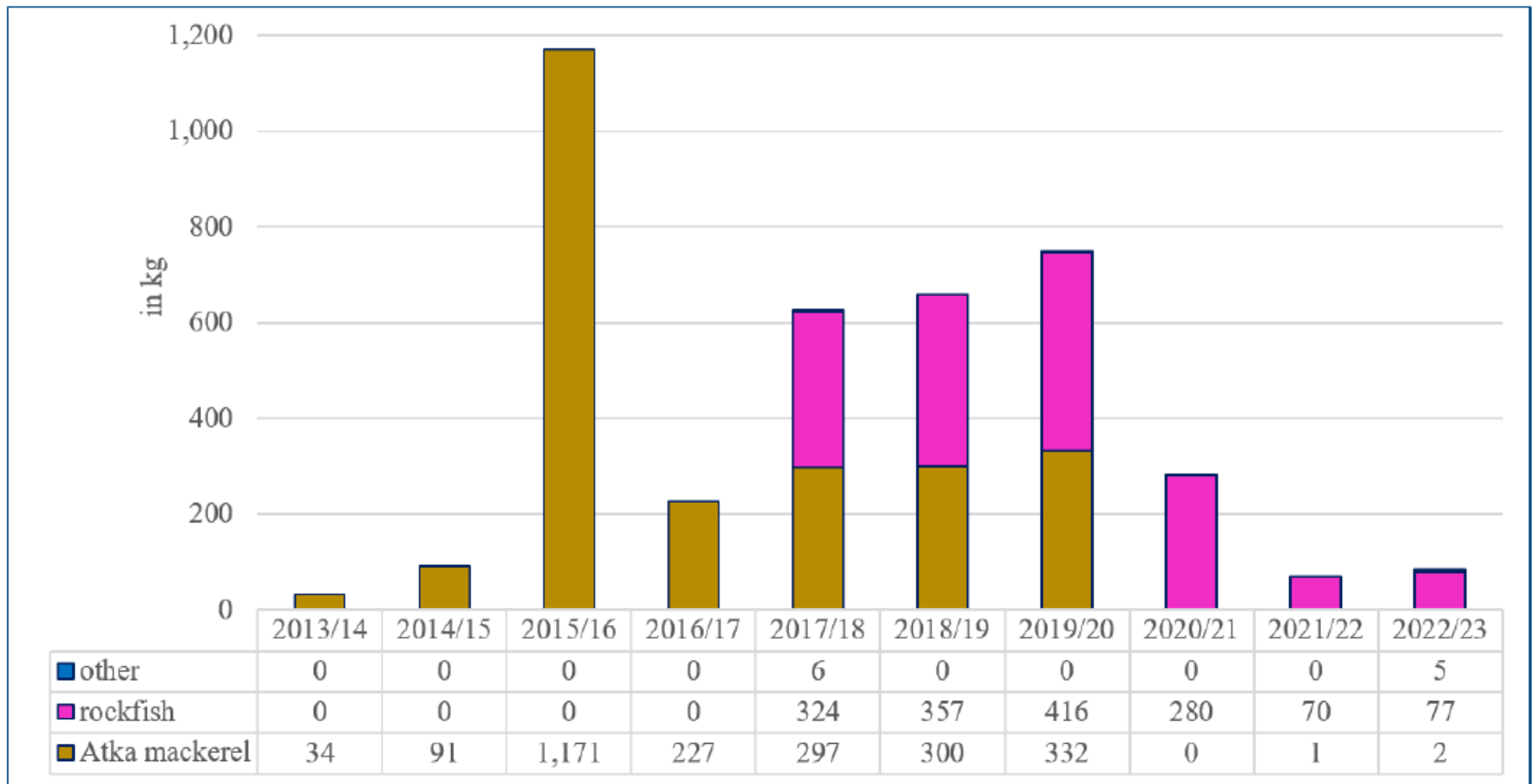


Aleutian Islands Red King Crab Incidental Catch in Groundfish Fisheries



- Not much federal fixed gear fishing in this area.
- Not very much fixed gear observer coverage.

Aleutian Islands Red King Crab Trawl Incidental Catch by Trip Target

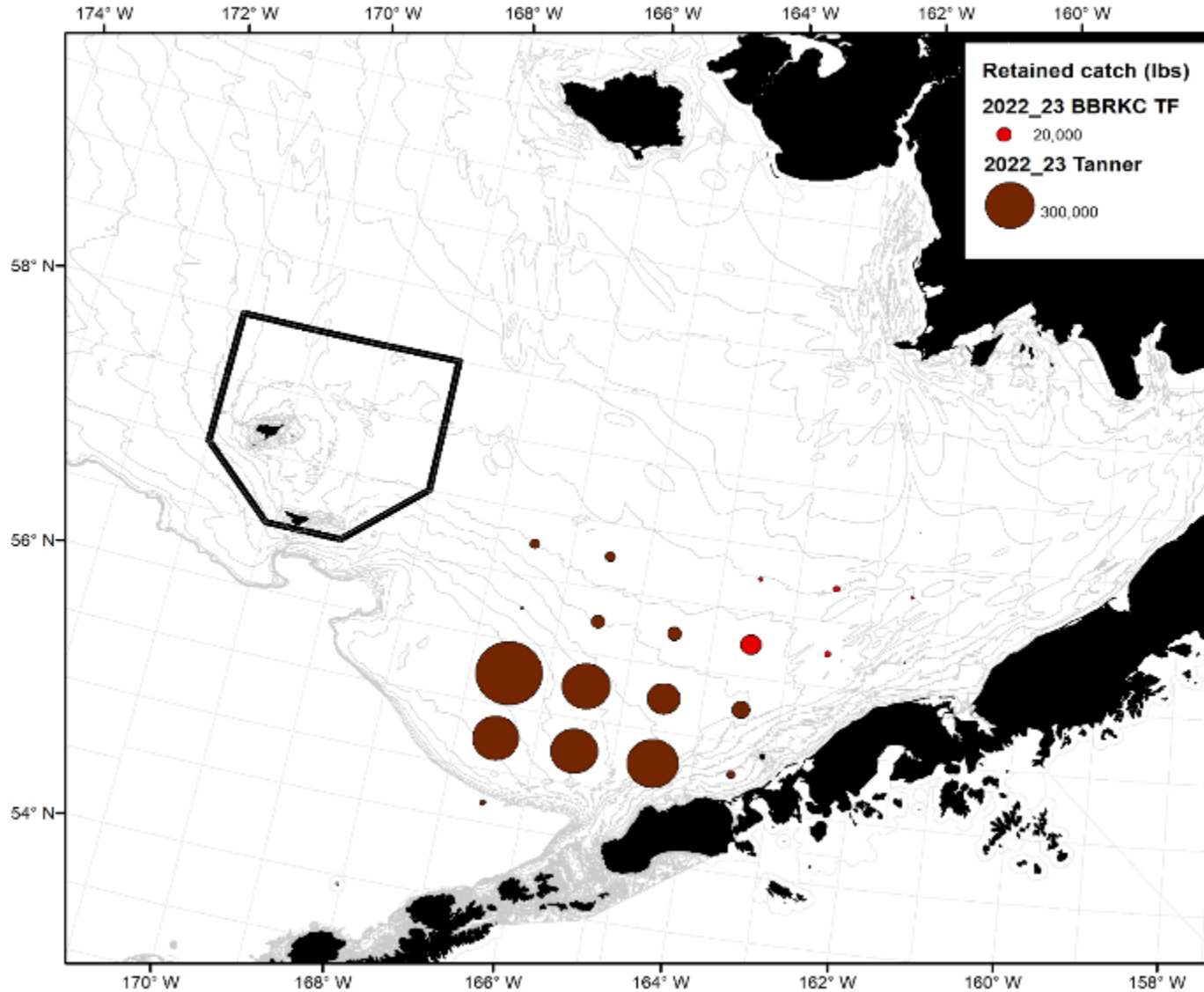


- 90% of the 2022/23 bycatch occurred in April.
- In recent years A80 has been targeting both Atka mackerel and rockfish within the same trip.
- Most of the rockfish is from Pacific Ocean perch fishing.
- “Other” species includes: Kamchatka flounder, Pacific cod, and pollock.

2022/23 Tanner + BBRKC cost recovery

Tanner
excludes stat
areas with <3
vessels

BBRKC cost
recovery
fishery



A large pile of crabs, likely blue crabs, is shown in a blue net. The crabs are densely packed and appear to be freshly caught. The net is suspended by yellow and blue ropes. The background is a dark, possibly underwater or boat deck, environment.

BBRKC

2022/23 fishery closed

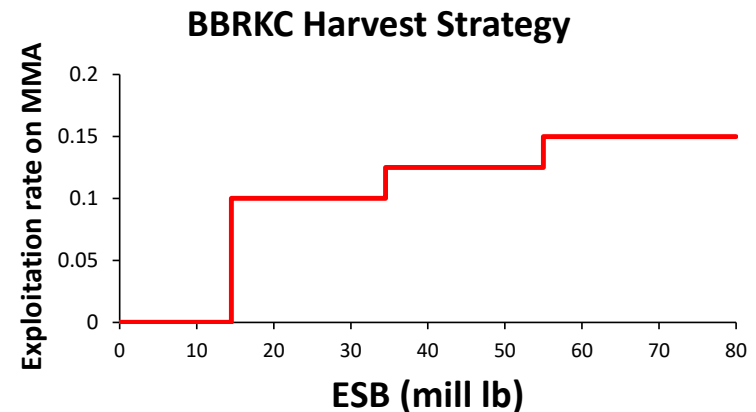
Bristol Bay Red King Crab Harvest Strategy

1. Stock threshold for opening fishery:

- 8.4-million mature-sized females (≥ 90 mm CL), and
- 14.5-mill lb of effective spawning biomass (ESB)

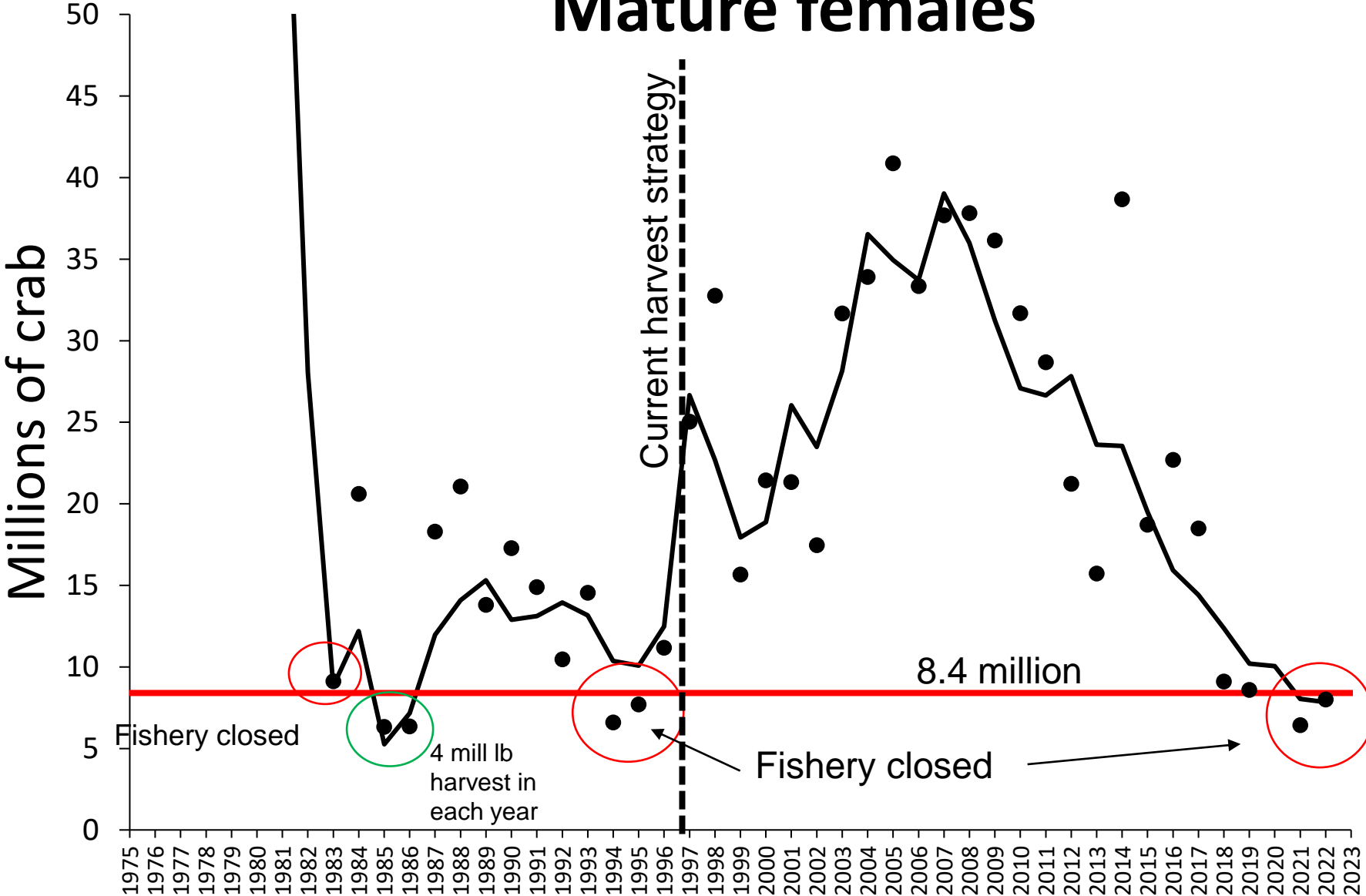
2. Exploitation rate on mature-sized (≥ 120 -mm CL) male abundance:

- 10%, when ESB < 34.75 -mill lb
- 12.5%, when ESB is between 34.75-mill lb and 55.0-mill lb
- 15%, when ESB ≥ 55.0 -mill lb



3. Harvest capped at 50% of legal male abundance

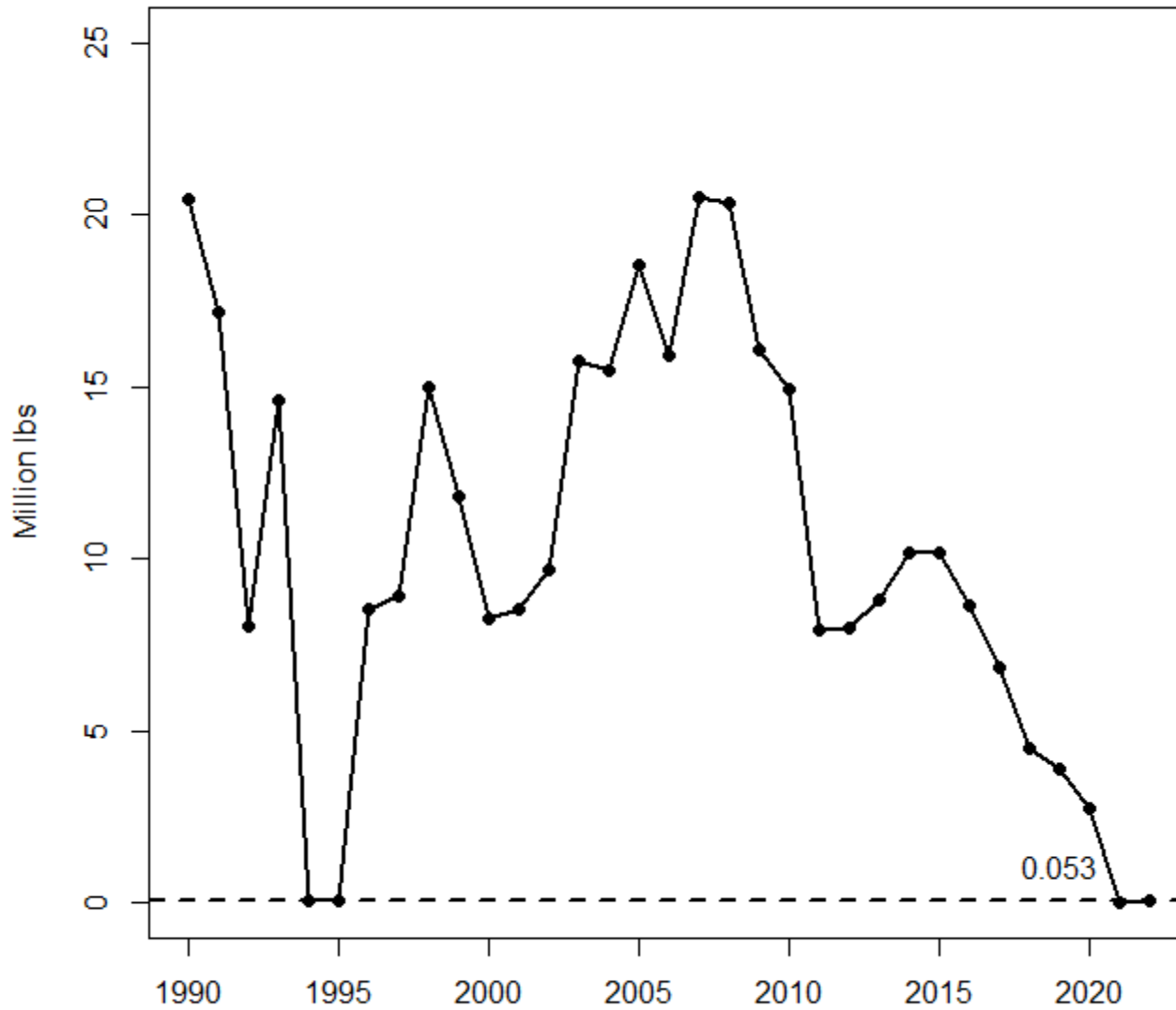
Mature females



Mature Female Abundance Threshold

- Blunt tool meant to avoid recruitment overfishing
- **8.4 million MFA threshold:** estimated at 20% of equilibrium level of fertilized females from Ricker stock-recruitment curve (“Thompsons rule”, Thompson 1990)
 - Defined as the minimum mature female abundance *“that allows sufficient recruitment so that the stock can eventually reach a level that produces MSY”* (1989 BSAI Crab FMP)

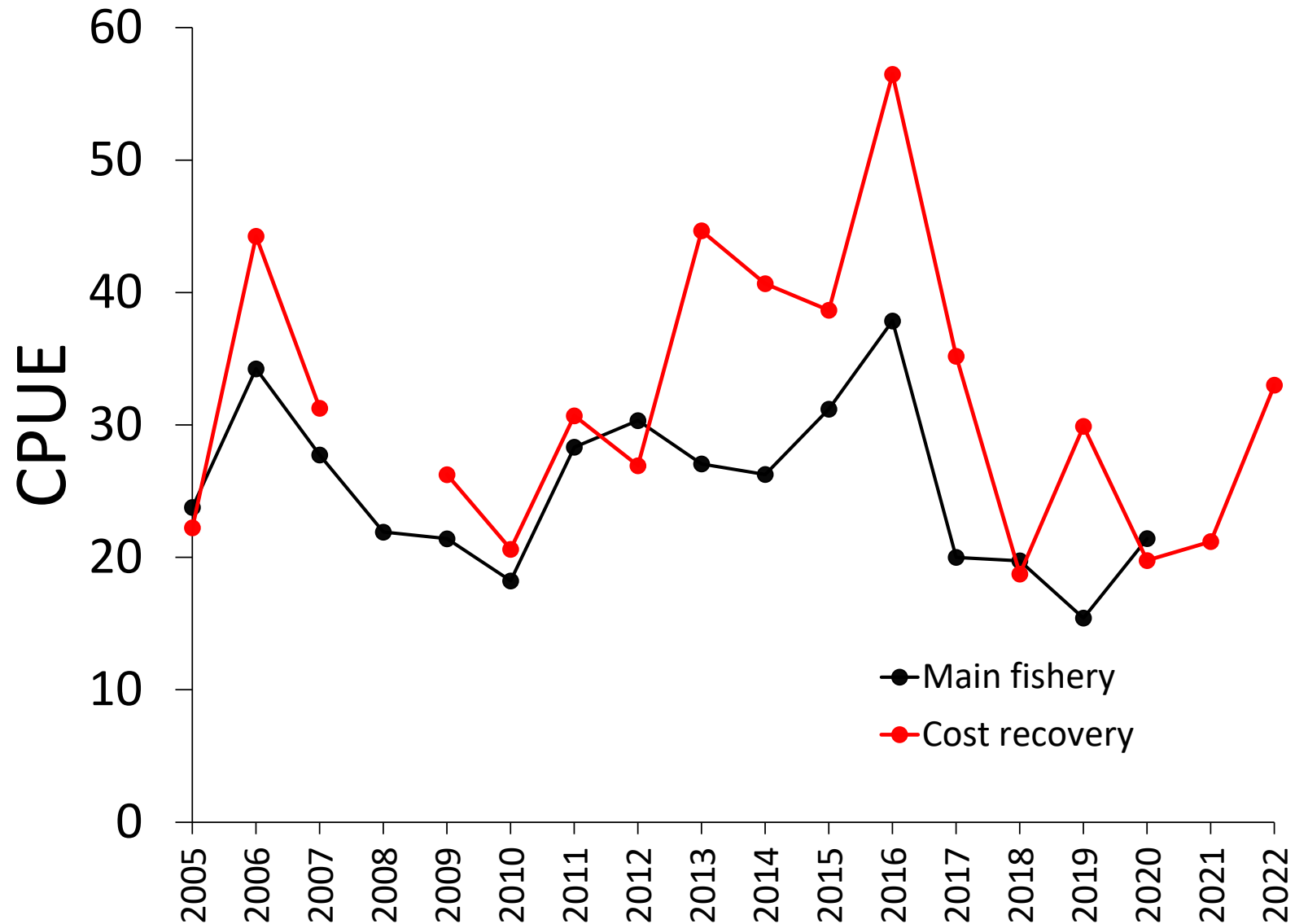
BBRKC retained catch



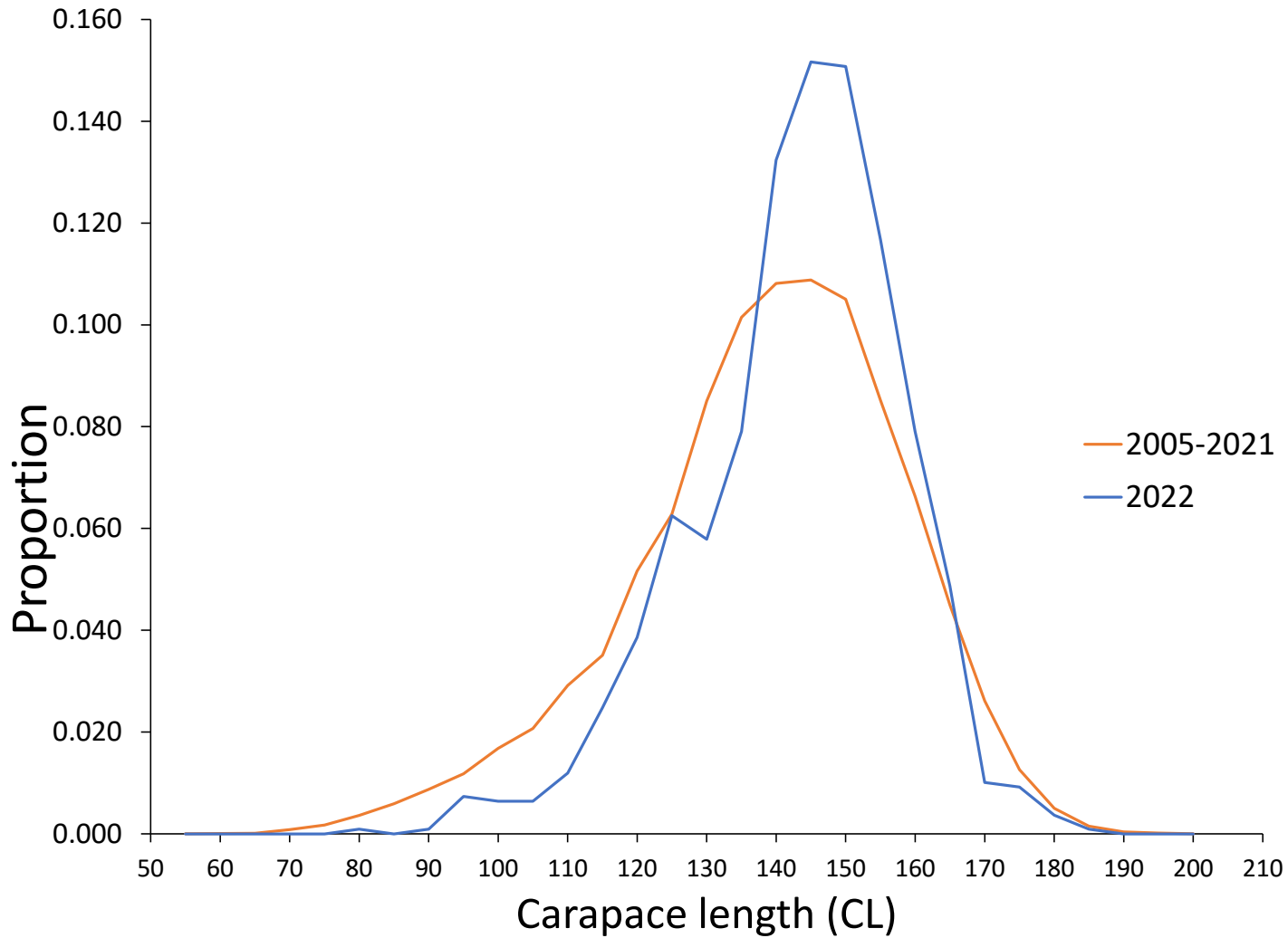
2022/23 Cost recovery fishery

- 52,863 lbs
- 7,987 crab

BBRKC cost recovery fishery

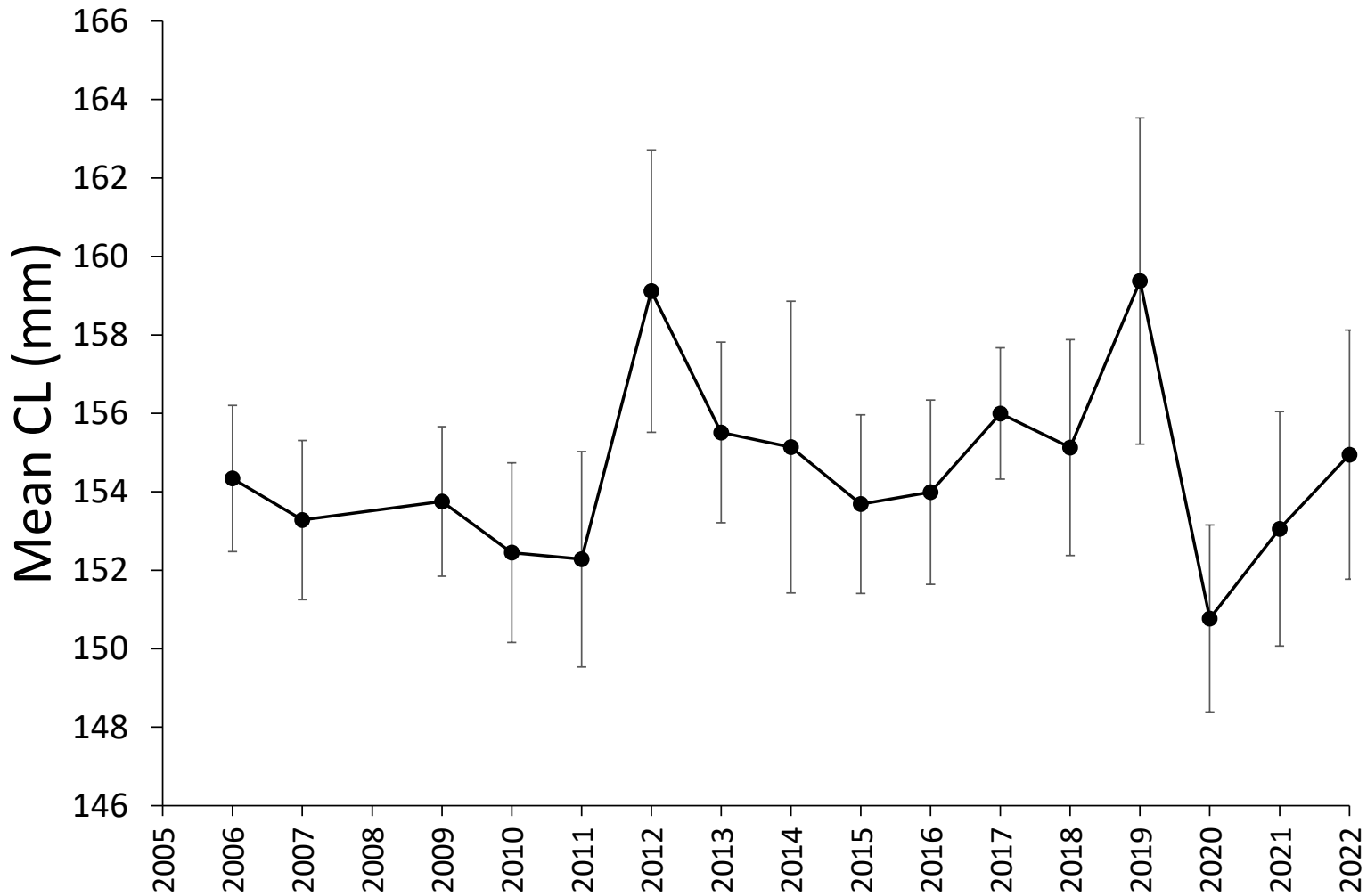


Observer data in CR fisheries

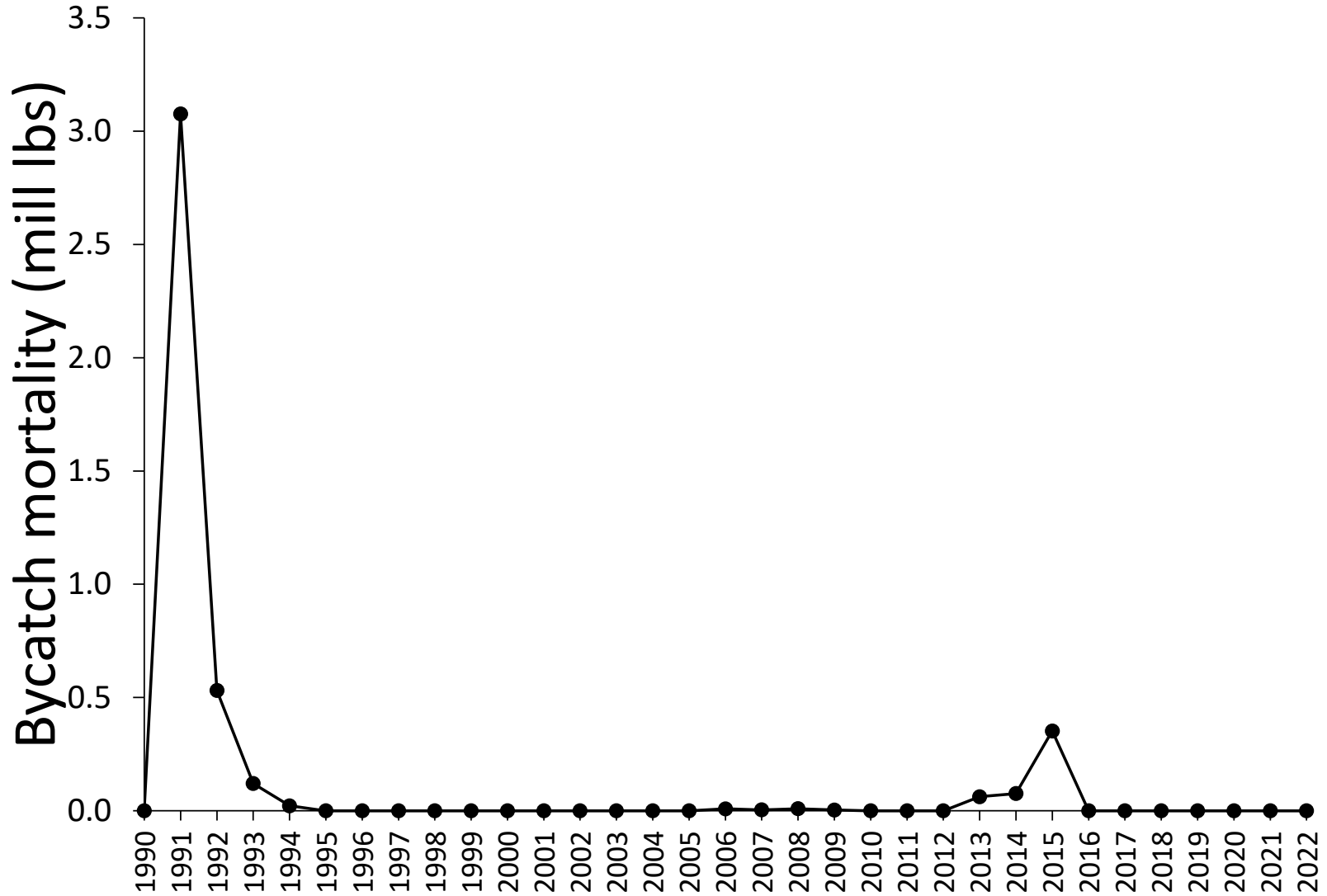


Cost recovery fisheries

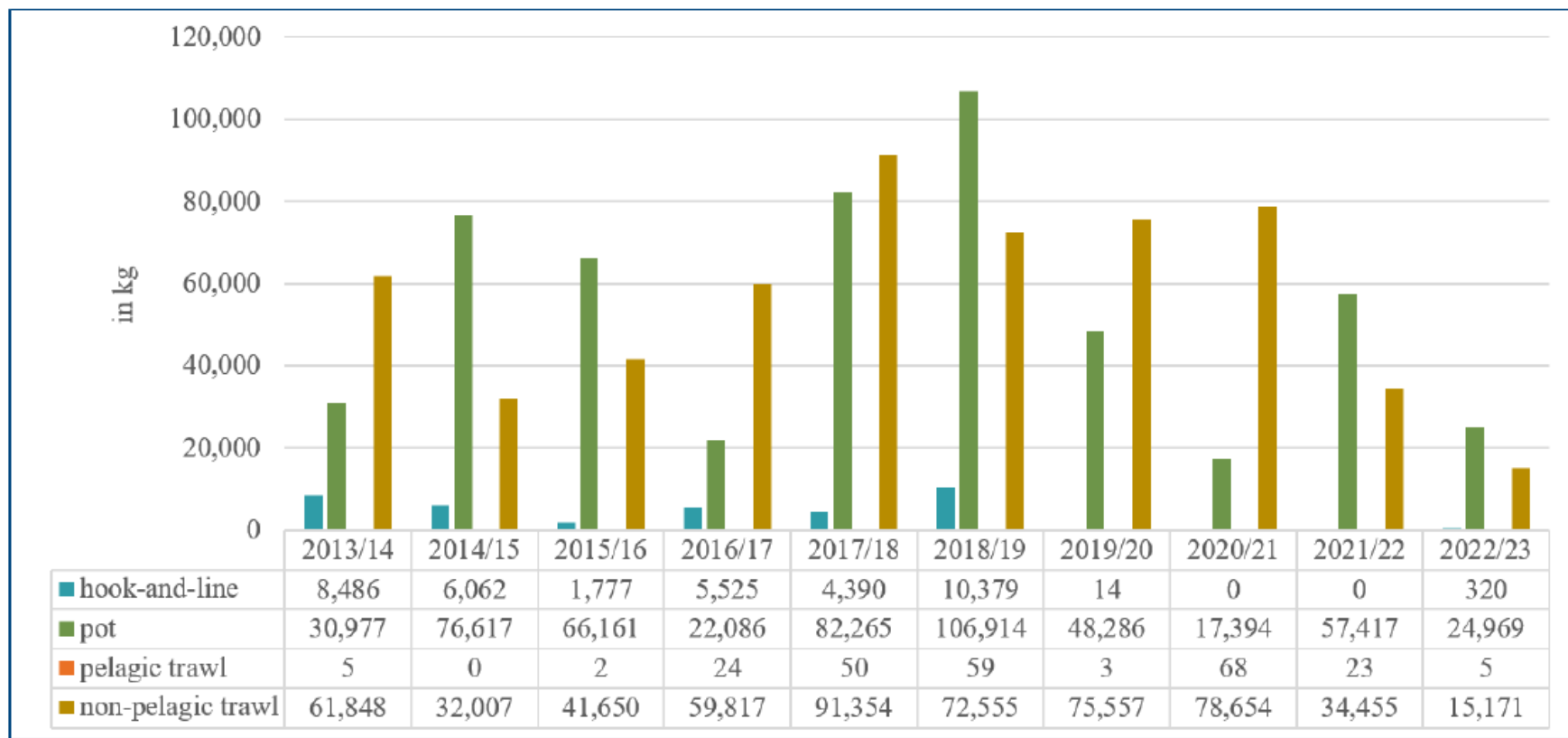
CR retained catch



BBRKC bycatch in Tanner fishery



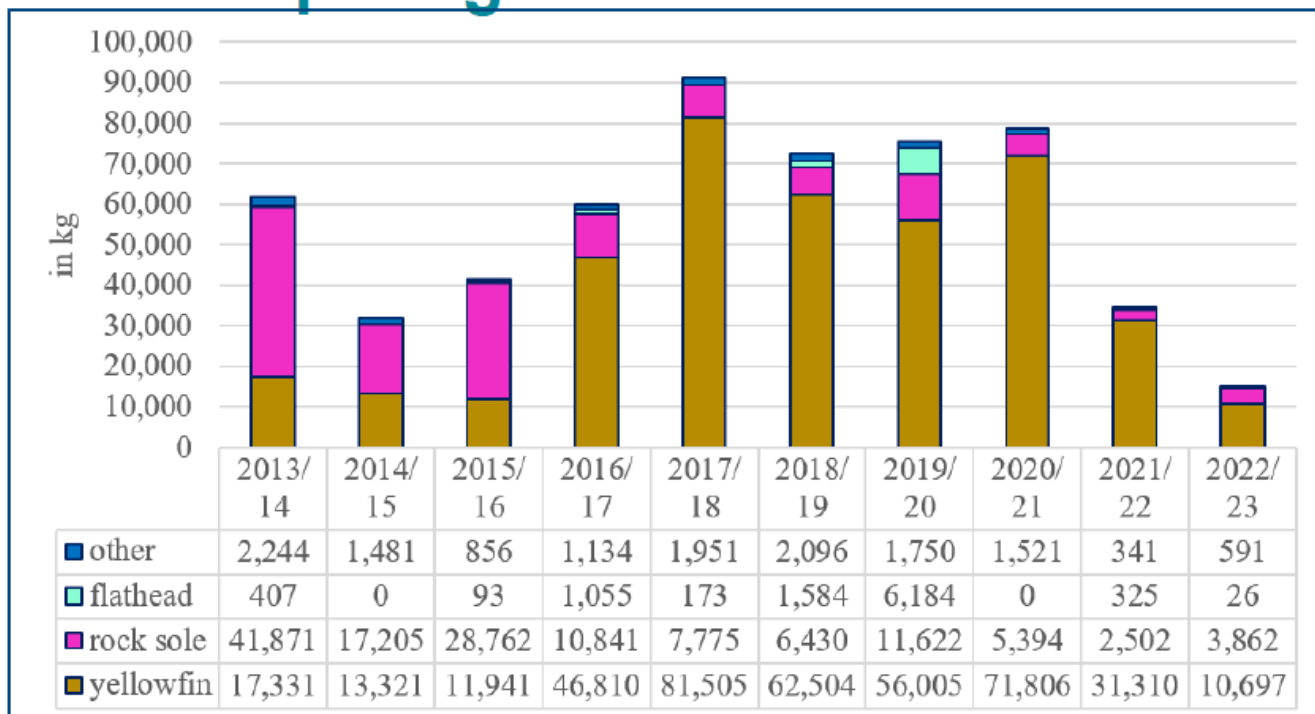
Bristol Bay Red King Crab Incidental Catch in Groundfish Fisheries



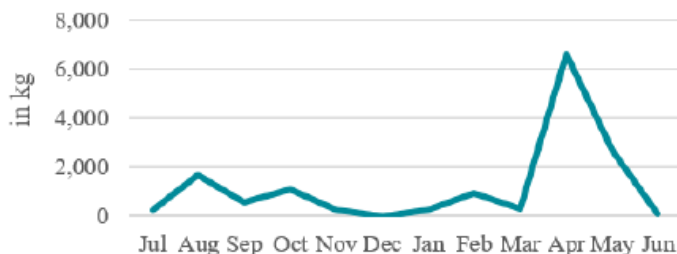
- In most years there is more RKC bycatch in the Pacific cod pot fisheries in the fall.
- Pot Pacific cod fishing is concentrated on the north side of Unimak Island to Port Moller.
- Observers reported more females in pot gear than in trawl gear in the past eight years in BB : 72%-91% female in pot gear vs 20% - 46% in trawl gear.
- Zero BBRKC bycatch reported in pot gear January through June 2023.

Bristol Bay Red King Crab Trawl Incidental Catch by Trip Target

- Rock sole and yellowfin sole are often targeted during the same fishing trip.
- “Other” species includes: Alaska plaice, arrowtooth flounder, Atka mackerel, Greenland turbot, Kamchatka flounder, other flatfish, Pacific cod, rockfish, and pollock.
- Red king crab savings subarea in Bristol Bay was closed to nonpelagic trawl in 2022 and 2023.



2022/23 estimated BBRKC bycatch in rock sole, yellowfin sole, and flathead sole fisheries by month



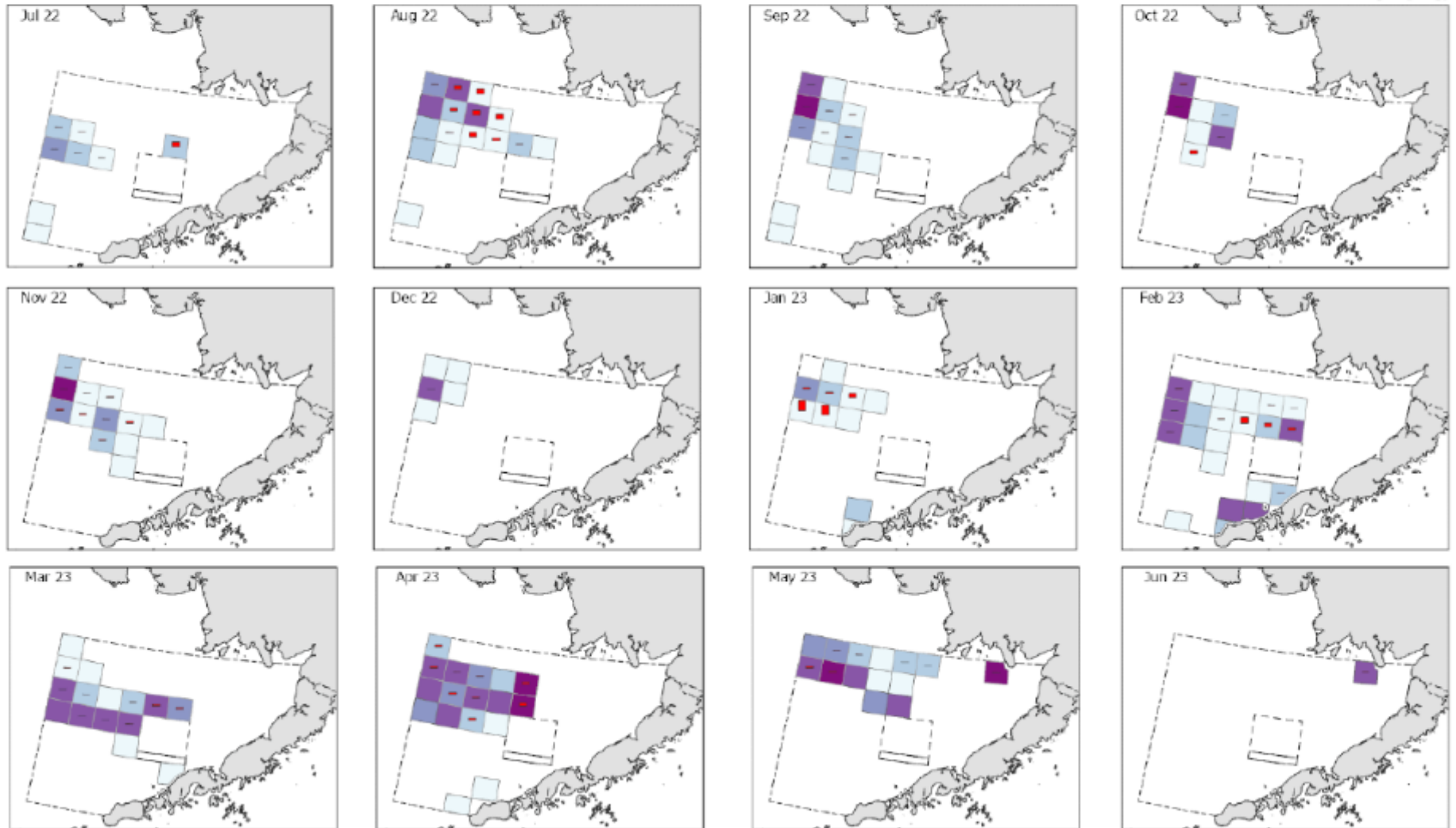
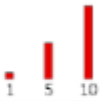
- Bycatch of BBRKC in trawl gear typically occurs throughout the crab year.
- In 2022/23 bycatch peaked in April/May during the yellowfin sole fishery due to high red king crab rates in the stock area.
- Majority of yellowfin/flathead harvest occurred Sept/Oct and Feb - May.

2022/23 Average Rate (kg BBRKC/mt of Groundfish) in the Flathead, Rock, and Yellowfin Soles NPT Fisheries by ADF&G Statistical Area and Month

NON-PELAGIC TRAWL CATCH OF FLATHEAD, ROCK, AND YELLOWFIN SOLES
(MT GROUNDFISH)

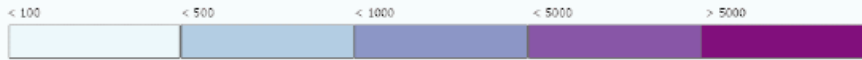


AVERAGE RATE OF RED KING CRAB BYCATCH
(KG CRAB/MT GROUNDFISH)

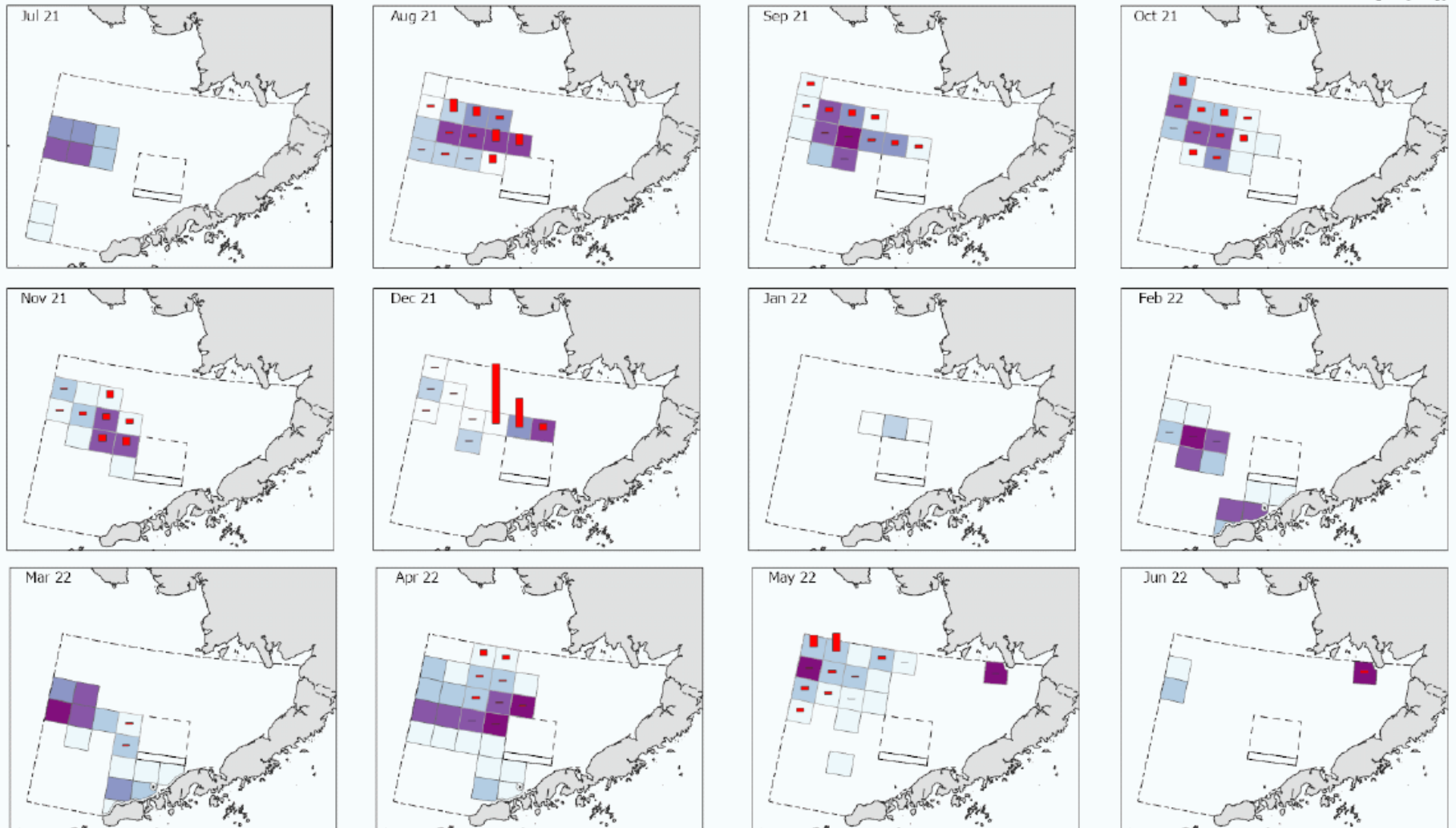
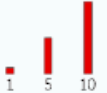


2021/22 Average Rate (kg BBRKC/mt of Groundfish) in the Flathead, Rock, and Yellowfin Soles NPT Fisheries by ADF&G Statistical Area and Month

NON-PELAGIC TRAWL CATCH OF FLATHEAD, ROCK, AND YELLOWFIN SOLES (MT GROUNDFISH)



AVERAGE RATE OF RED KING CRAB BYCATCH (KG CRAB/MT GROUNDFISH)

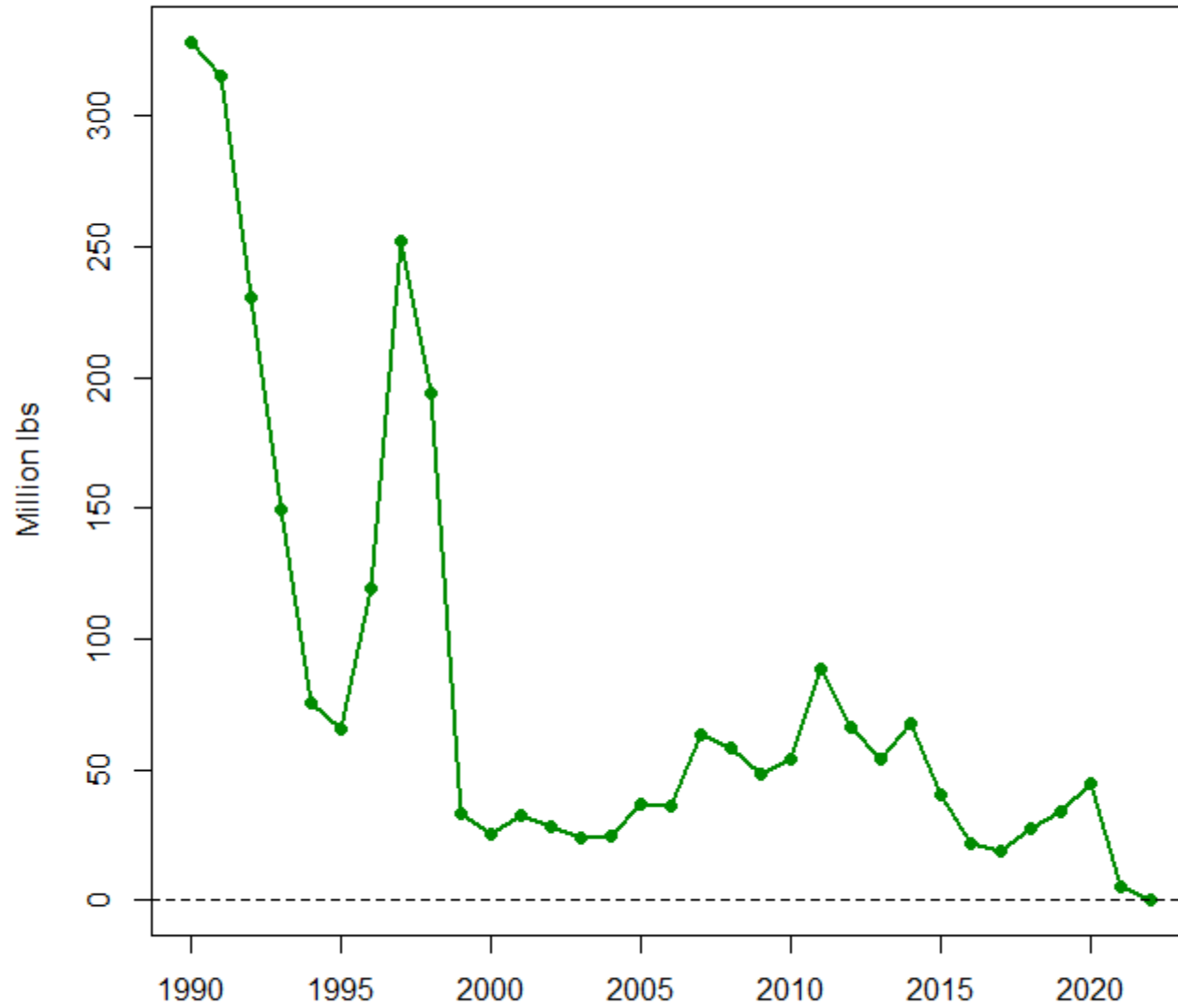




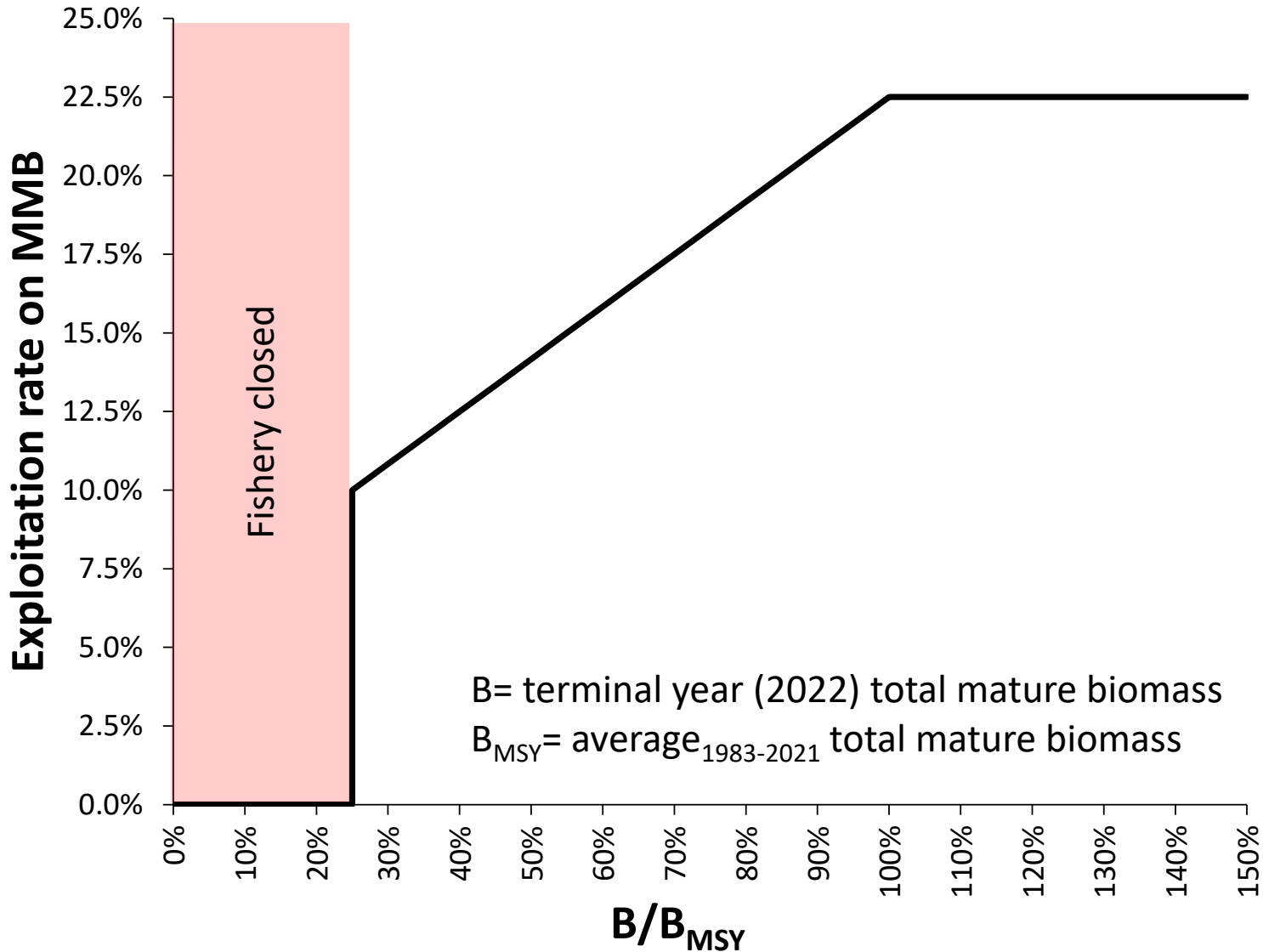
Snow crab

2022/23 fishery closed

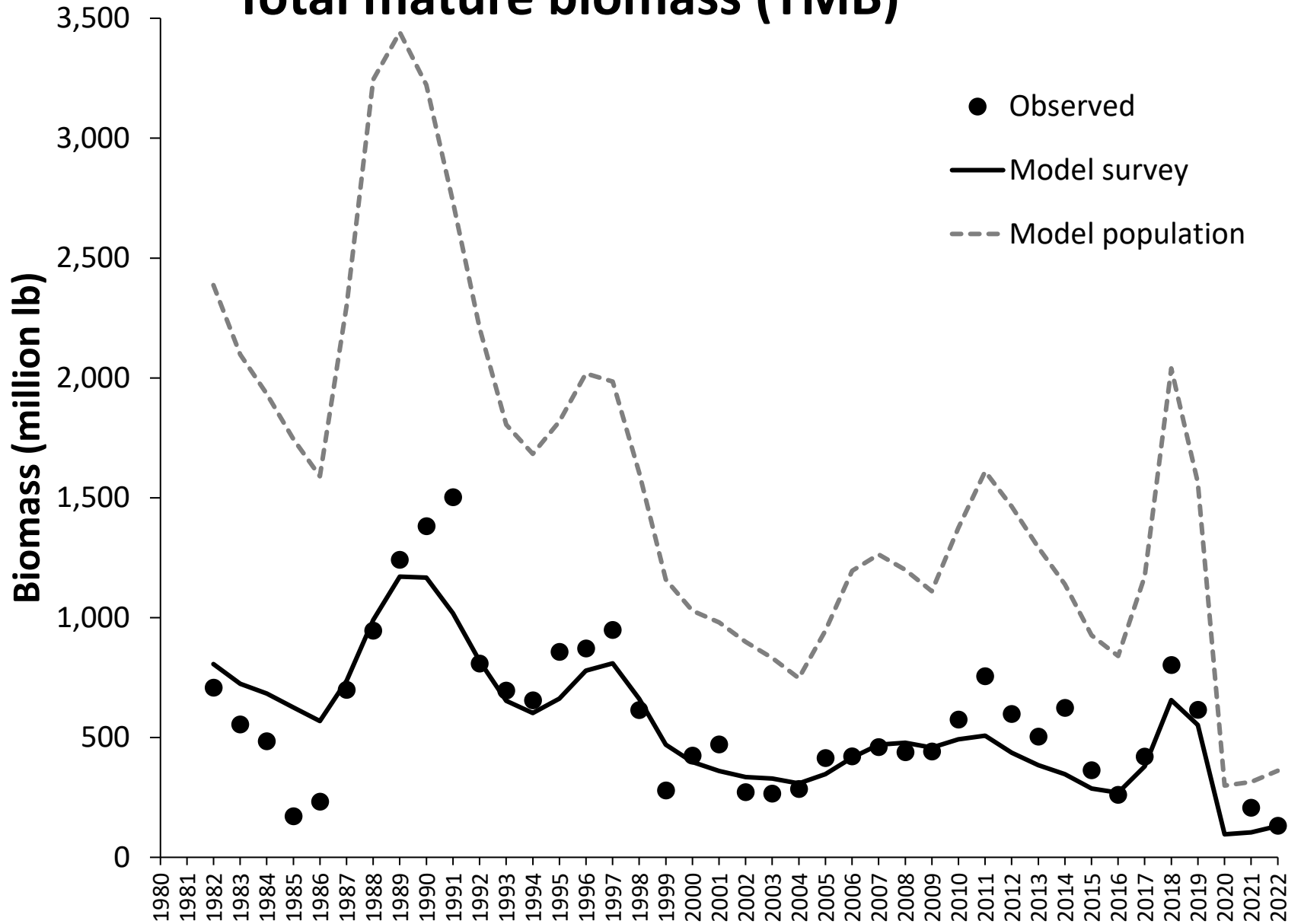
snow crab retained catch



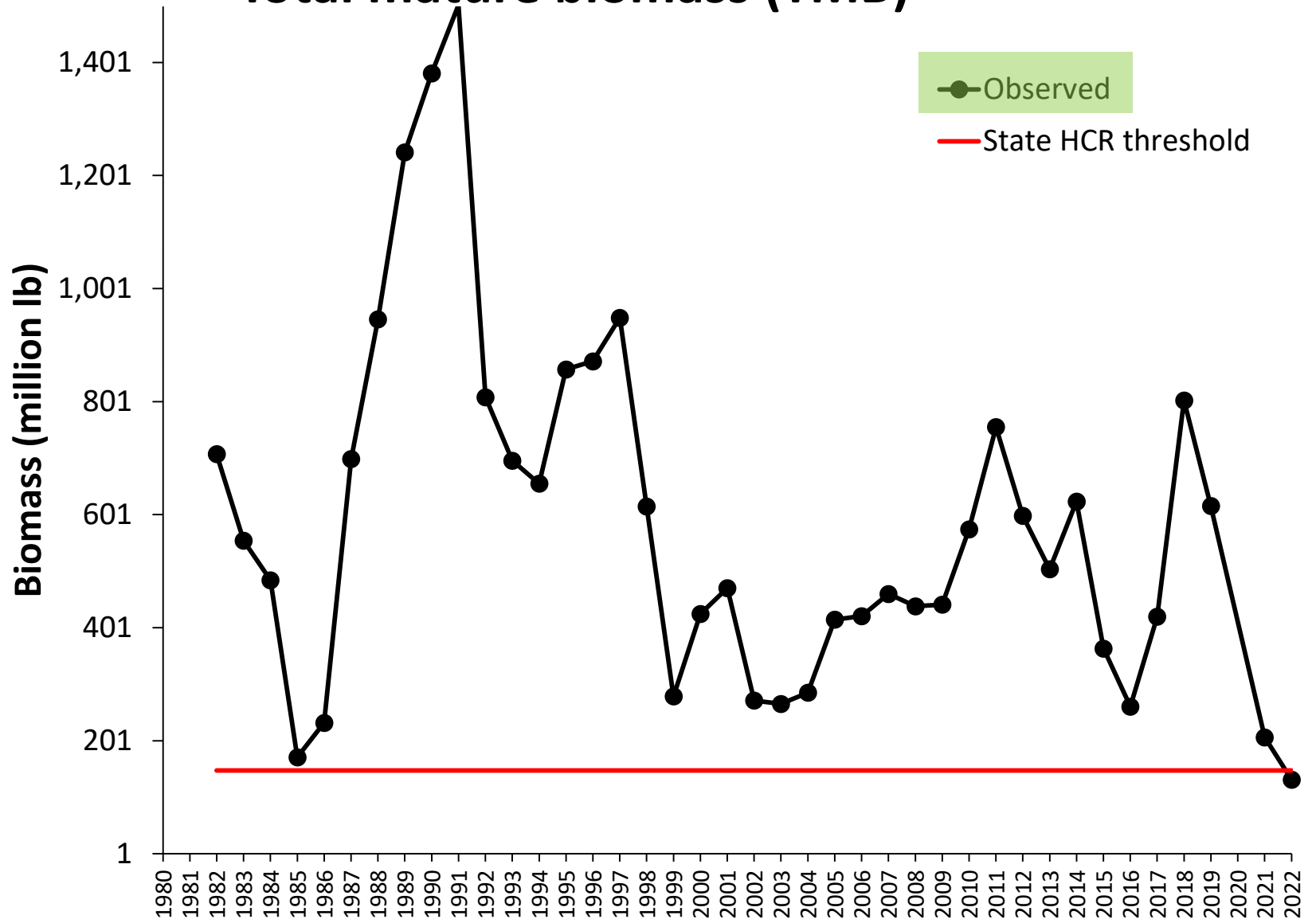
State Harvest Strategy



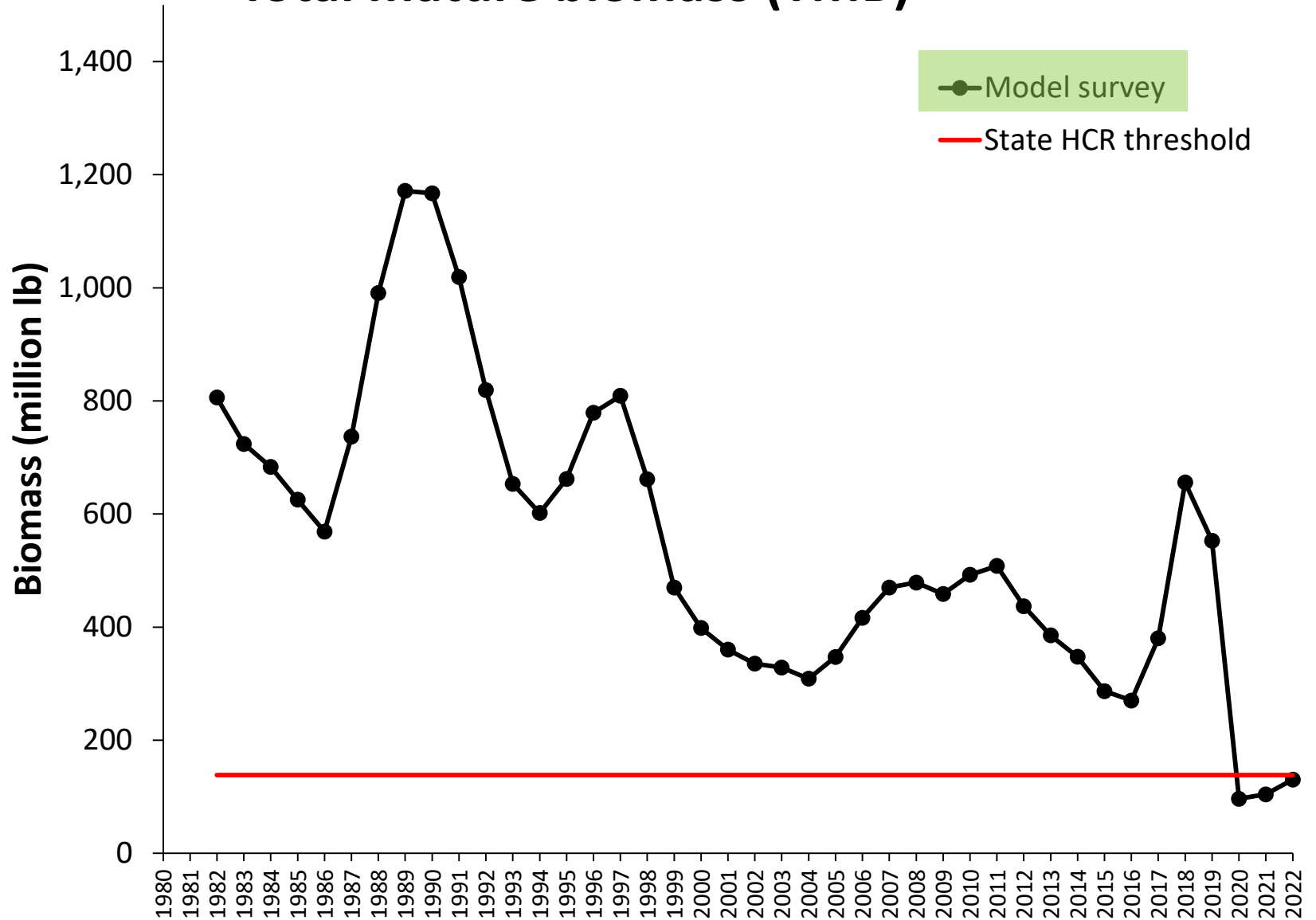
Total mature biomass (TMB)



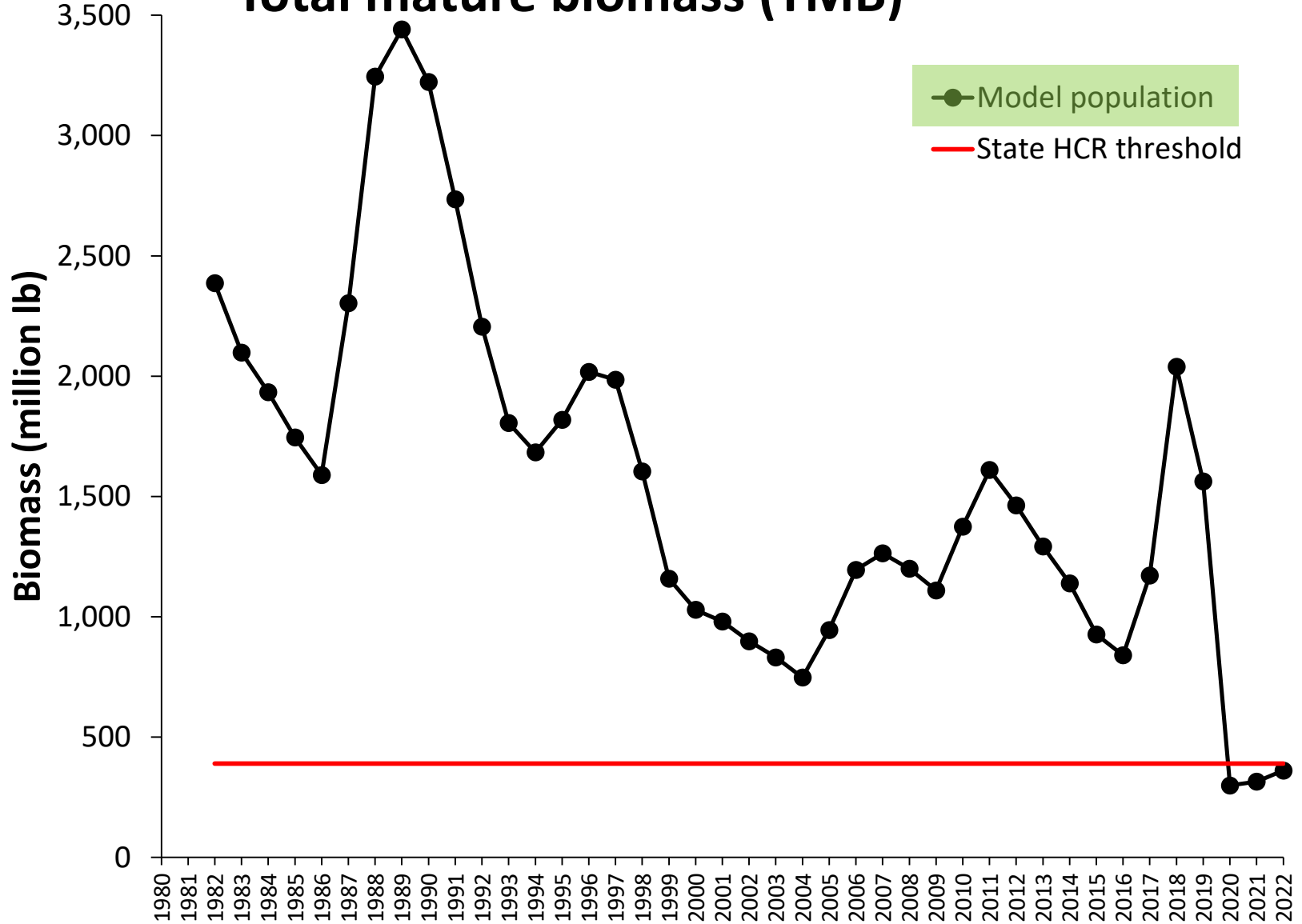
Total mature biomass (TMB)



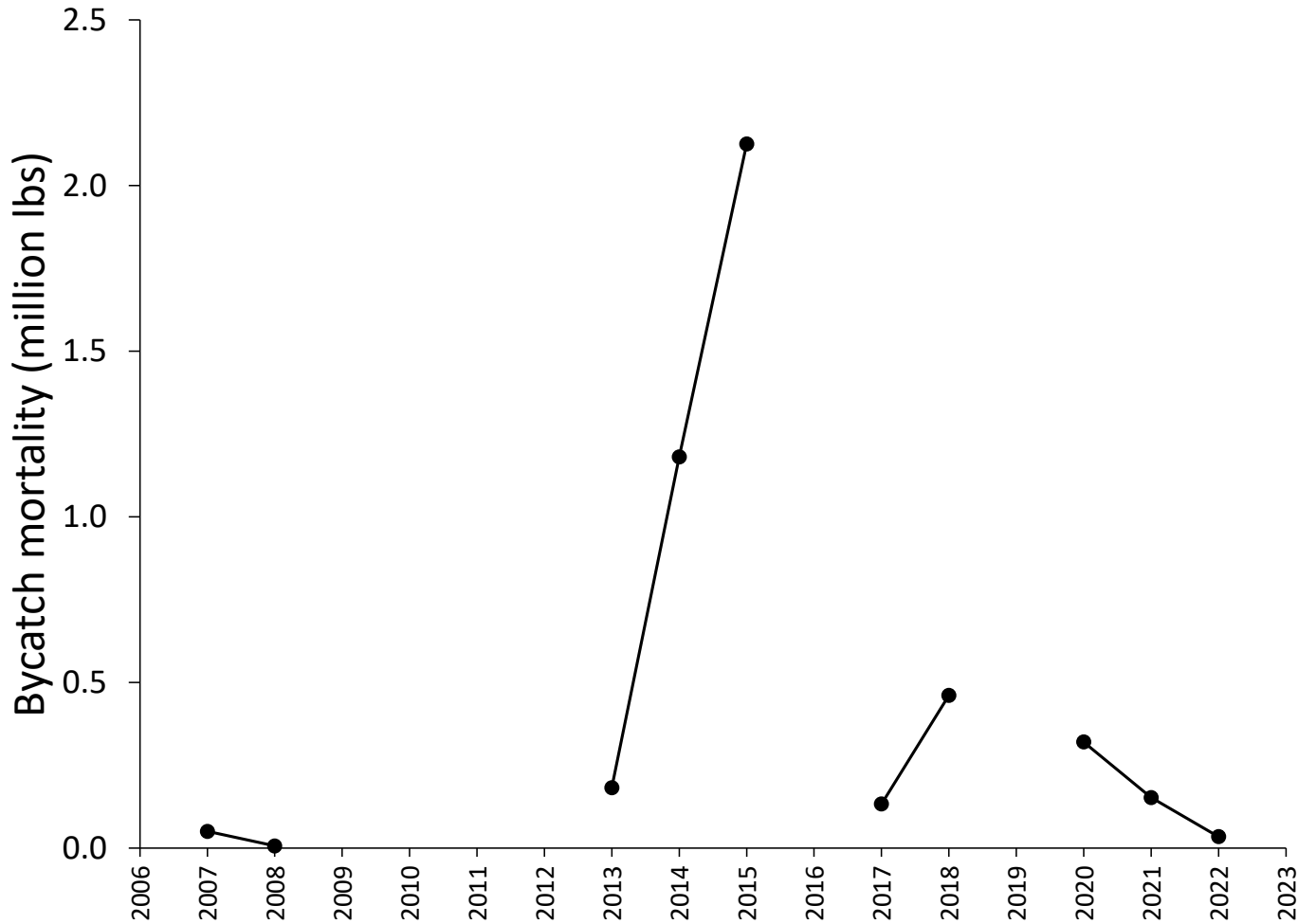
Total mature biomass (TMB)



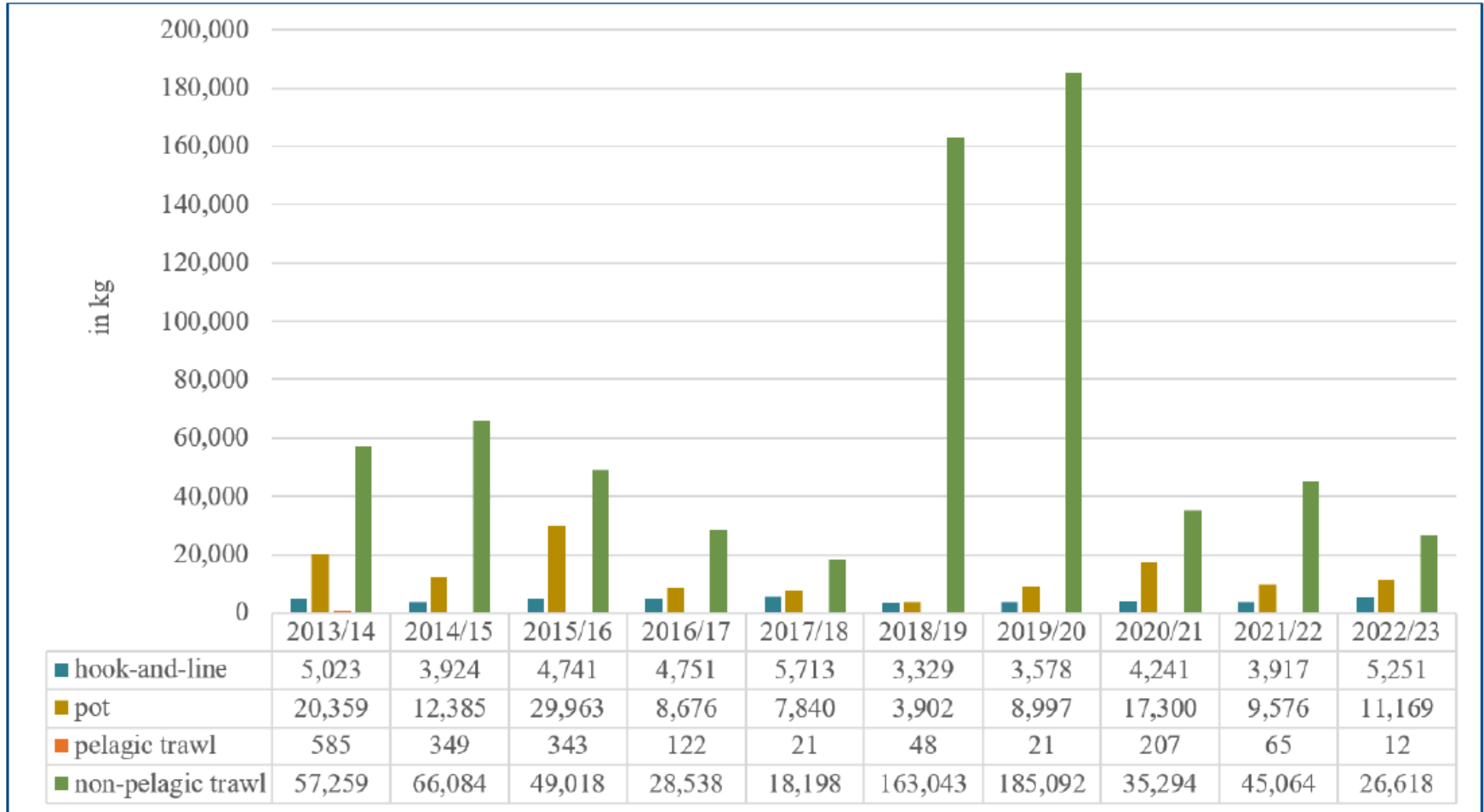
Total mature biomass (TMB)



Snow crab bycatch mortality in Tanner W fishery



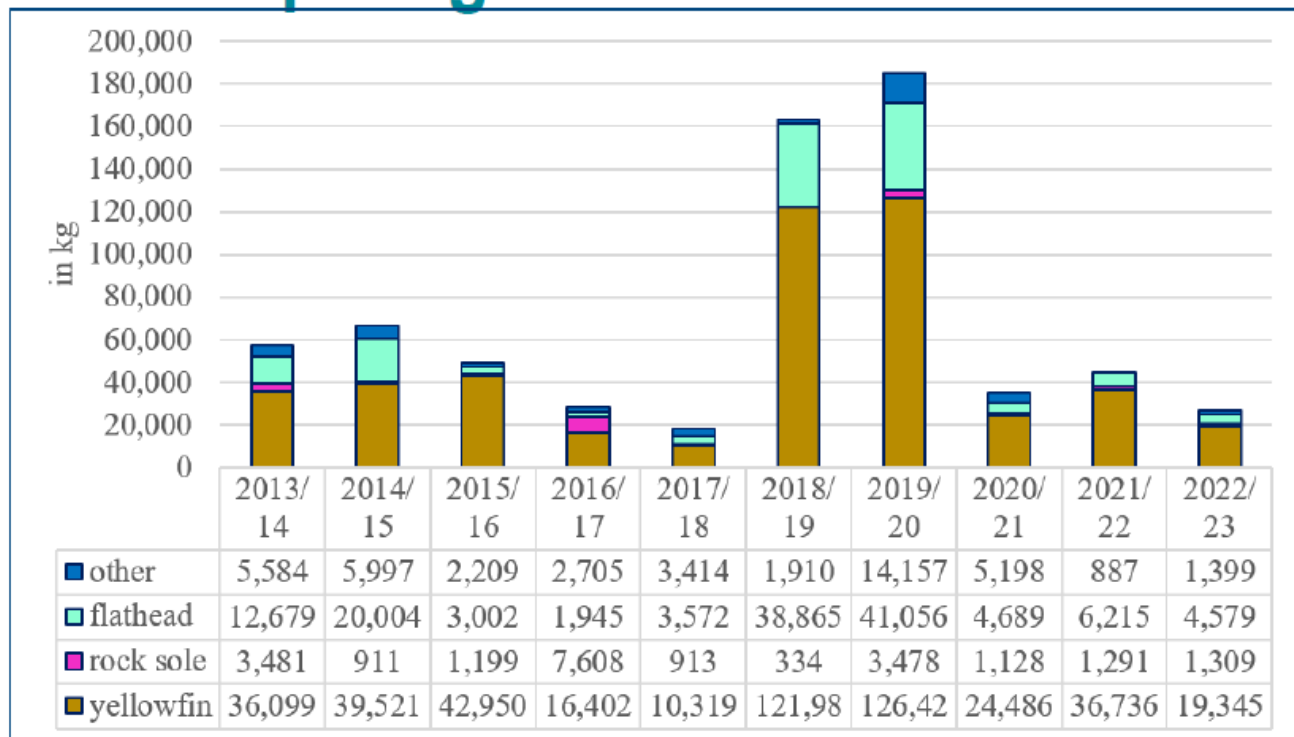
Bering Sea Snow Crab Incidental Catch in Groundfish Fisheries



- Pot and hook-and-line Pacific cod fishing accounts for most BSS bycatch in the fixed gear category.
- Hook-and-line Pacific cod fishing is spread out throughout the stock area.
- Pot Pacific cod fishing is concentrated on the north side of Unimak Island to Port Moller.

Bering Sea Snow Crab Trawl Incidental Catch by Trip Target

- 2018/19 and 2019/20 increased BSS bycatch in the yellowfin fishery was due mainly to increased yellowfin sole fishing in the area above the Pribilof Islands.
- “Other” species includes: Alaska plaice, arrowtooth flounder, Atka mackerel, Greenland turbot, Kamchatka flounder, other flatfish, Pacific cod, rockfish, and pollock.



2022/23 estimated BSS bycatch in rock sole, yellowfin sole, and flathead sole fisheries by month

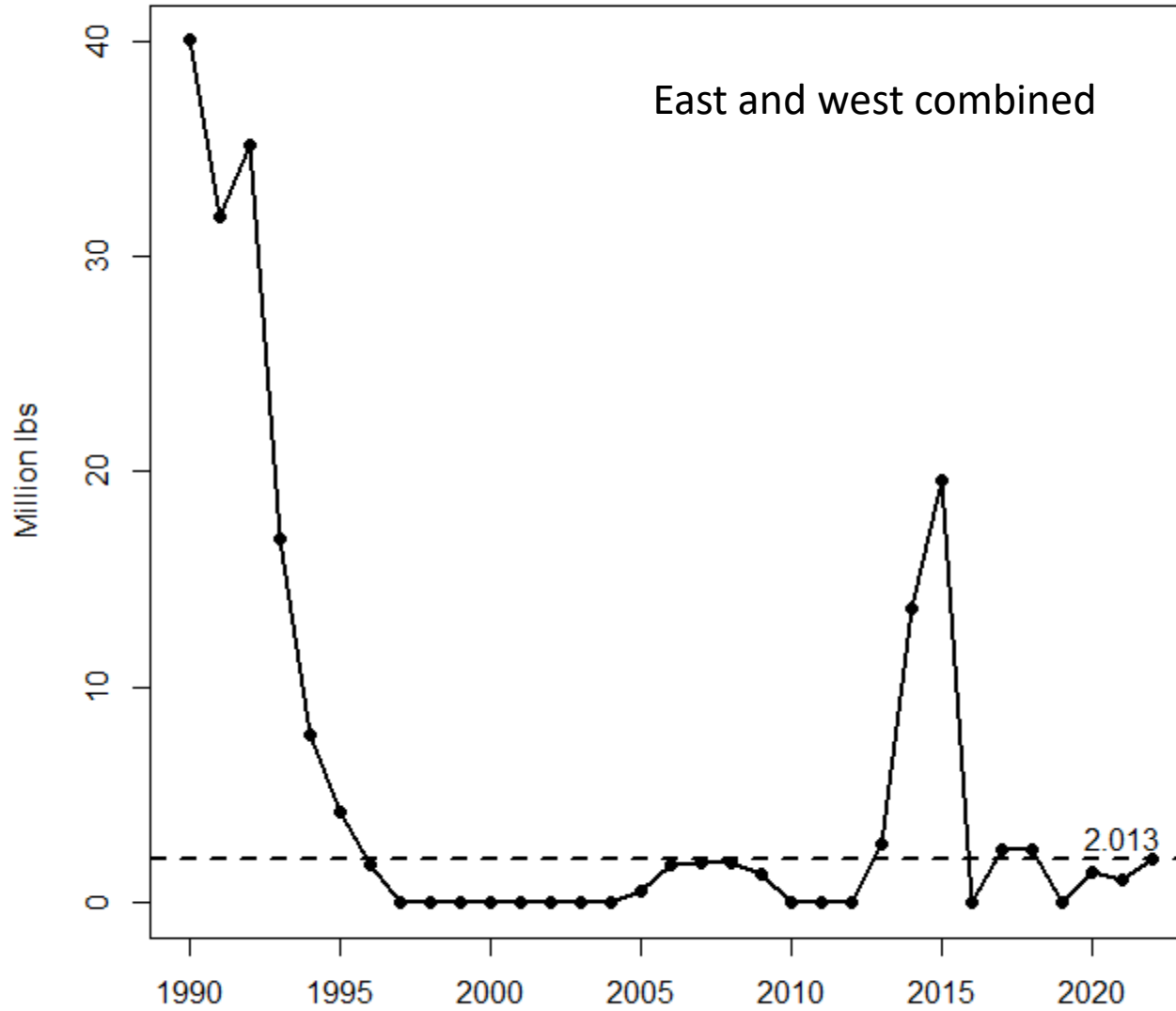


- Bycatch of BSS in trawl gear typically occurs throughout the crab year.
- In 2022/23 bycatch was highest in February during the yellowfin sole fishery.
- In 2022/23 rates were the highest in the February.
- Majority of yellowfin/flathead harvest occurred Sept/Oct and Feb - May.



Tanner crab

Tanner crab retained catch

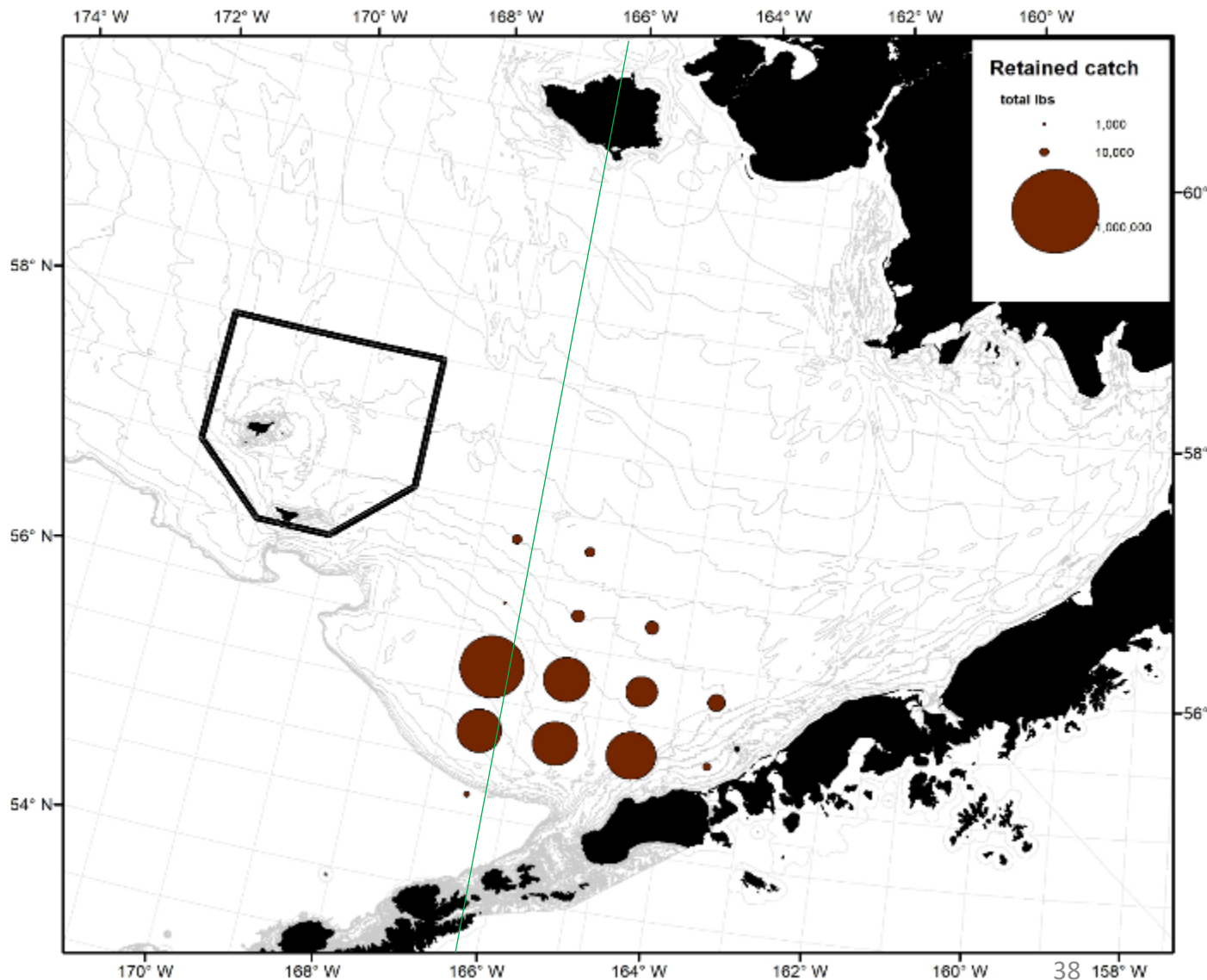


2022/23 TAC 2.015 mill lb (East=1.165 mill lb, West=0.850 mill lb)

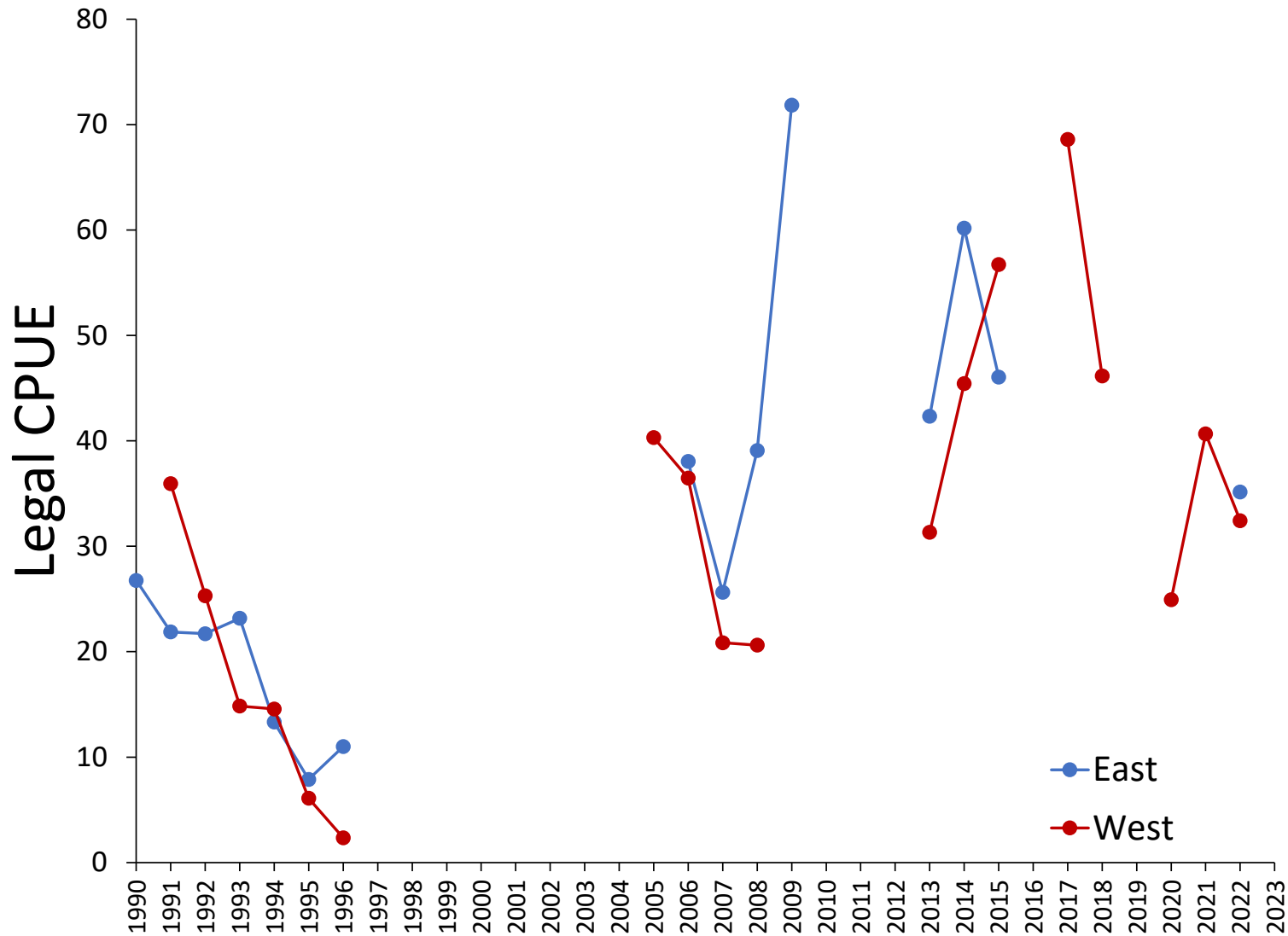
2022/23 Tanner crab retained catch

Excludes stat
areas with <3
vessels

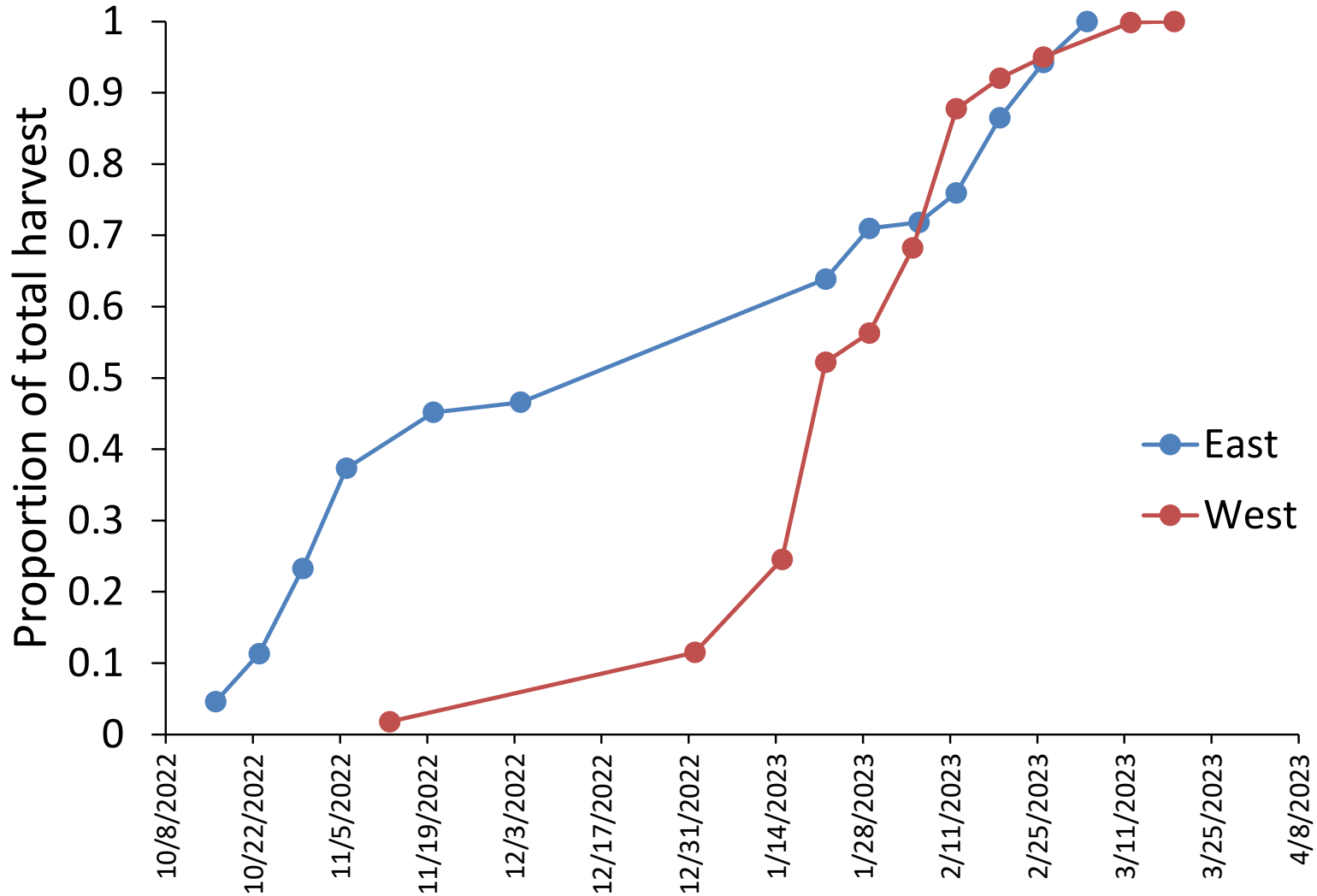
99% of harvest
shown here



Tanner crab retained catch CPUE



2022/23 Tanner crab



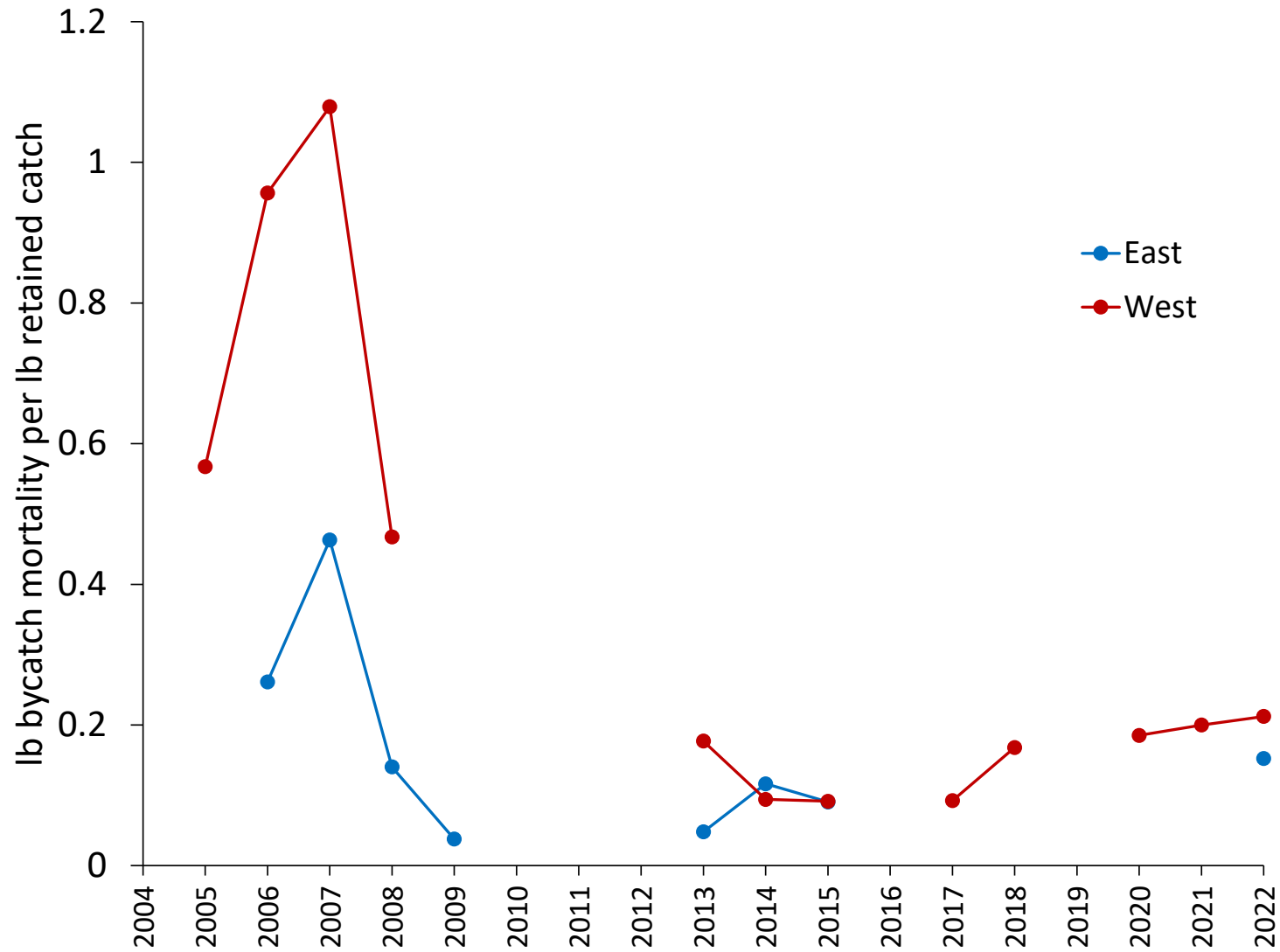
2022/23 EBT: observations from the fleet

- High CPUE Tanner crab fishing on mostly new-shell crab along the 166°W long. boundary and north of Unimak Island in the southwestern most part of the grounds.
- Most productive fishing in 50 to 65 fathoms.
- Like recent Tanner seasons, many vessels retained Tanner crab smaller than the traditional industry preferred size of 5 inches.
- Concern about bottom trawl flatfish fisheries in Bristol Bay impacting both Tanner crab numbers and habitat.

2022/23 WBT: observations from the fleet

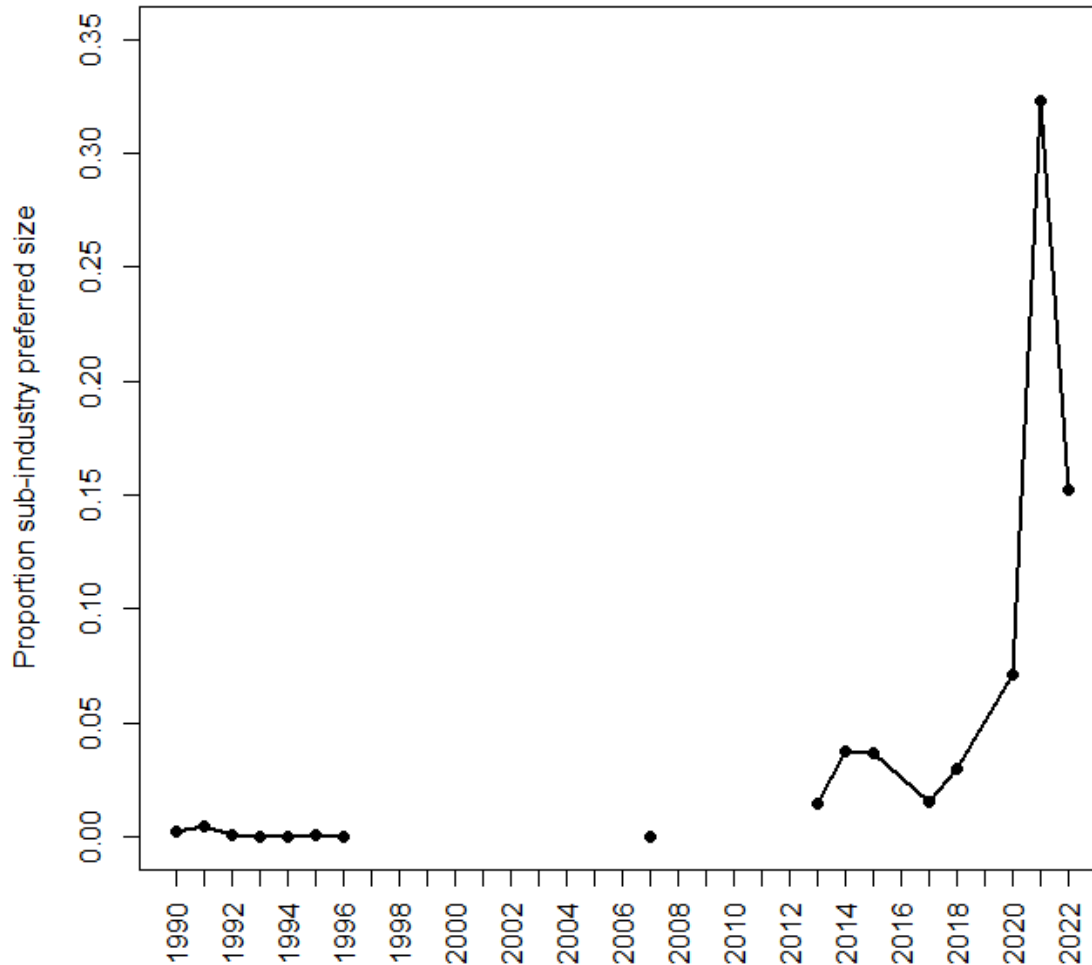
- High CPUE Tanner crab fishing on mostly new-shell crab along the 166°W long. boundary in the southeastern most part of the grounds.
- Most productive fishing in 65 to 80 fathoms.
- Low CPUE fishing farther north and on the east side of the Pribilof Islands closure box.
- No effort at all on the west side of the Pribilof Islands due to low CPUE seen in the previous seasons and the high cost of fuel.
- Like recent Tanner seasons, many vessels retained Tanner crab smaller than the traditional industry preferred size of 5 inches.
- Concern about bottom trawl flatfish fisheries E/W of the Pribilof Islands impacting both Tanner crab numbers and habitat.

Tanner crab discard mortality rate



Retained Catch

Retained catch (dockside data)



Legal size:

west 4.4 inches

east 4.8 inches

Preferred size: 5 inches

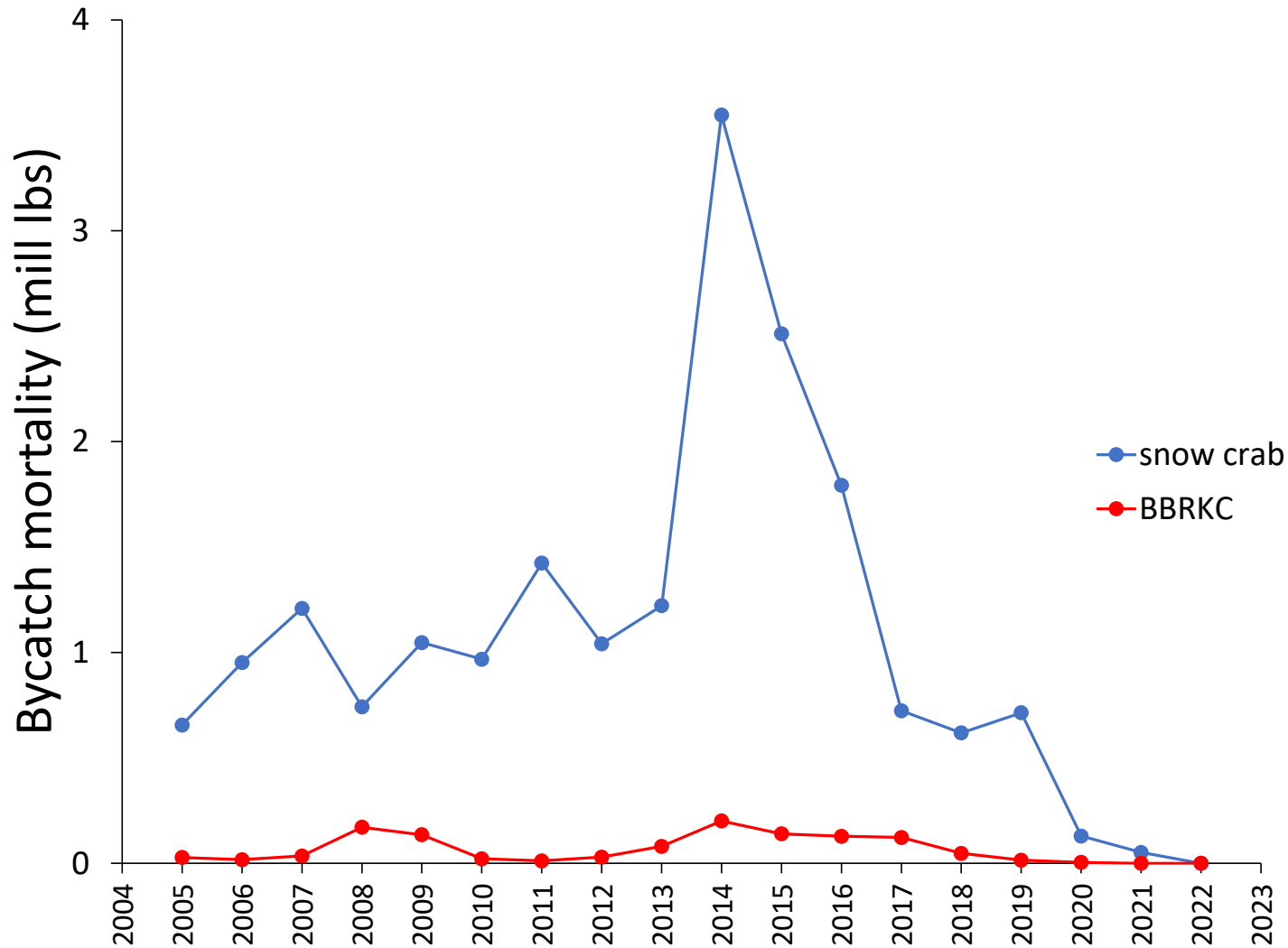
2021: small snow crab TAC, there was market for small Tanner crab in place of snow crab.

- Most vessels retained down to smaller sizes than in the past.

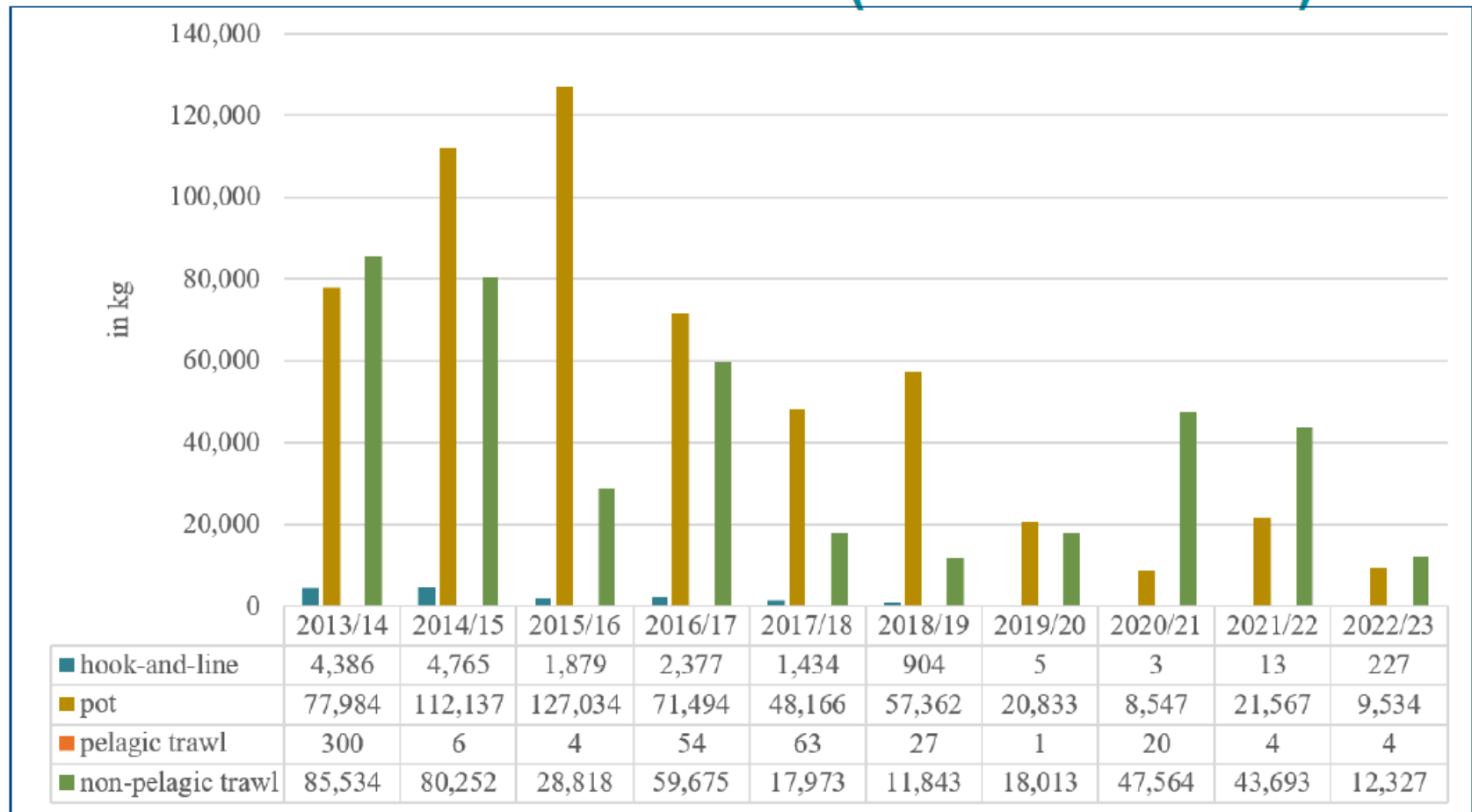
2022: snow crab closed

- Many vessels also retained smaller crab than industry preferred

Tanner crab bycatch in non-directed crab fisheries



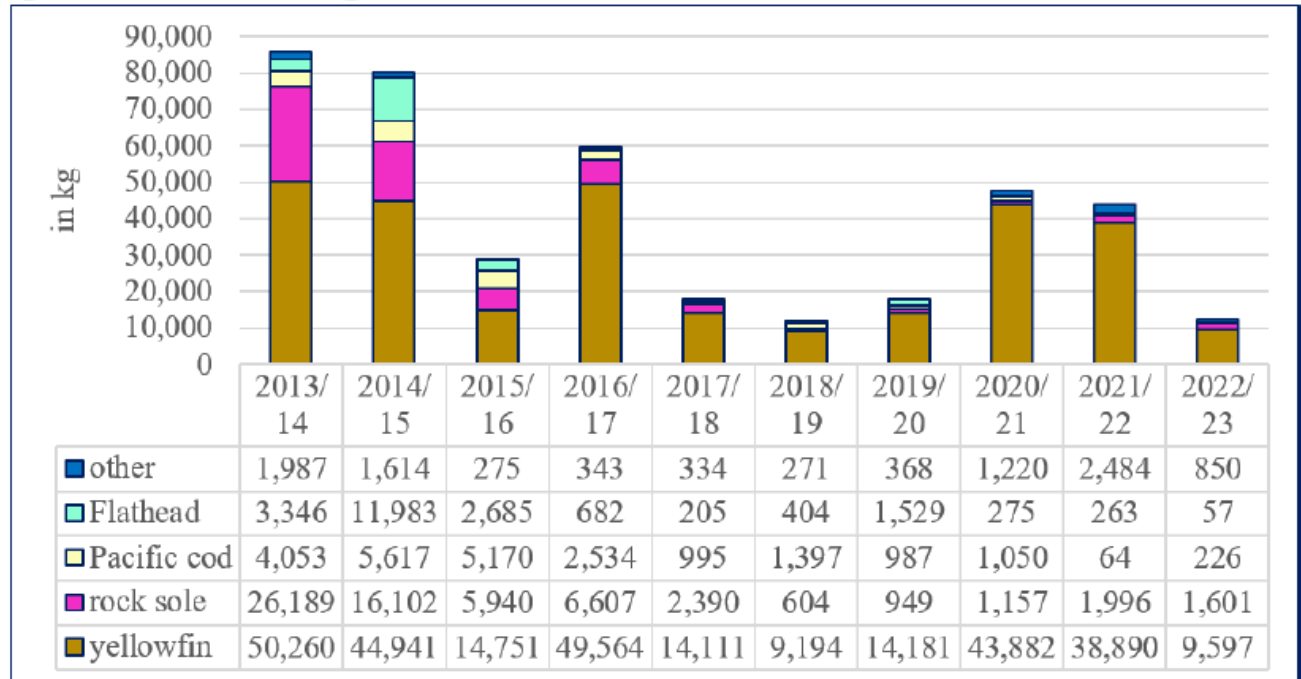
Eastern Bering Sea Tanner Crab Incidental Catch in Groundfish Fisheries (East of 166° W)



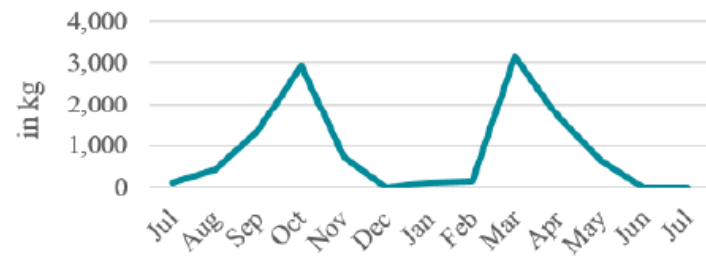
- Pacific cod fishing with pot gear accounts for most EBST bycatch in the fixed gear category.
- Pot Pacific cod fishing is concentrated on the north side of Unimak Island to Port Moller.
- In 2022/23 there was a relatively low rate of Tanner crab bycatch in pots fishing for Pacific cod.

Eastern Bering Sea Tanner Crab Trawl Incidental Catch by Trip Target (East of 166° W)

- The majority of bycatch in 2022/23 was September - October and again March - April.
- “Other” species includes: Alaska plaice, arrowtooth flounder, Atka mackerel, flathead sole, Greenland turbot, Kamchatka flounder, other flatfish, rockfish, sablefish, and pollock.



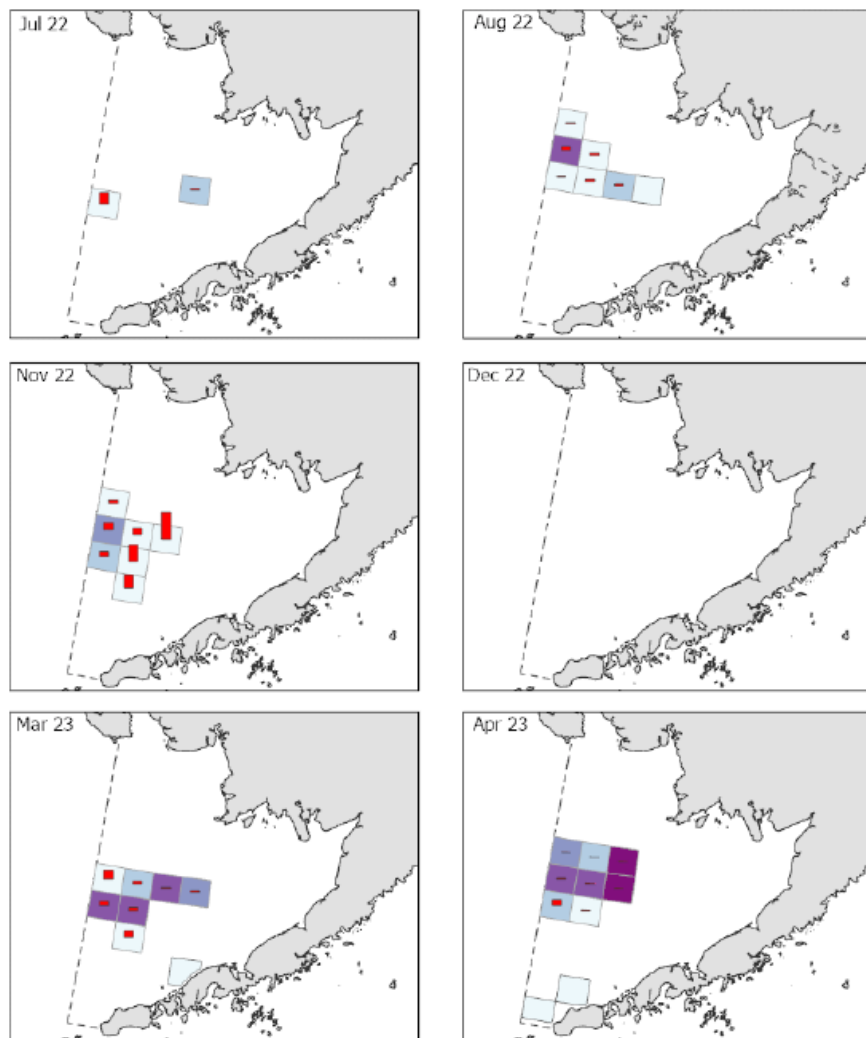
2022/23 estimated EBST bycatch in rock sole, yellowfin sole, and flathead sole fisheries by month



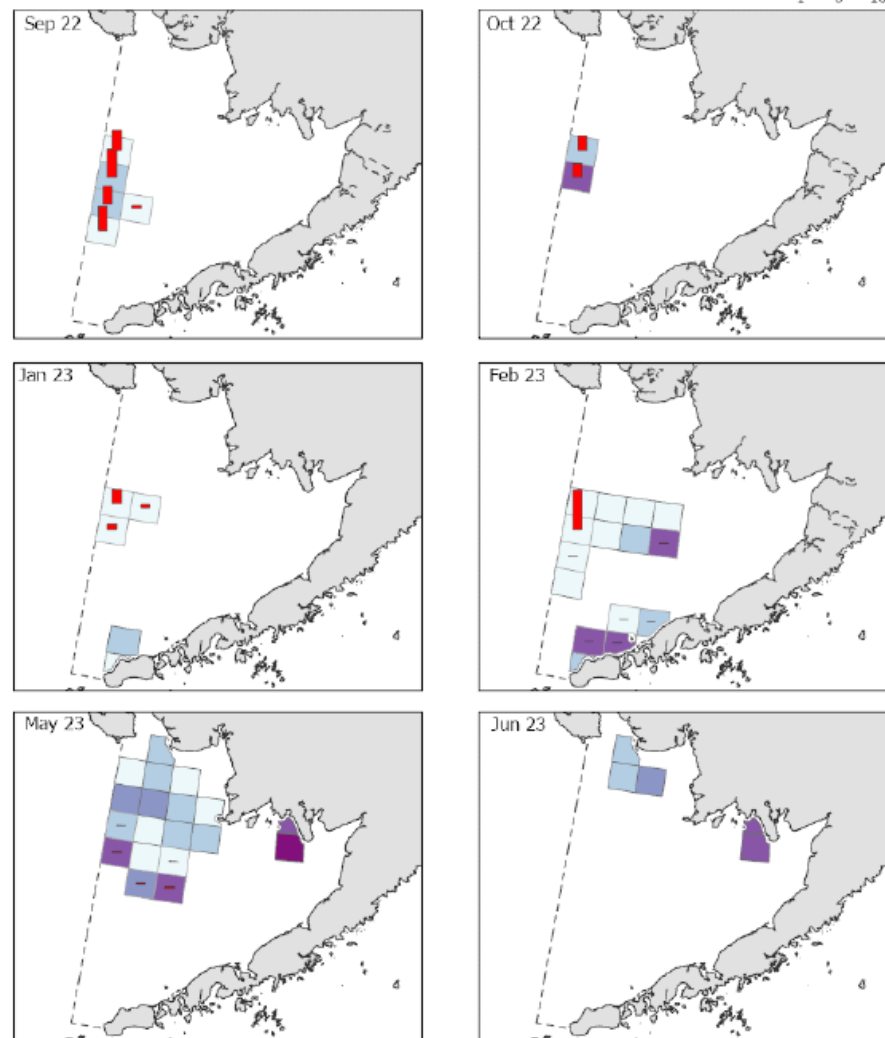
- Bycatch of EBST in trawl gear typically occurs throughout the crab year.
- In 2022/23 bycatch was highest in March and October/November during the yellowfin sole fishery due to high Tanner crab rates in the stock area.
- Majority of yellowfin harvest in stock area occurred April-June when the crab bycatch rates were lower.

2022/23 Average Rate (kg EBST/mt of Groundfish) in the Flathead, Rock, and Yellowfin Soles NPT Fisheries by ADF&G Statistical Area and Month

NON-PELAGIC TRAWL CATCH OF FLATHEAD, ROCK, AND YELLOWFIN SOLES (MT GROUND FISH)

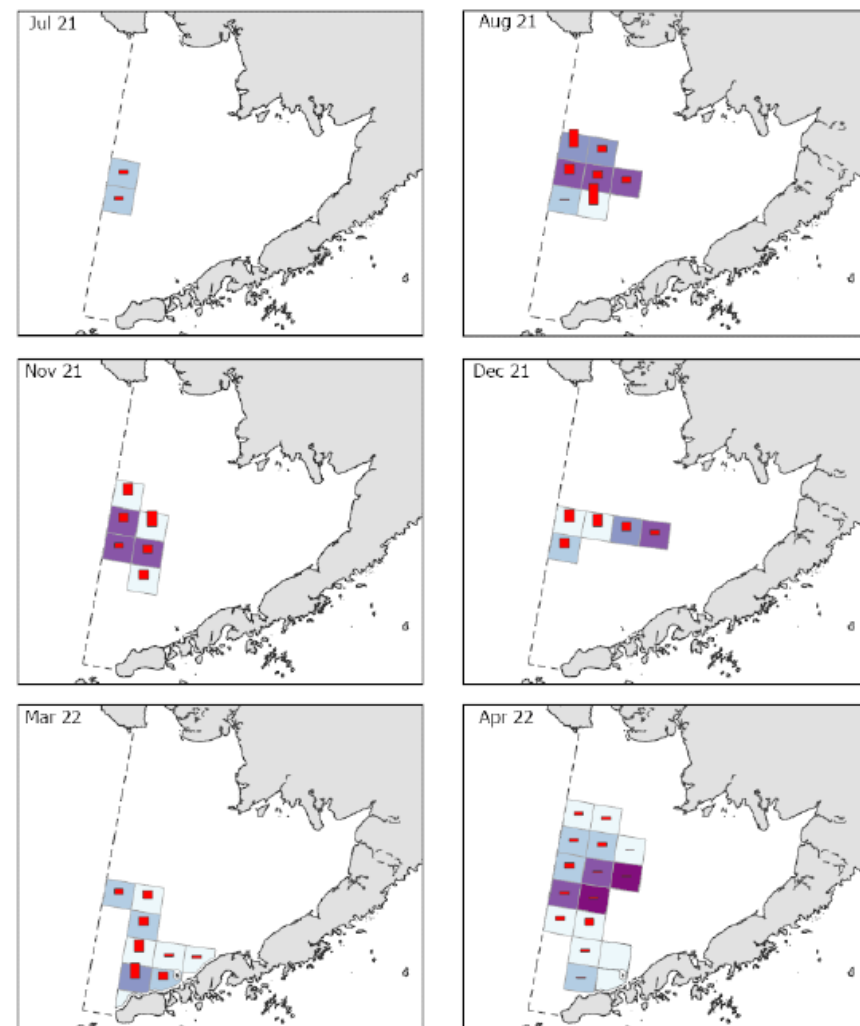


AVERAGE RATE OF EASTERN BERING SEA TANNER CRAB BYCATCH (KG CRAB/MT GROUND FISH)

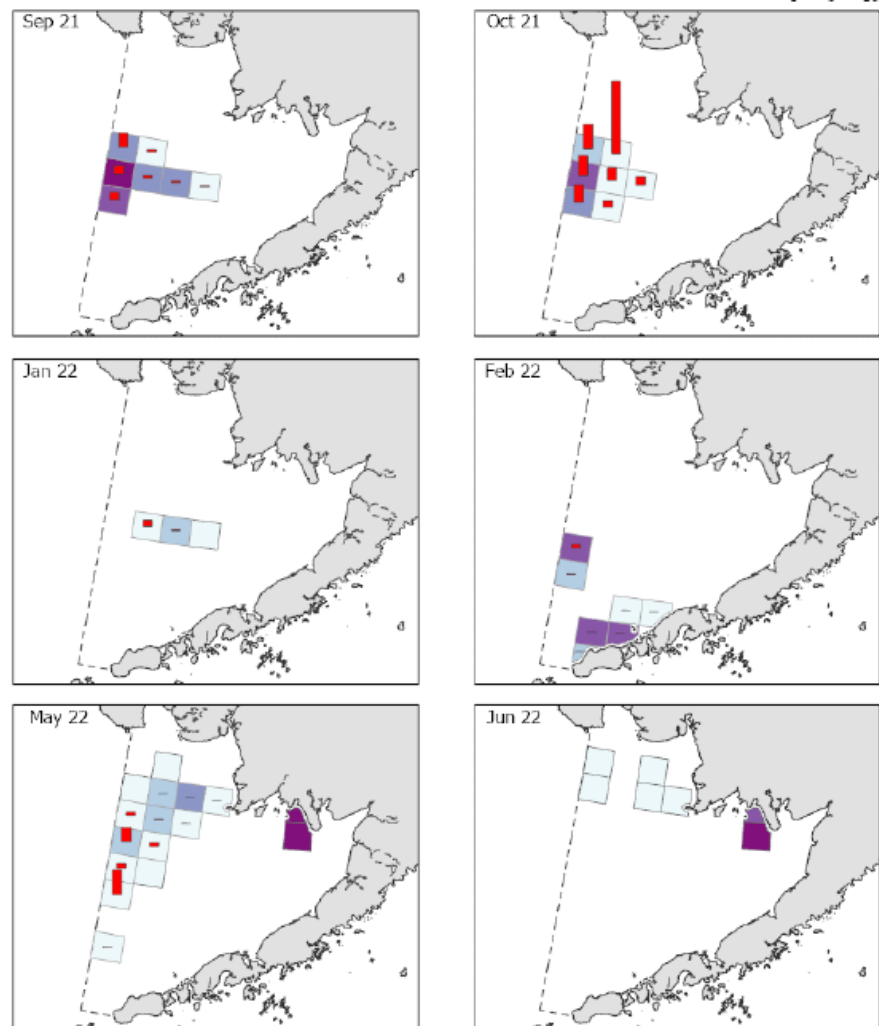
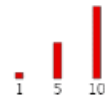


2021/22 Average Rate (kg EBST/mt of Groundfish) in the Flathead, Rock, and Yellowfin Soles NPT Fisheries by ADF&G Statistical Area and Month

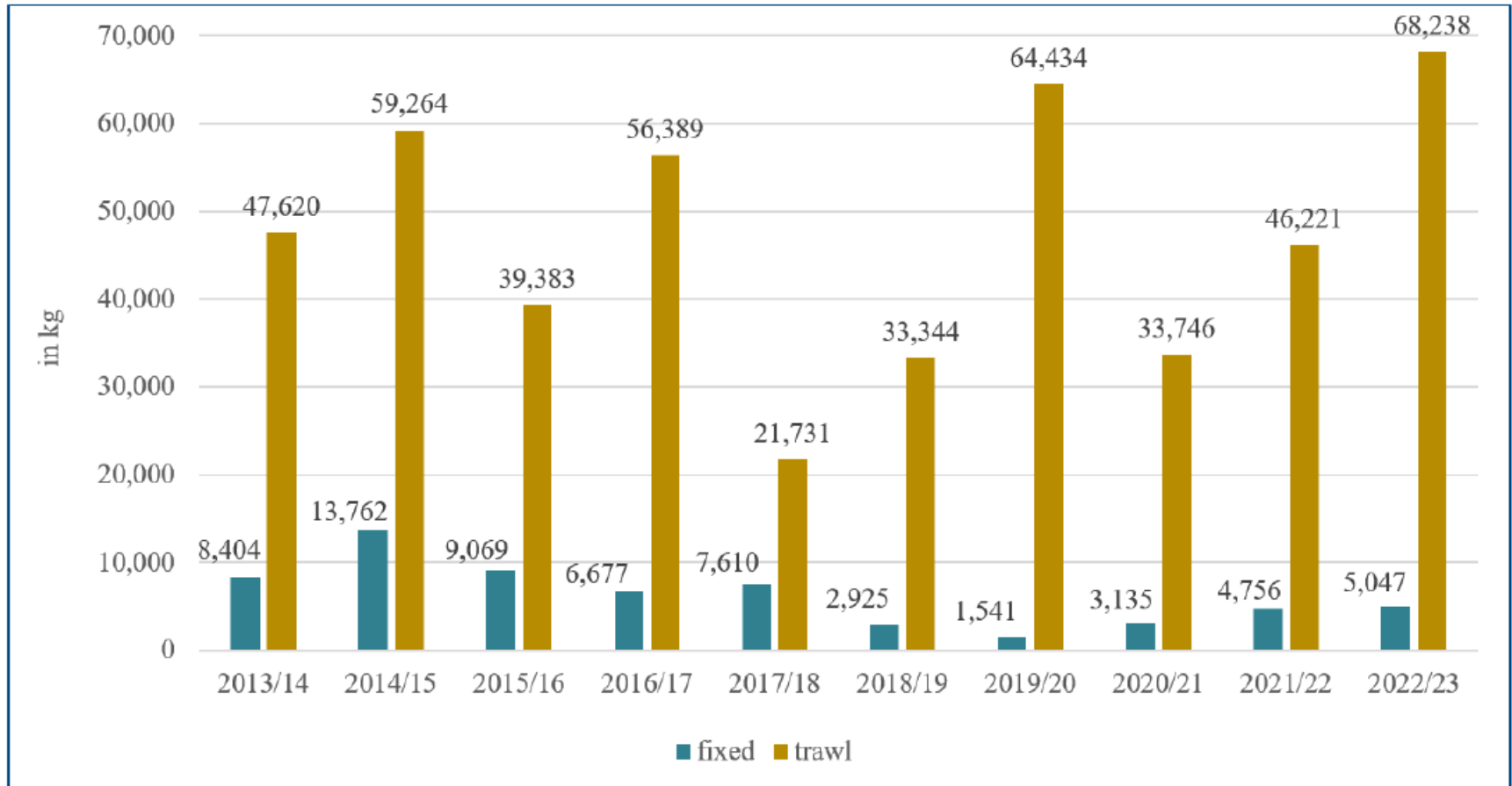
NON-PELAGIC TRAWL CATCH OF FLATHEAD, ROCK, AND YELLOWFIN SOLES (MT GROUND FISH)



AVERAGE RATE OF EASTERN BERING SEA TANNER CRAB BYCATCH (KG CRAB/MT GROUND FISH)



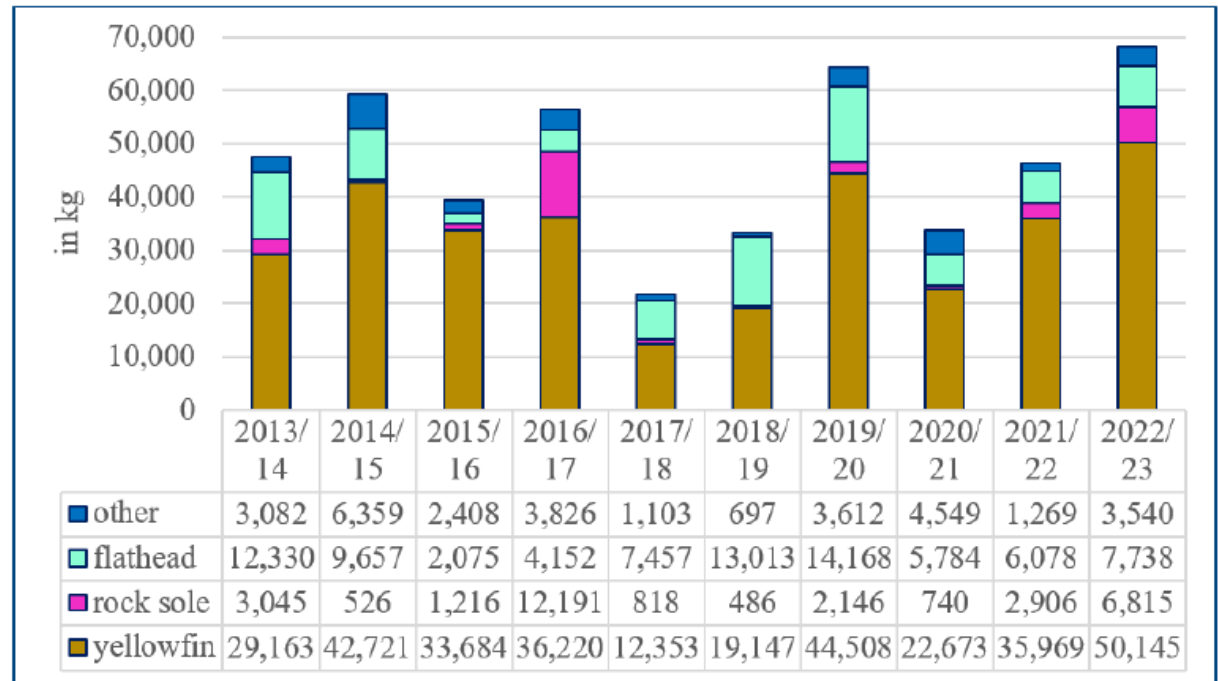
Western Bering Sea Tanner Crab Incidental Catch in Groundfish Fisheries (West of 166° W)



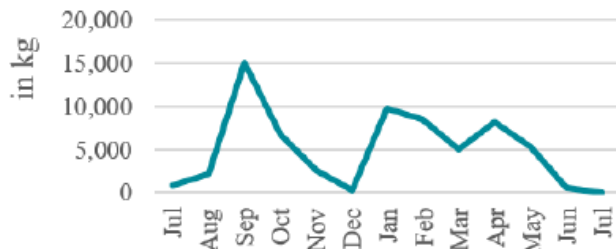
- WBST bycatch in fixed gear is mostly from hook-and-line and pot Pacific cod fisheries.
- Pot catcher vessels do not fish for groundfish in the WBST stock area as much as in the EBST stock area which results in less fixed gear bycatch in the Western area than the Eastern area.

Western Bering Sea Tanner Crab Trawl Incidental Catch by Trip Target (West of 166° W)

- “Other” species includes: Alaska plaice, arrowtooth flounder, Atka mackerel, Greenland turbot, Kamchatka flounder, other flatfish, Pacific cod, rockfish, sablefish, and Pollock.



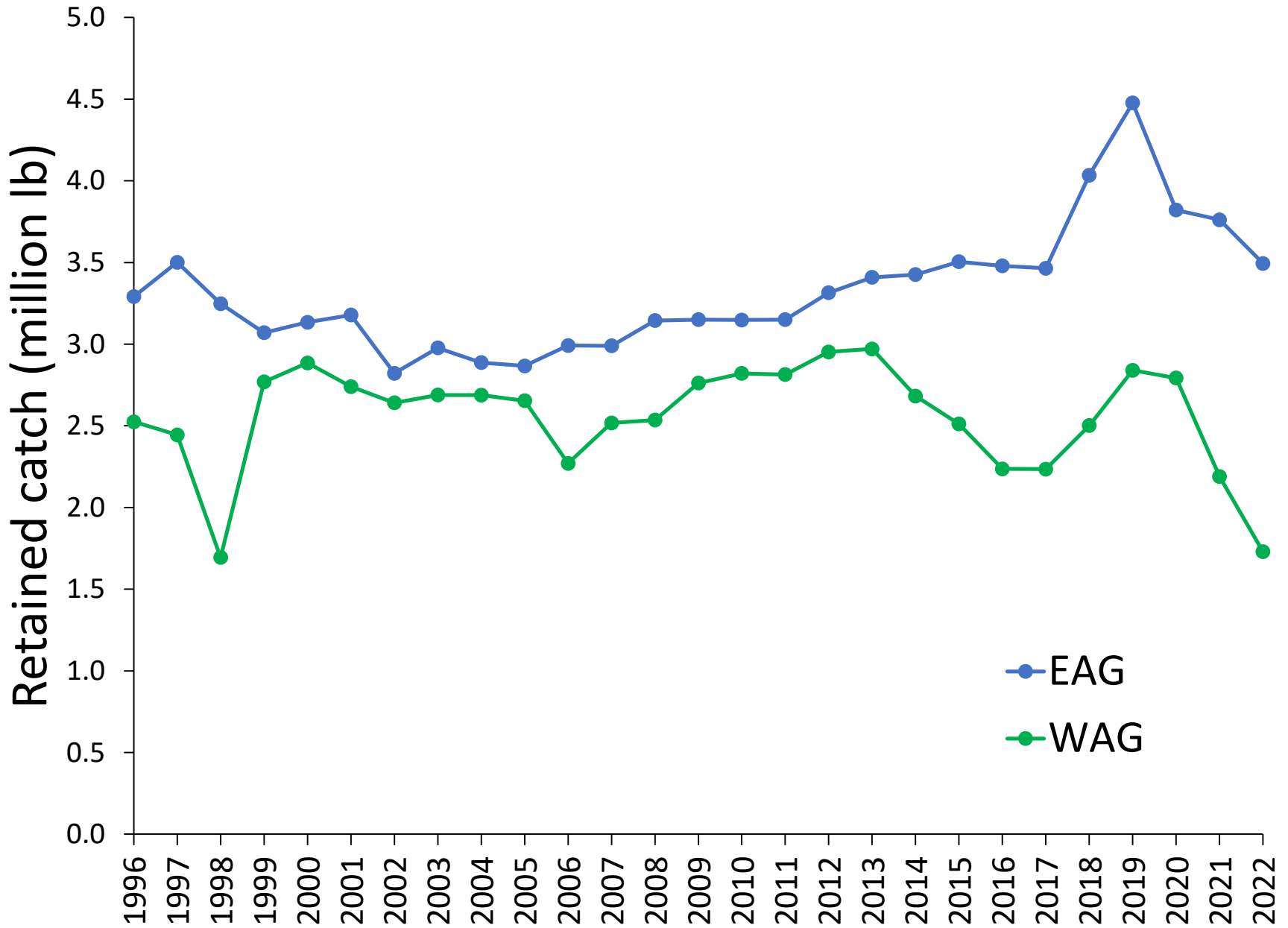
2022/23 estimated WBST bycatch in rock sole, yellowfin sole, and flathead sole fisheries by month



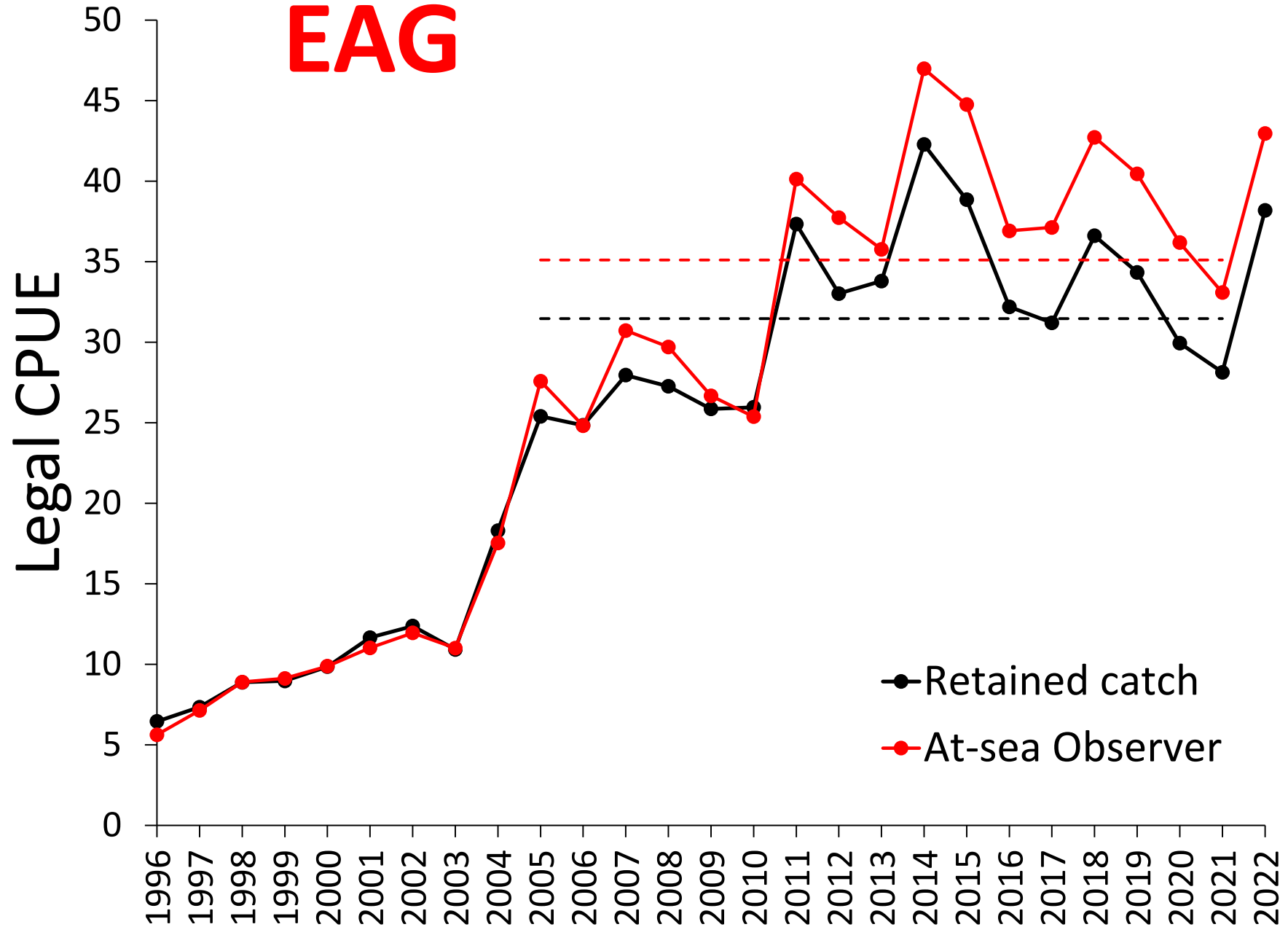
- Bycatch of WBST in trawl gear typically occurs throughout the crab year.
- In 2022/23 bycatch was highest in September during the yellowfin sole fishery.
- Rates are more consistent throughout the year.
- Majority of yellowfin/flathead harvest in stock area occurred September and October.



AIGKC

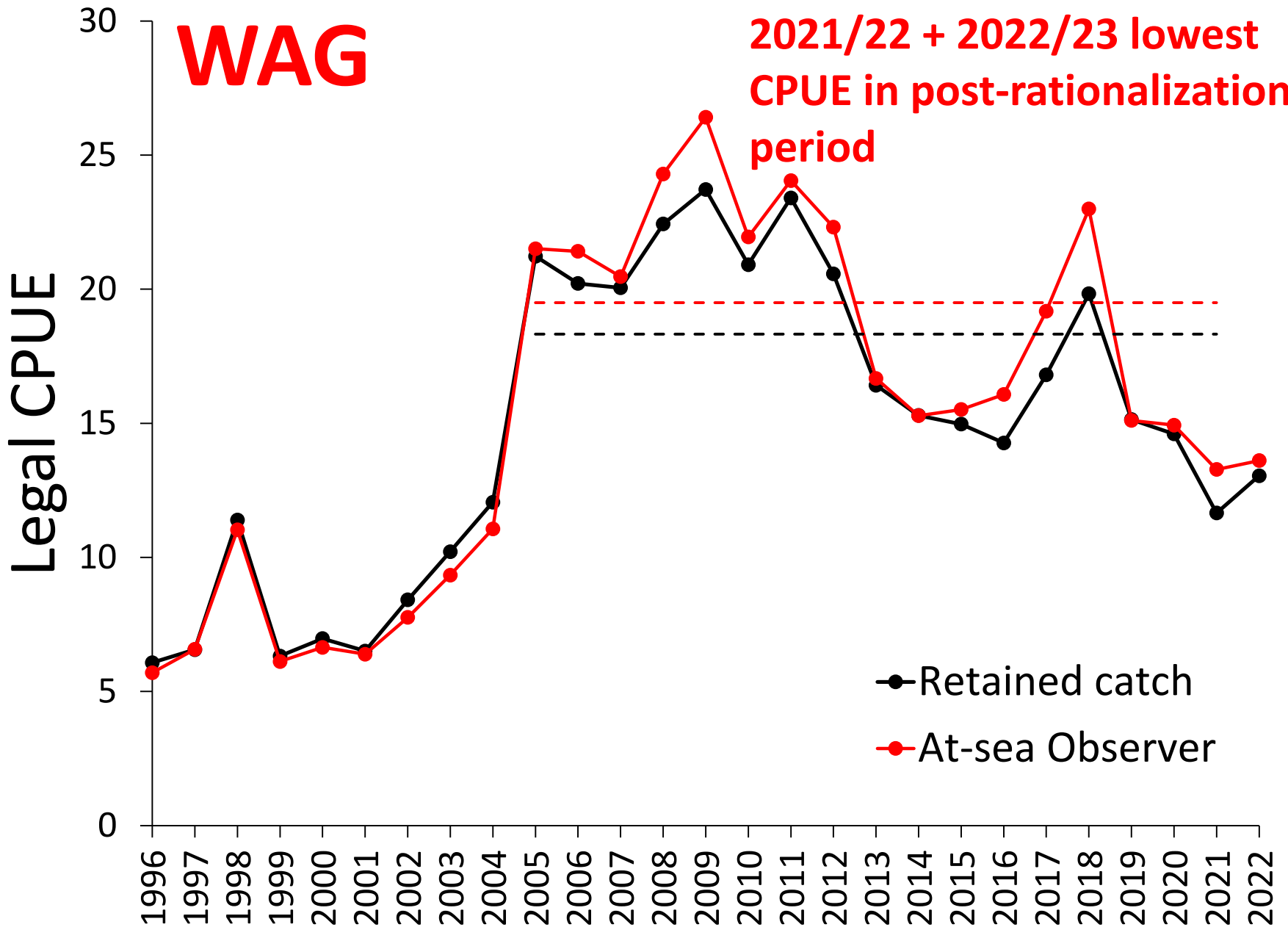


EAG

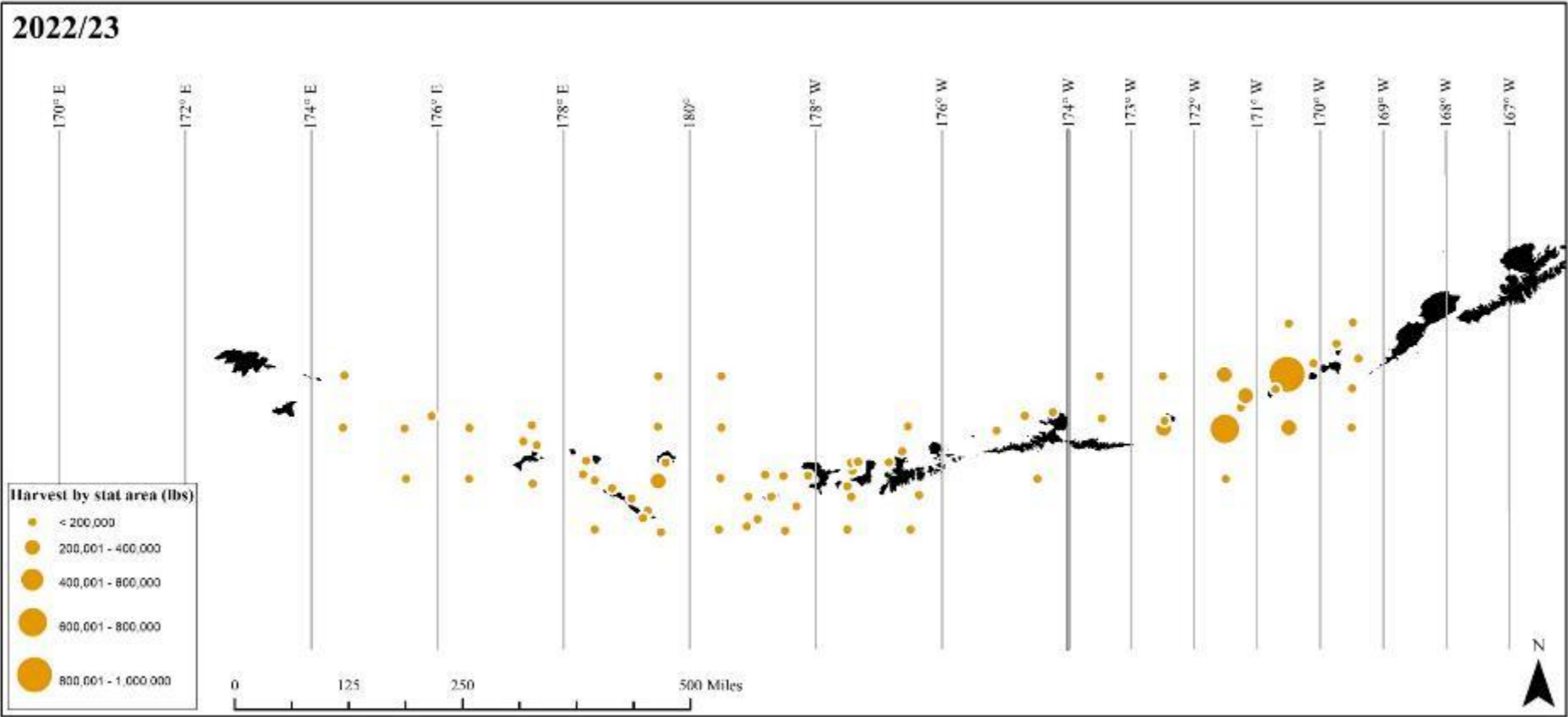


WAG

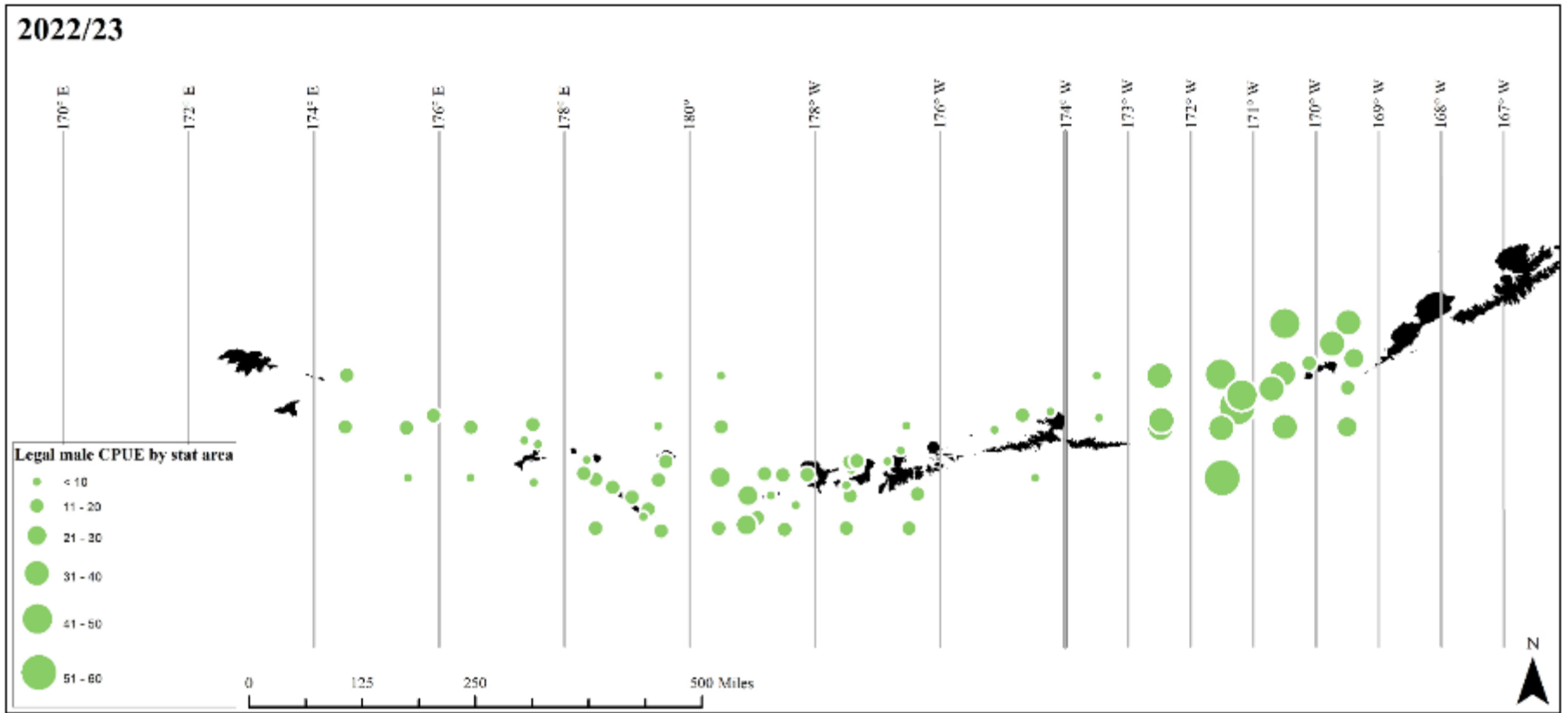
2021/22 + 2022/23 lowest CPUE in post-rationalization period



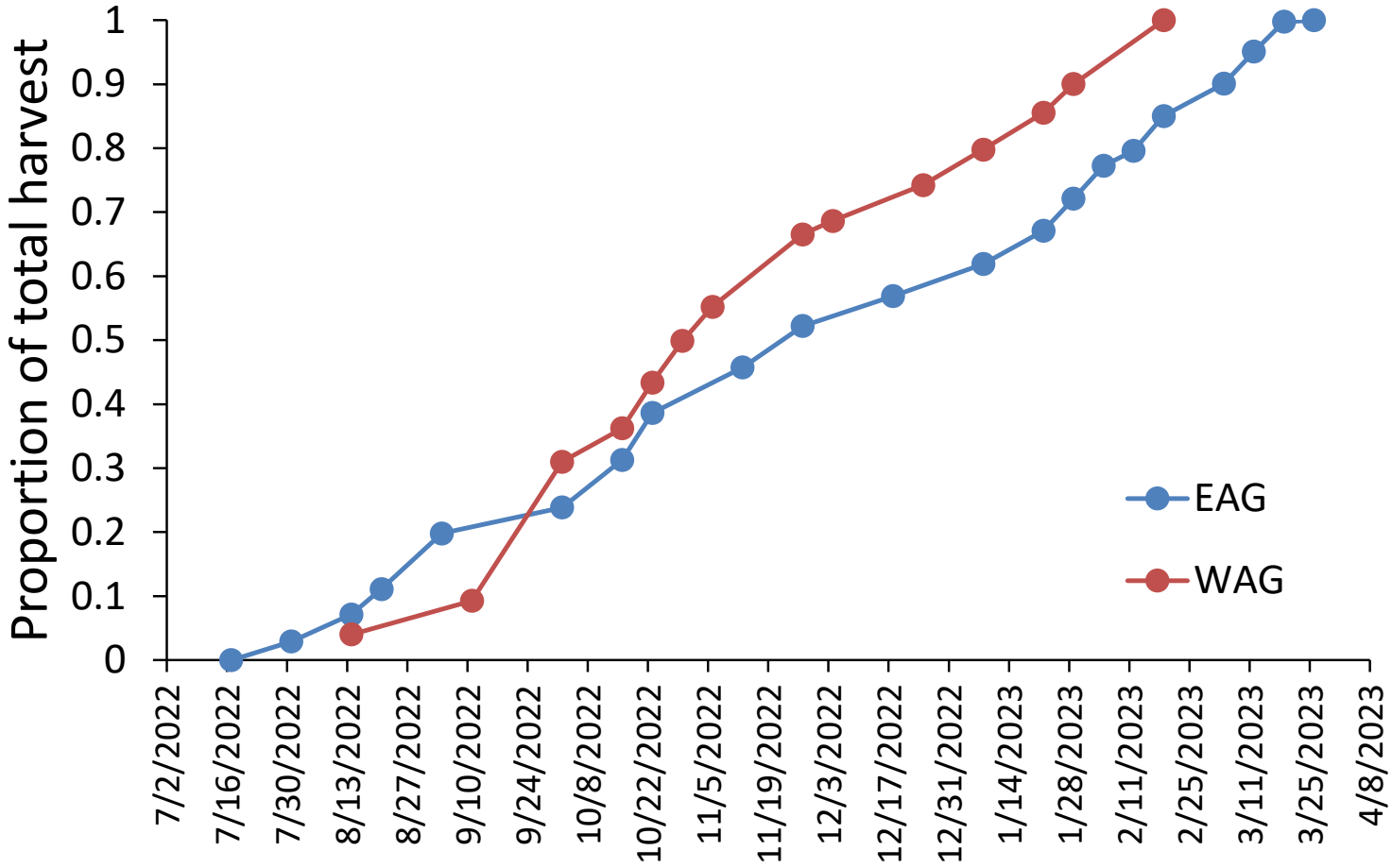
2022/23 Harvest Spatial Distribution



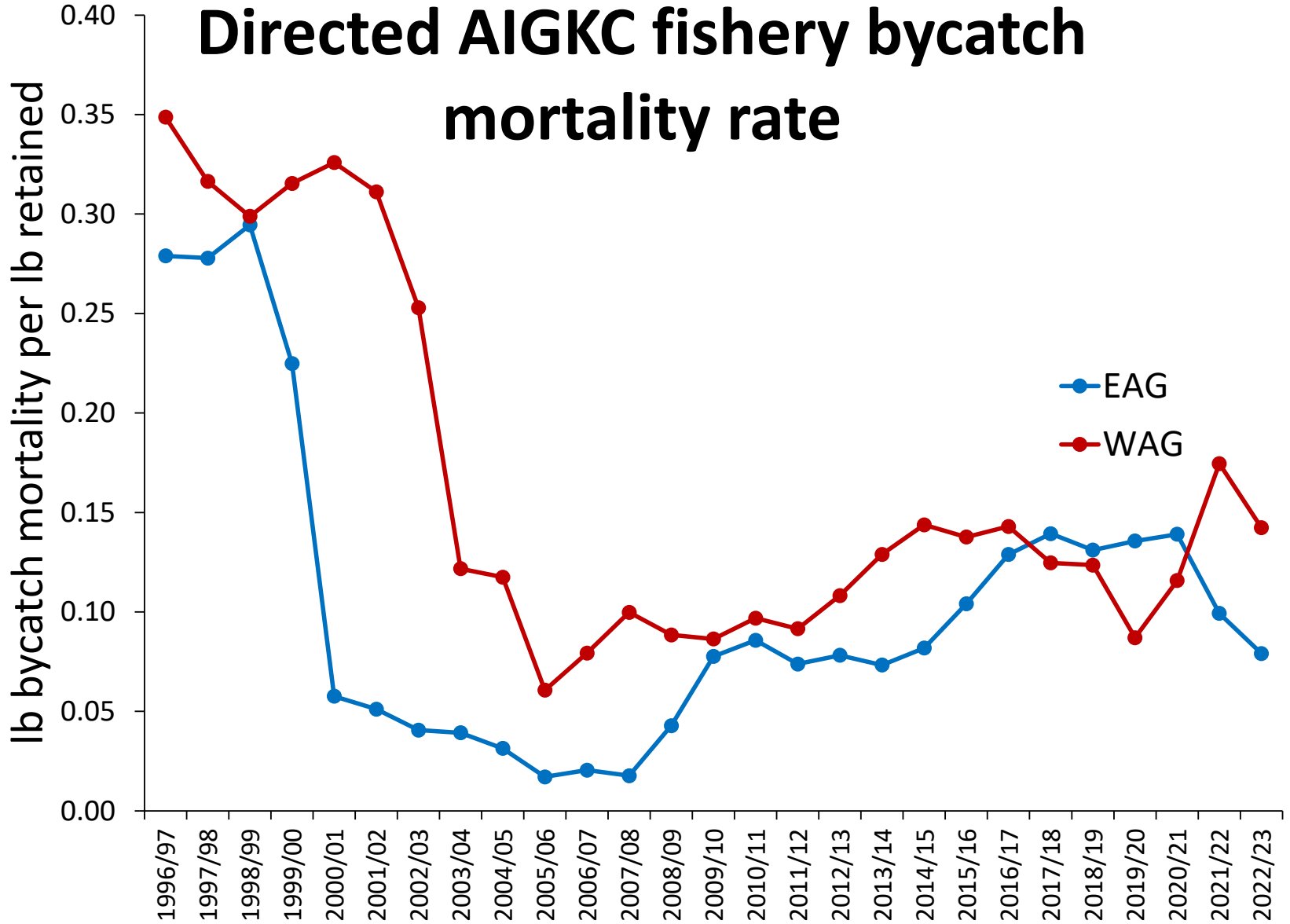
2022/23 CPUE Spatial Distribution



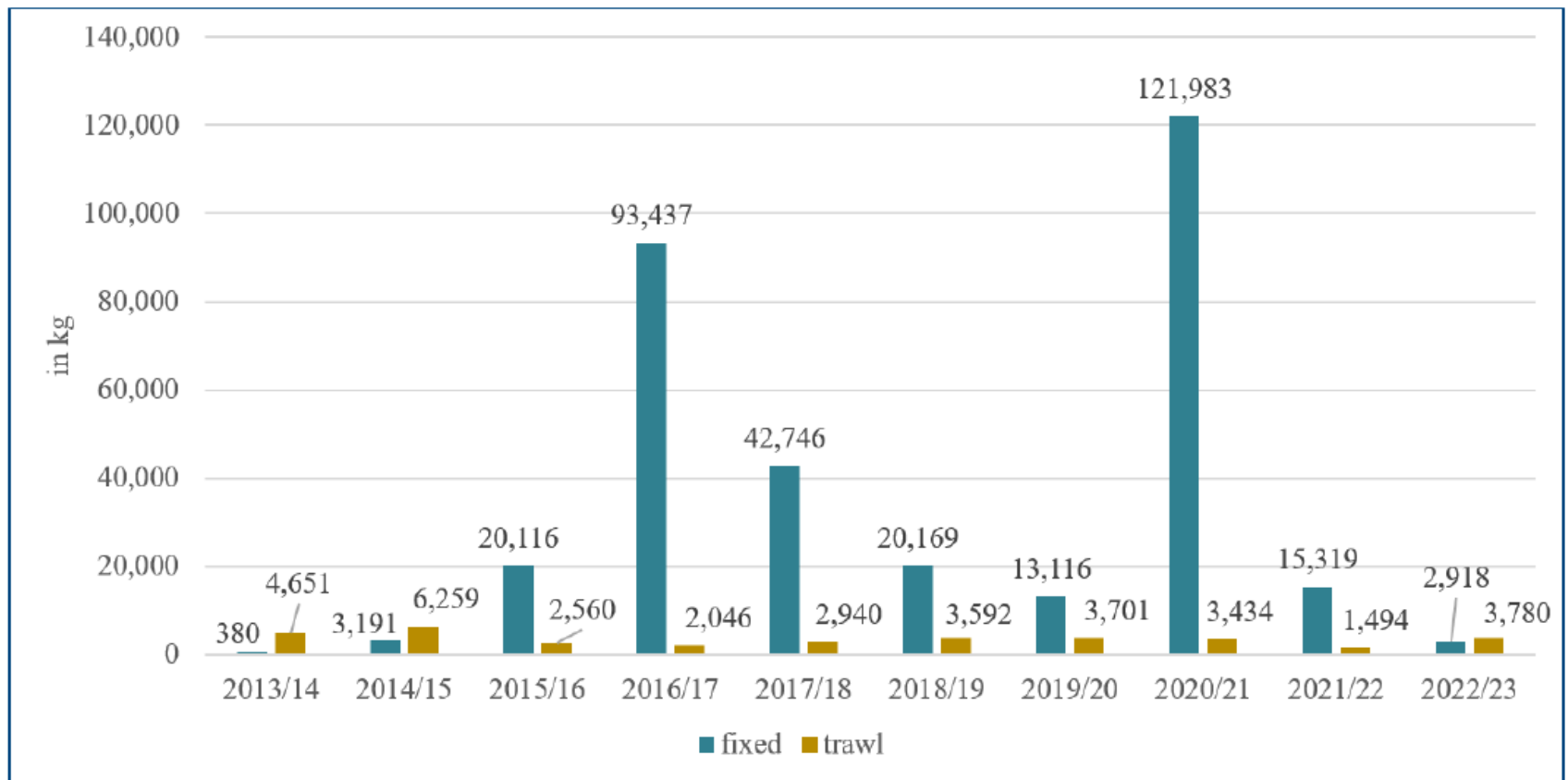
2022/23 AIGKC



Directed AIGKC fishery bycatch mortality rate

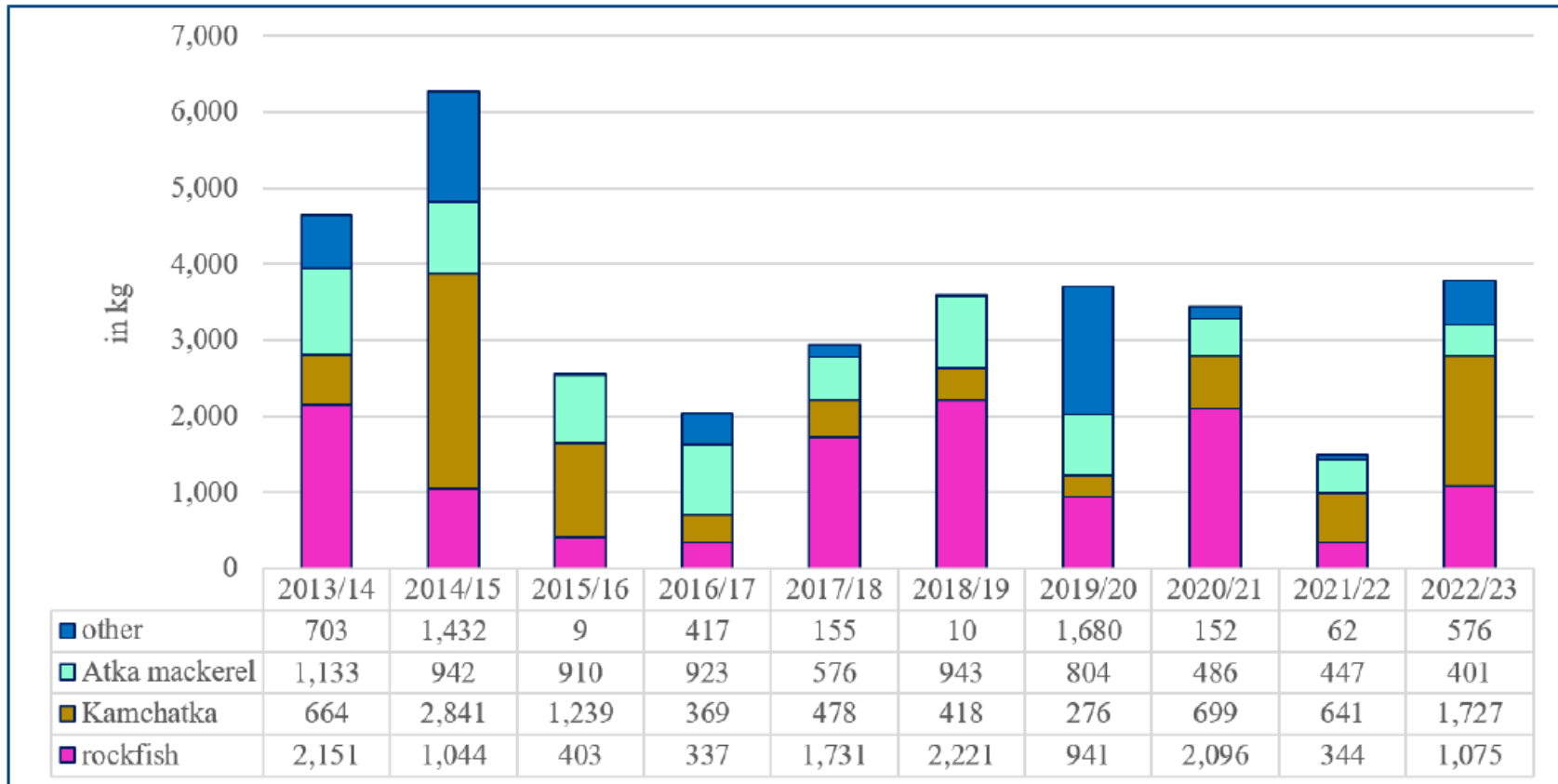


Eastern Aleutian Islands Golden King Crab Incidental Catch in Groundfish Fisheries (East of 174° W)



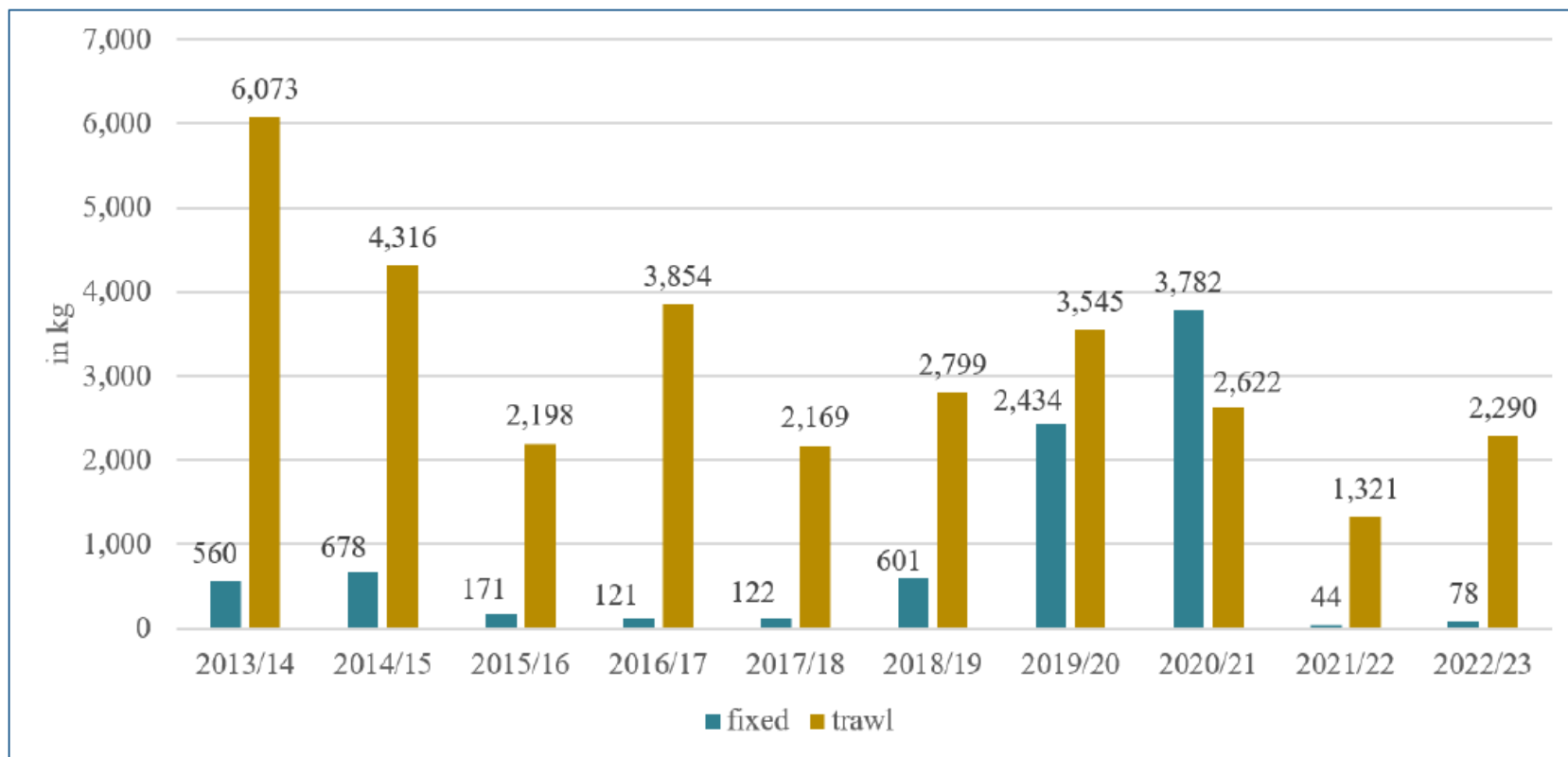
- The EAG stock area includes federal groundfish areas from the WGOA, BS, and AI.
- When there is not much federal pot Pcod observer/EM coverage in the stock area the State pot vessels get an extrapolation rate based on all observed/EM groundfish targeted with pot gear in the stock area, including sablefish. This is typically the cause of the “spike” years.

Eastern Aleutian Islands Golden King Crab Trawl Incidental Catch by Trip Target (East of 174° W)



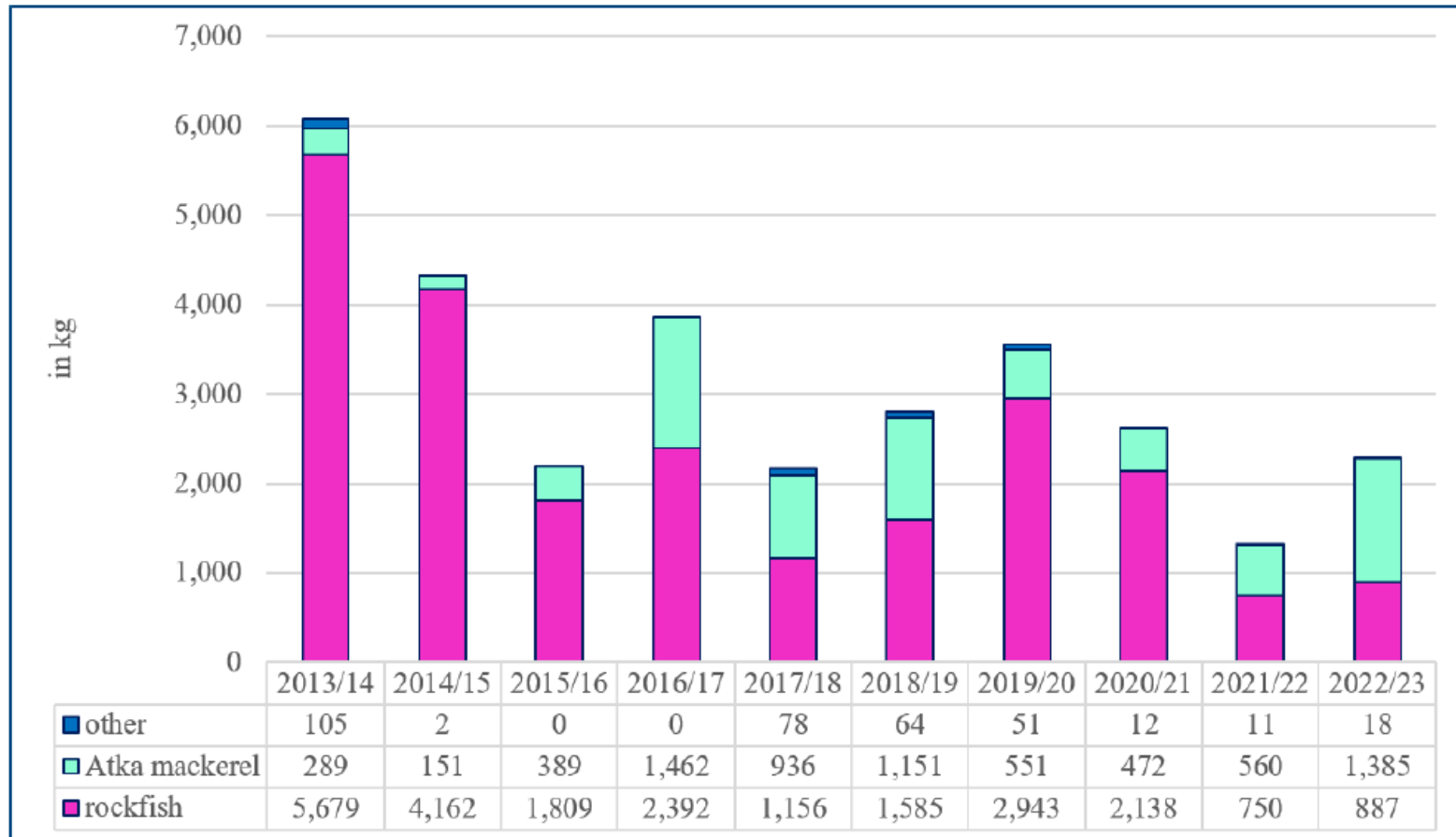
- The EAG stock area includes federal groundfish areas from the WGOA, BS, and AI.
- Amendment 80 is targeting a variety of species during the same trip in this stock area.
- “Other” species includes: Alaska plaice, arrowtooth flounder, Greenland turbot, other flatfish, Pacific cod, flathead sole, rock sole, yellowfin sole, sablefish, and pollock.

Western Aleutian Islands Golden King Crab Incidental Catch in Groundfish Fisheries (West of 174° W)



- Not much federal fixed gear fishing in this area.
- Not very much fixed gear observer coverage.
- When there is not very much federal pot Pcod observer/EM coverage in the stock area the State pot vessels get an extrapolation rate based on all observed/EM groundfish targeted with pot gear in the stock area, including sablefish. This is typically the cause of the “spike” years.

Western Aleutian Islands Golden King Crab Trawl Incidental Catch by Trip Target (West of 174° W)



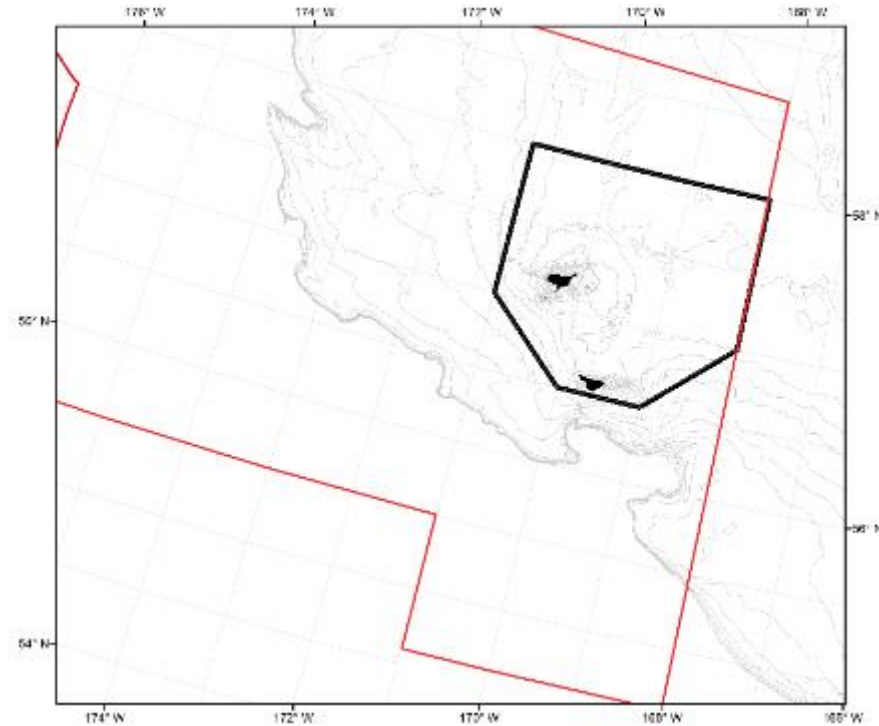
- Most trawl bycatch accrues in the summer months.
- Rockfish target is mostly Pacific Ocean perch.
- “Other” species includes: Kamchatka flounder, Pacific cod, and pollock.

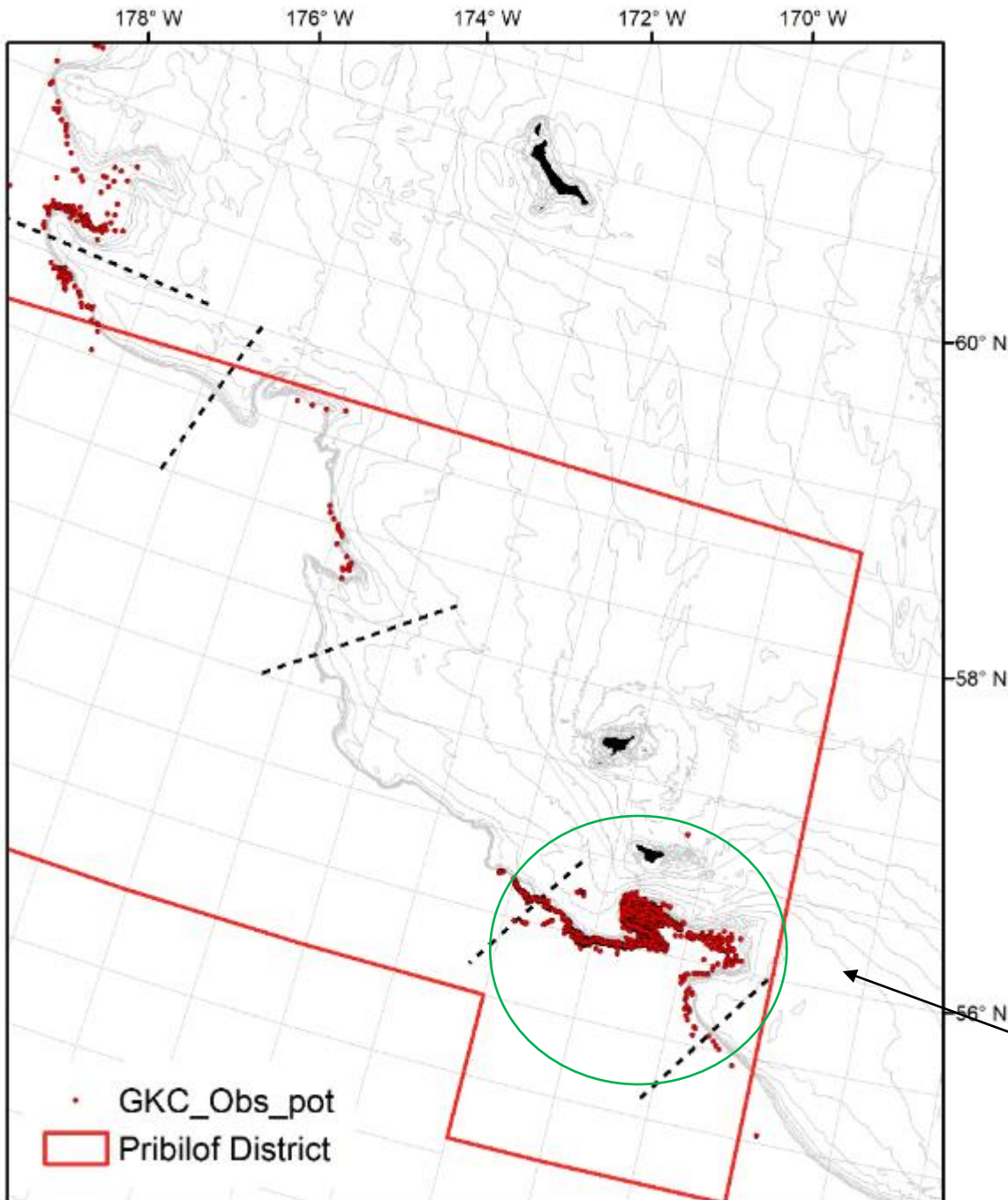
A large pile of cooked crab legs, likely snow crabs, is shown in a metal tray. The legs are piled high and appear to be in a serving or storage container. A black rectangular box is overlaid on the center of the image, containing the text "PIGKC" in white, bold, sans-serif font. The background shows the metallic surface of the tray and a white rectangular object, possibly a lid or a piece of paper, in the upper right corner.

PIGKC

2022 Pribilof GKC

- Fishery conducted by calendar year
- 3 vessel, 2 processors participated in the 2022 fishery
 - GHL = 130,000 lb (59 t)
 - Harvest = confidential



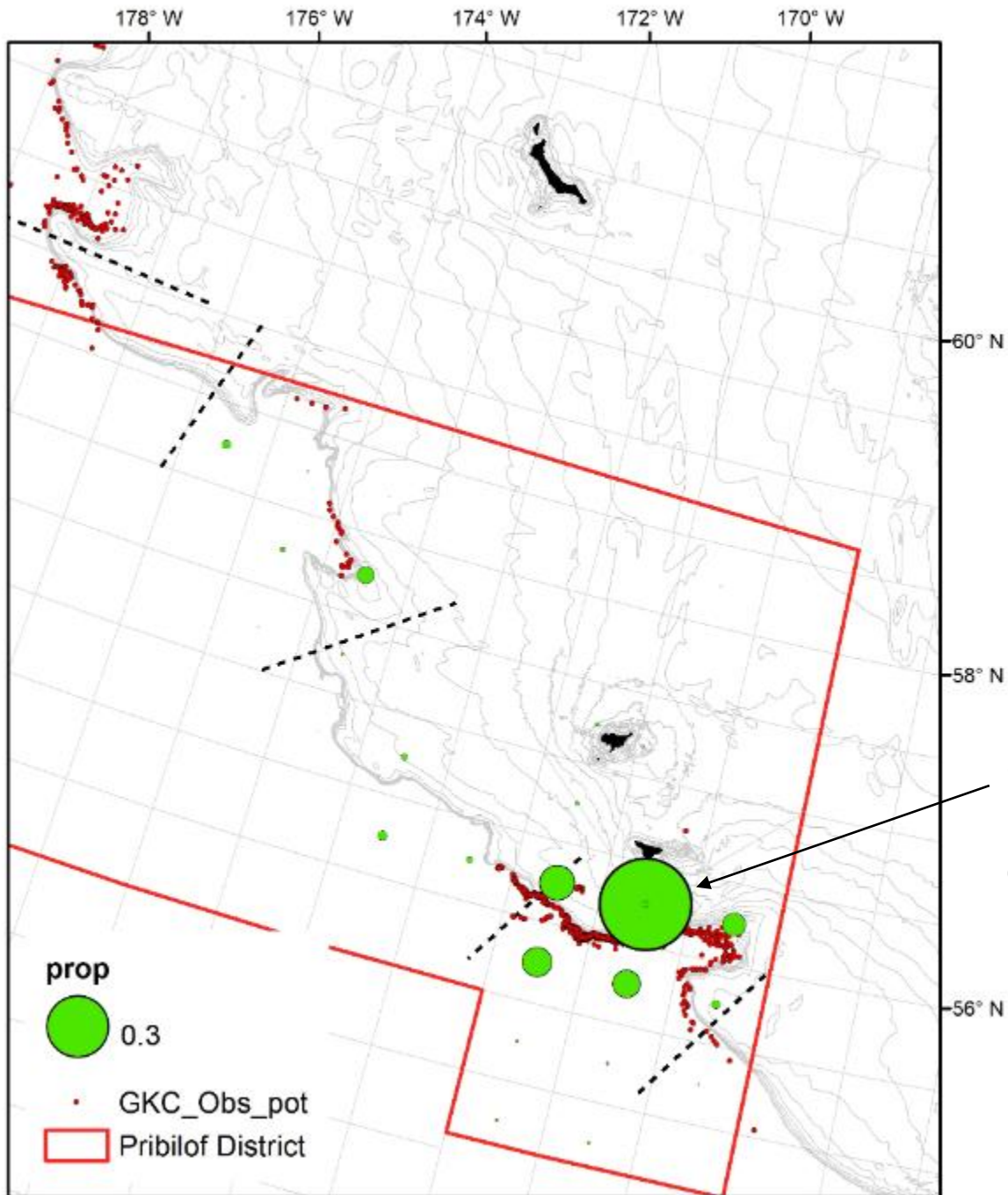


Observer pot location during Bering Sea golden king crab fisheries from 1992-2022 (n=8,141).

Pots north of the Pribilof District northern boundary were fished during the Northern District – Saint Matthew island Section fishery.

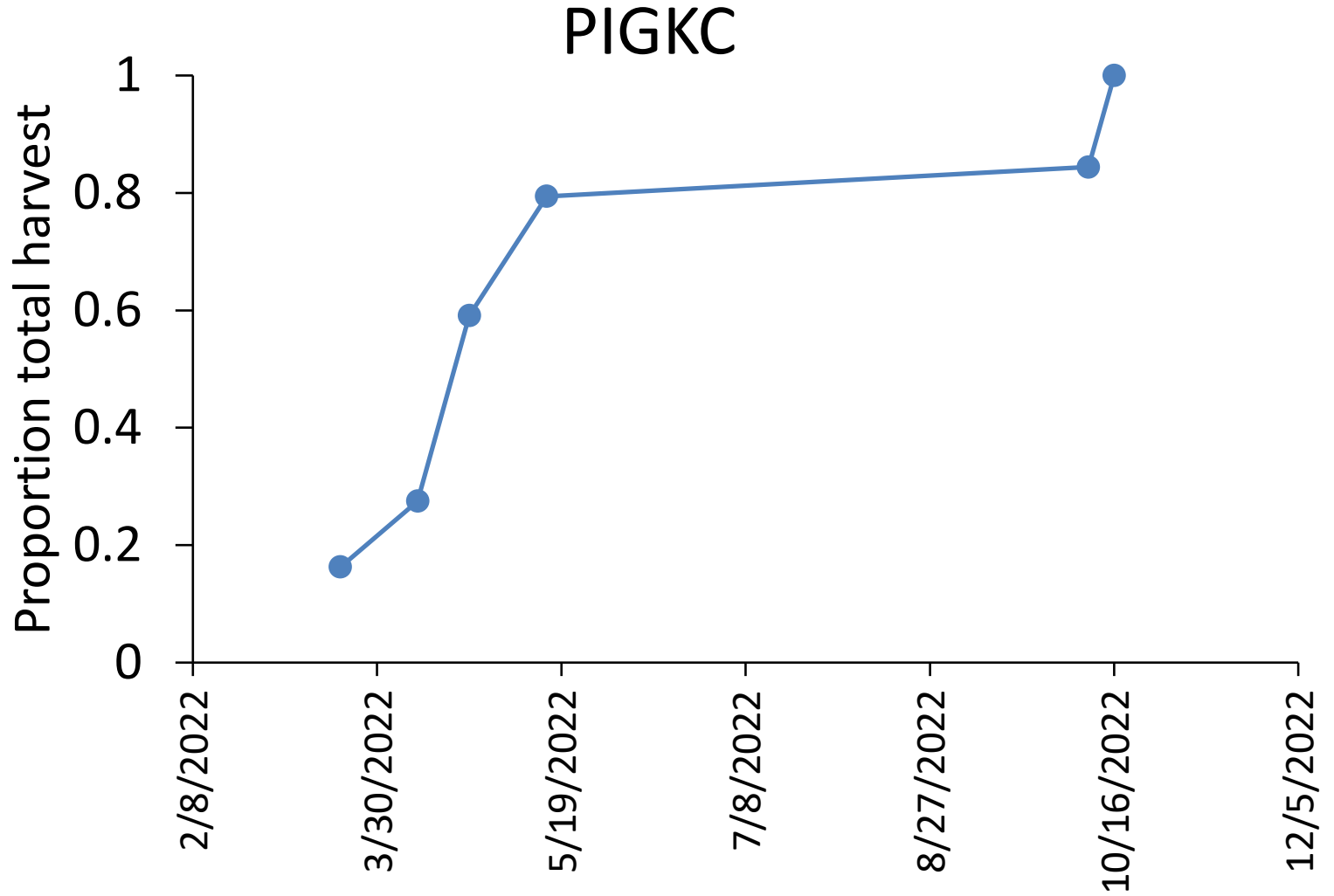
~95% of all observer pots

Proportion of historical catch by stat_area

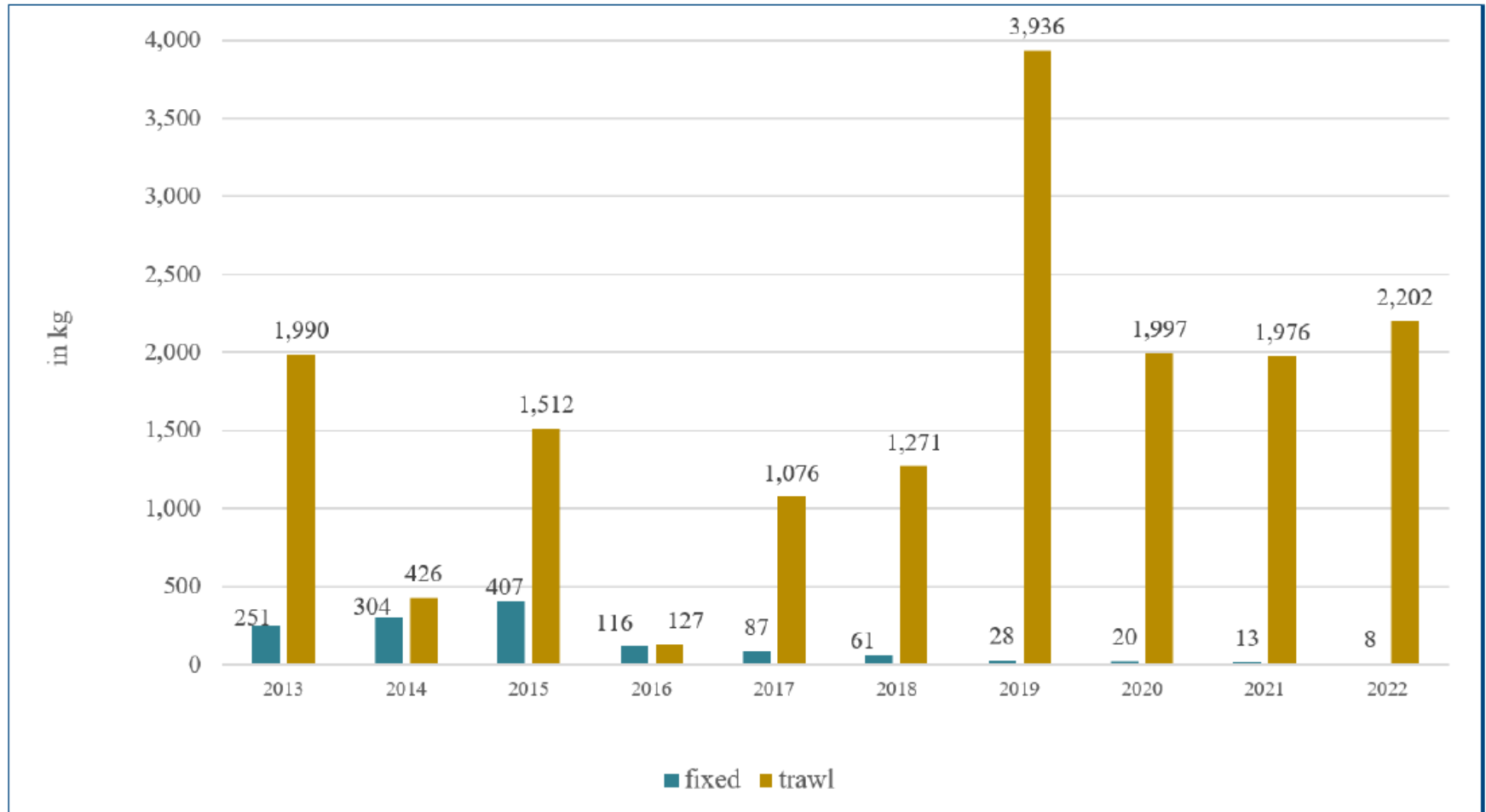


67% of all historical catch

2022 PIGKC

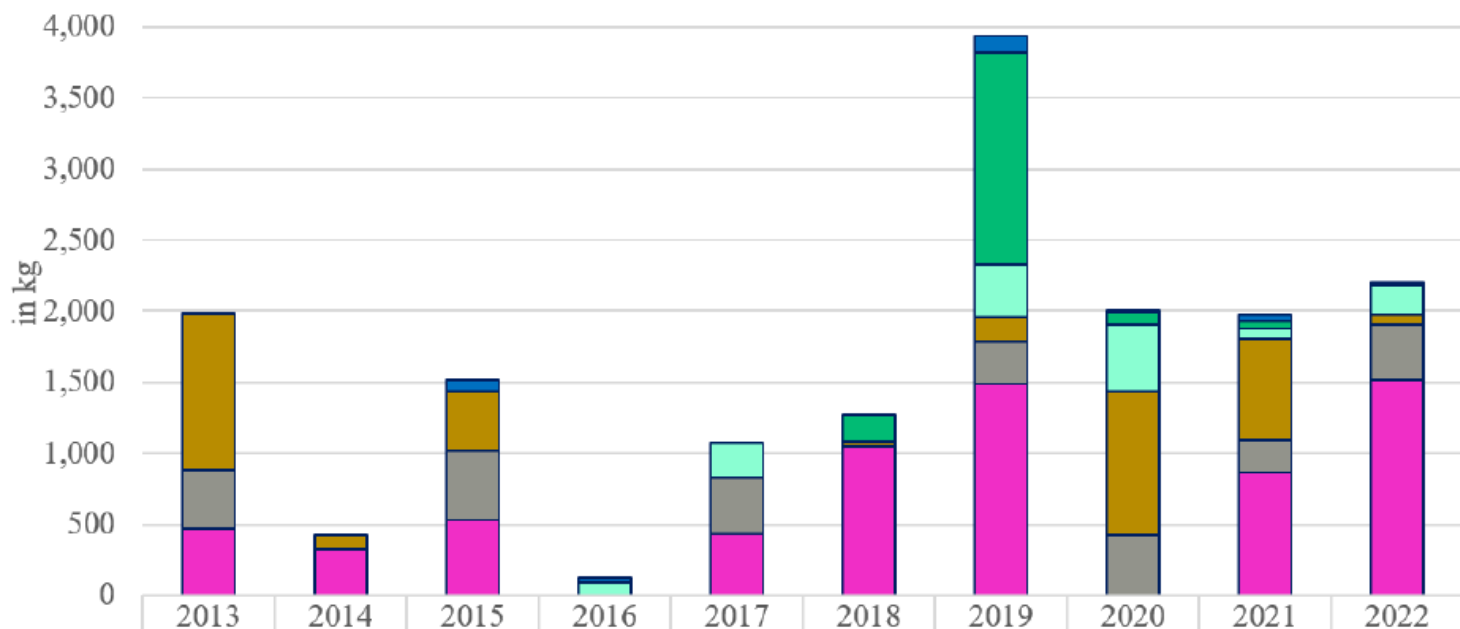


Pribilof Island Golden King Crab Incidental Catch in Groundfish Fisheries



- Most fixed gear GKC bycatch is from hook-and-line Pacific cod fishing.

Pribilof Island Golden King Crab Trawl Incidental Catch by Trip Target

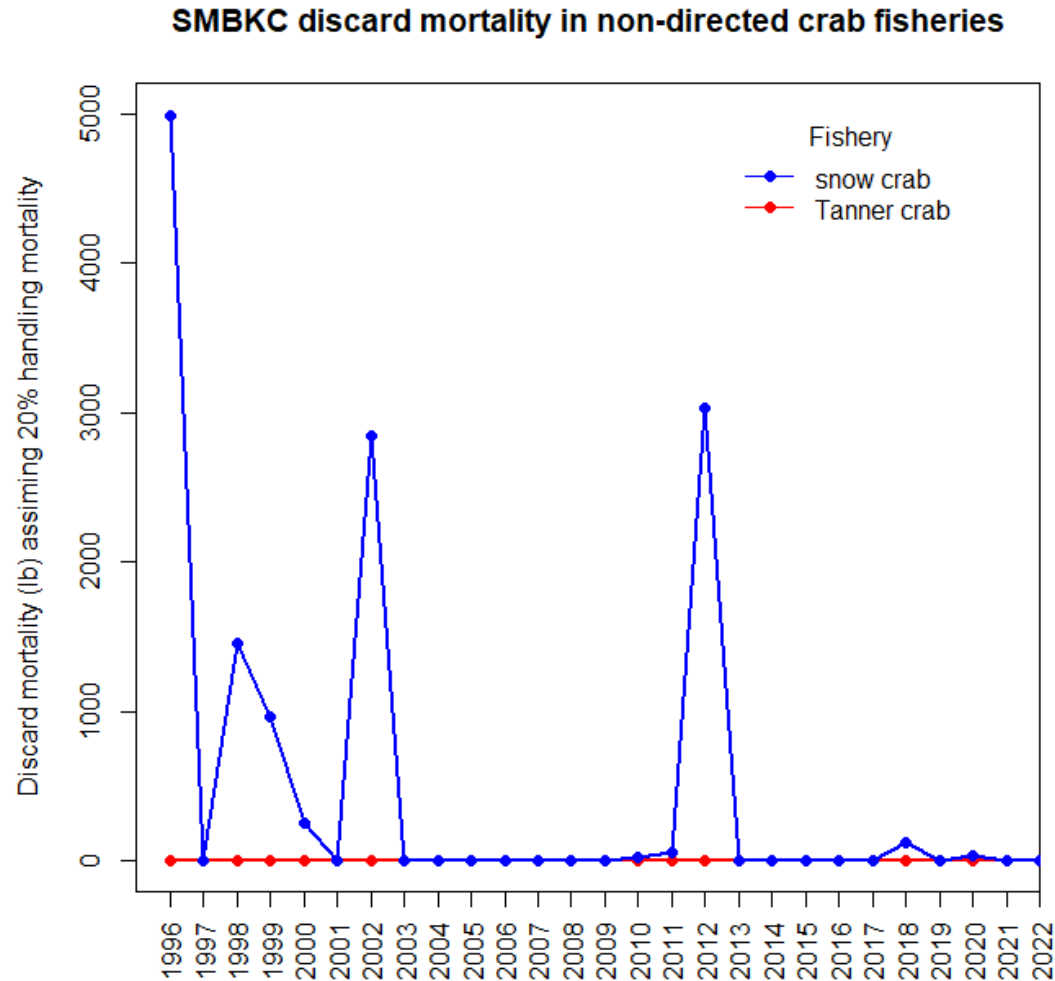


	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
other	0	0	81	40	0	0	119	1	41	13
greenland turbot	0	0	0	0	0	184	1,484	95	56	5
flathead	0	0	0	86	249	0	374	463	75	208
arrowtooth/Kamchatka	1,104	103	411	0	0	37	169	1,012	713	71
other flatfish	415	0	485	0	391	0	304	427	230	389
rockfish	471	323	535	0	436	1,050	1,486	0	862	1,516

- Majority of bycatch occurred from September through November in 2022.
- “Other” species includes: Alaska plaice, Atka mackerel, Pacific cod, rock sole, yellowfin sole, sablefish, and pollock.

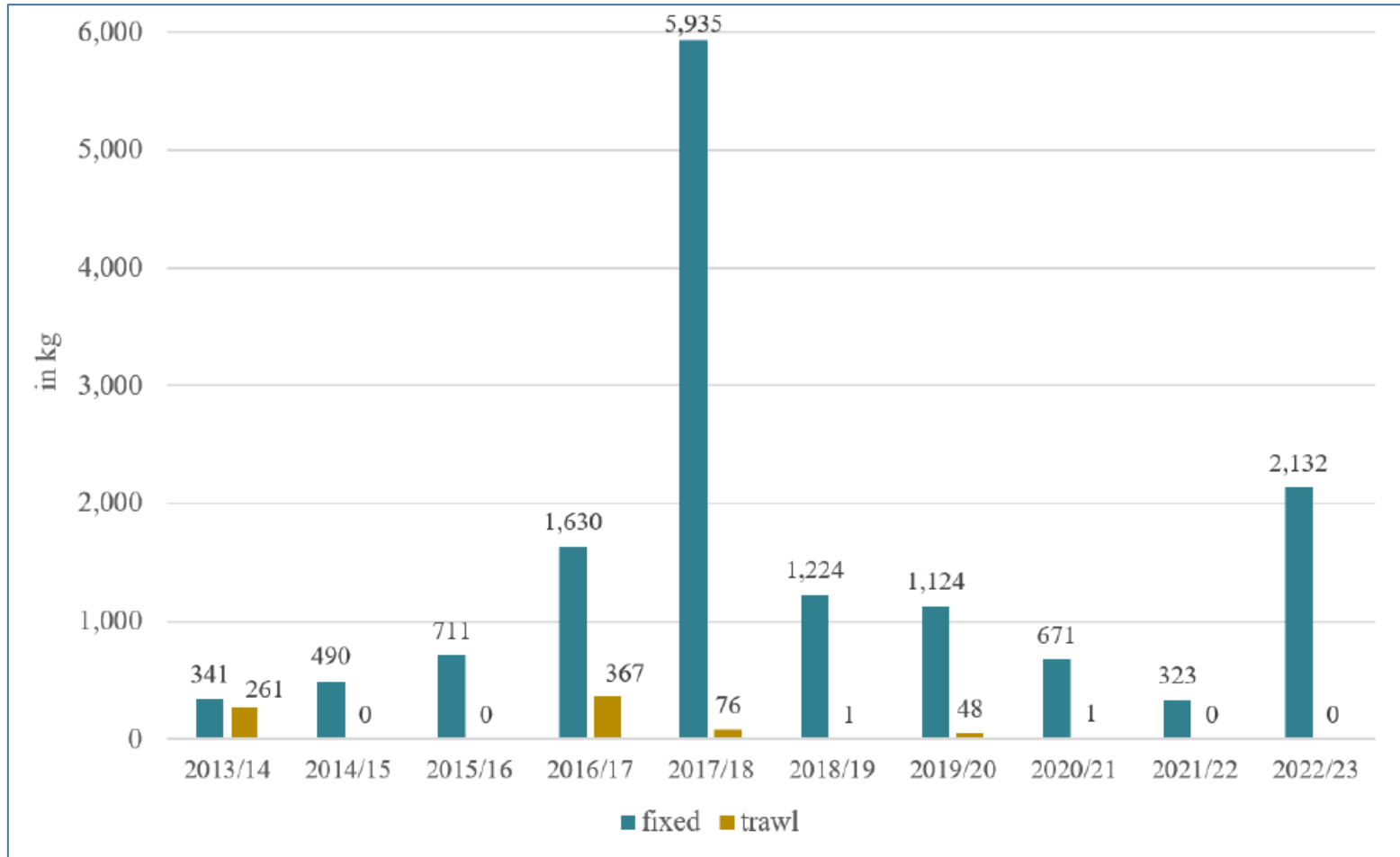
Other BSAI crab stocks

SMBKC: non-directed crab fishery bycatch

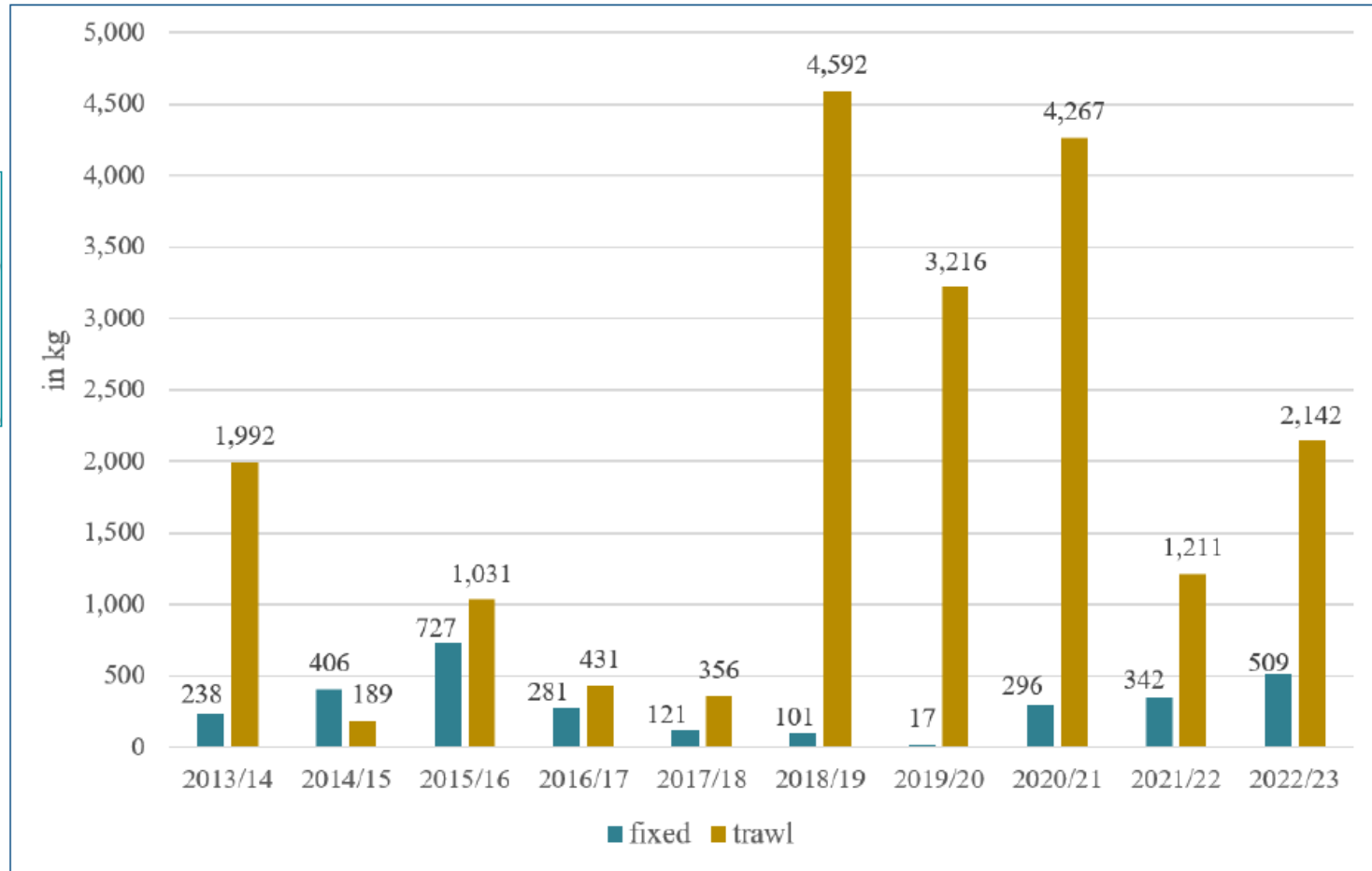


Saint Matthew Islands Blue King Crab Incidental Catch in Groundfish Fisheries

- Overfished stock.
- Very little trawling in this stock area due to trawl closure areas.
- Fixed gear trip targets in this area include halibut, Greenland turbot, sablefish, and Pacific cod.
- BKC is usually seen in the Pacific cod trip target for fixed gear (hook-and-line and pot).

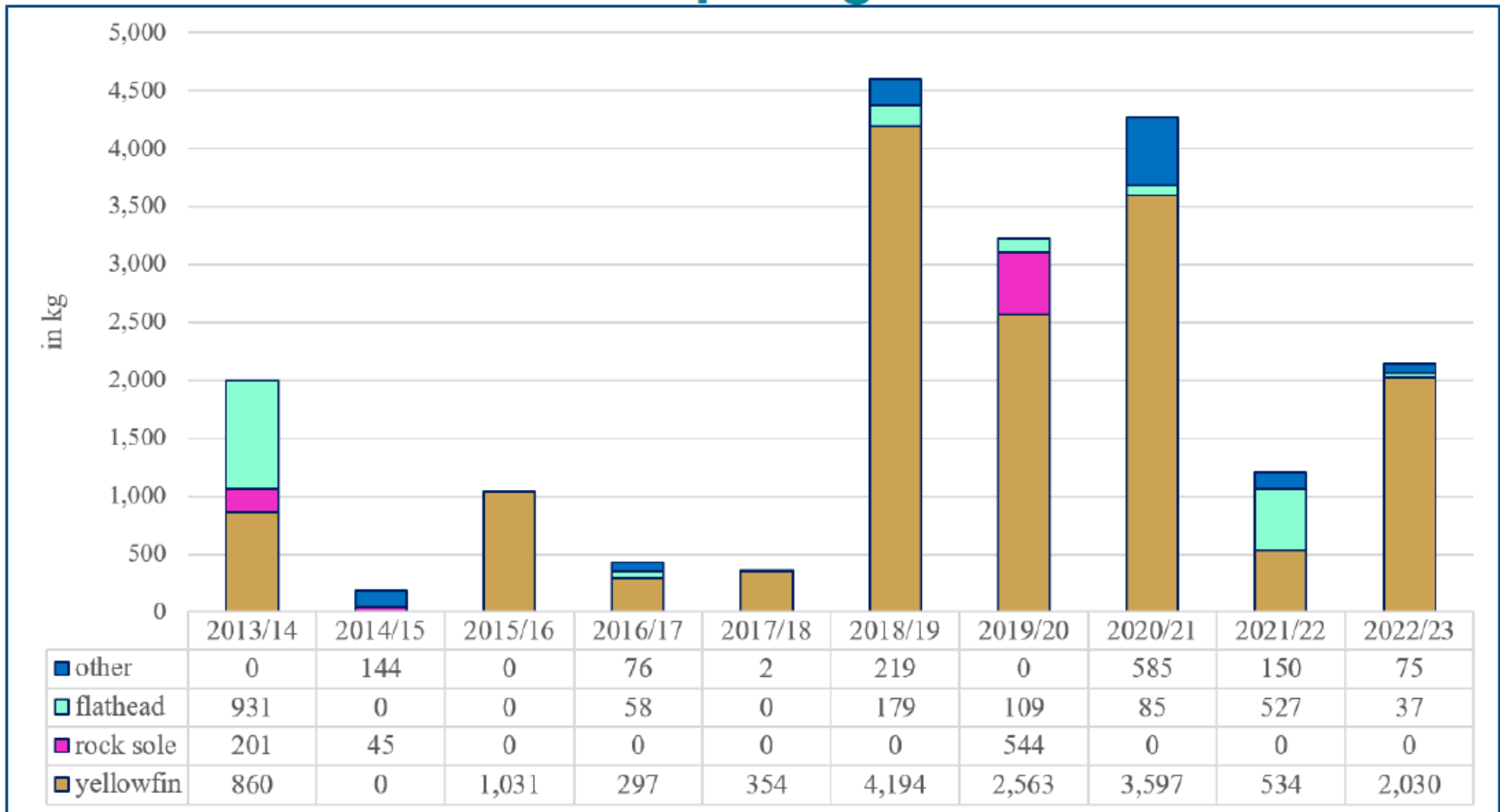


Pribilof Islands Red King Crab Incidental Catch in Groundfish Fisheries



- Pot and trawl gear are prohibited in the Pribilof Islands Habitat Conservation Zone which is in place to protect blue king crab.
- Most fixed gear fishing in this area is by CPs using hook-and-line gear targeting Pacific cod and came from within the Pribilof Islands Habitat Conservation Zone..

Pribilof Islands Red King Crab Trawl Incidental Catch by Trip Target

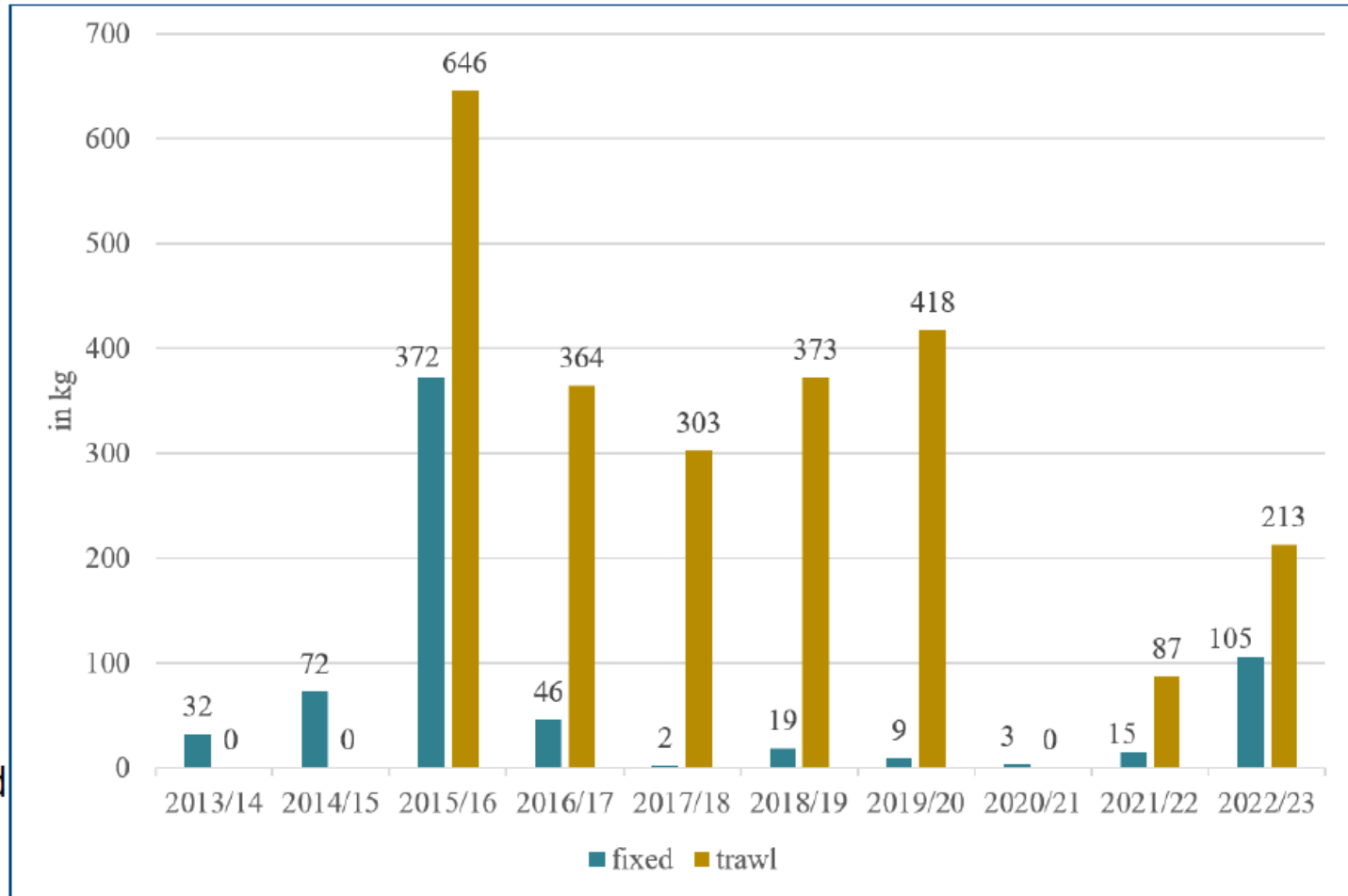


- Majority of 2022/23 bycatch was from yellowfin sole fishing in October.
- “Other” species includes: Alaska plaice, arrowtooth flounder, Atka mackerel, Greenland turbot, Kamchatka flounder, other flatfish, Pacific cod, rockfish, and pollock.

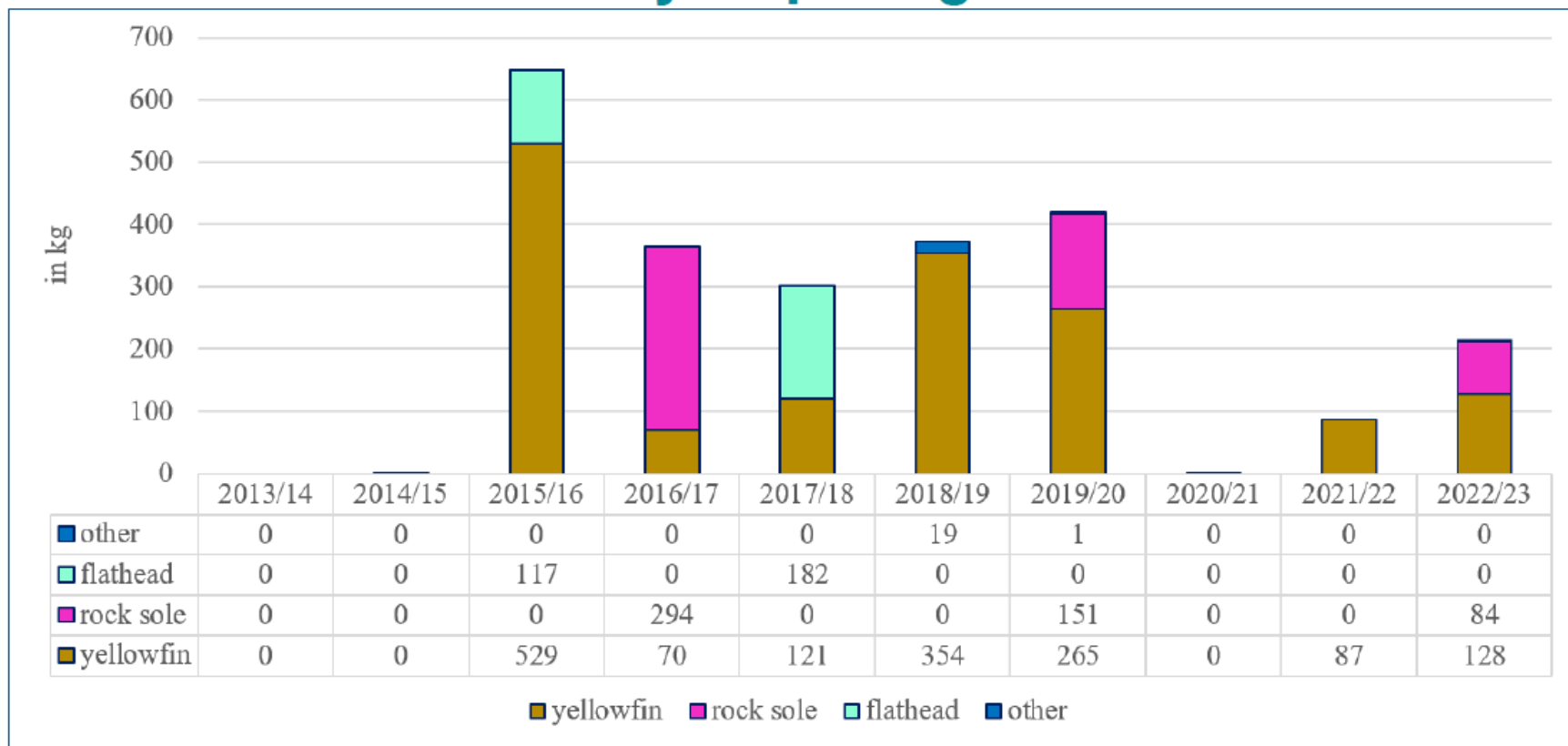
Pribilof Islands Blue King Crab Incidental Catch in Groundfish Fisheries



- Pot and trawl gear are prohibited in the Pribilof Islands Habitat Conservation Zone which is in place to protect blue king crab.
- Overfished stock.
- Overfishing occurred in the 2015/16 crab year.
- Most fixed gear fishing in this area is by CPs with hook-and-line gear targeting Pacific cod and came from within the Pribilof Islands Habitat Conservation Zone.



Pribilof Islands Blue King Crab Trawl Incidental Catch by Trip Target



- Most trawl bycatch is occurring just outside the NE corner of the closure area.
- Majority of bycatch in 2022/23 crab year occurred in May during the yellowfin sole fishery and November during the rock sole fishery.
- “Other” species includes: Alaska plaice, arrowtooth flounder, Atka mackerel, Greenland turbot, Kamchatka flounder, other flatfish, Pacific cod, rockfish, and pollock.

Norton Sound Red King Crab Incidental Catch in Groundfish Fisheries

- 2009 – 2017: no RKC bycatch in NSRKC stock area
- In 2018: 8 kg of RKC bycatch (mortality applied)
- In 2019: 13 kg of RKC bycatch (mortality applied)
- In 2020 - 2022: less than 1 kg of RKC bycatch



Thank you



Photo courtesy of Sam Zmolek

Thanks to Abby Jahn from the Region for providing bycatch maps!