
C4 BBRKC: GROUNDFISH AREA CLOSURES

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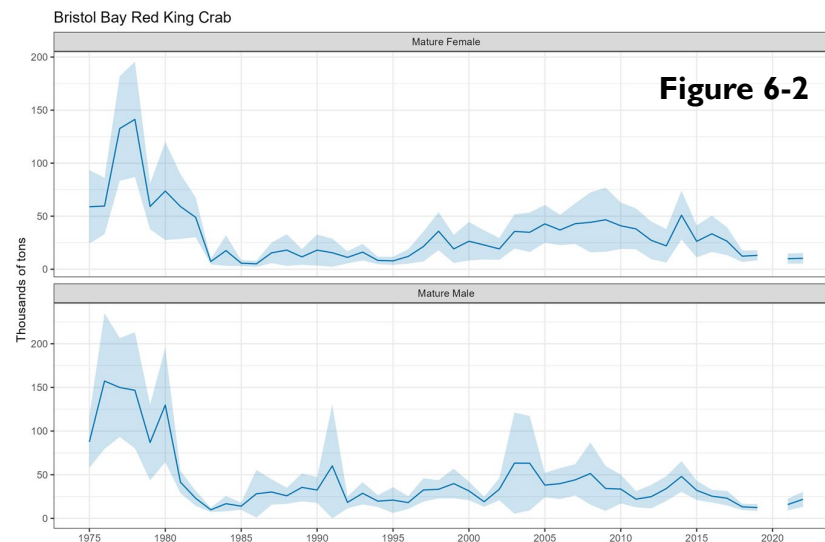
PRESENTATION OUTLINE

- Purpose & Need; Alternatives (Sections 1 & 2)
- Fishery and environmental context (Sections 3 & 6)
- Spatial PSC rate information RE: effort relocation (Appendix 2)
- Discussion of alternatives/impacts (Section 5)
- Pelagic gear definition and “trawl gear performance standard” (Section 4)



PURPOSE & NEED

- BBRKC stock and recruitment is at a low level
- Consecutive BBRKC fishery closures
- A “combination of factors related to continued warming and variability in ocean conditions”
- Consider measures **focused on reducing** BBRKC mortality from groundfish fishing in areas that **may be important** to BBRKC and where BBRKC **may be found** year-round
- Objective: “**may help increase**” abundance and promote OY in BBRKC fishery **while minimizing impacts** on GF fleet and other species

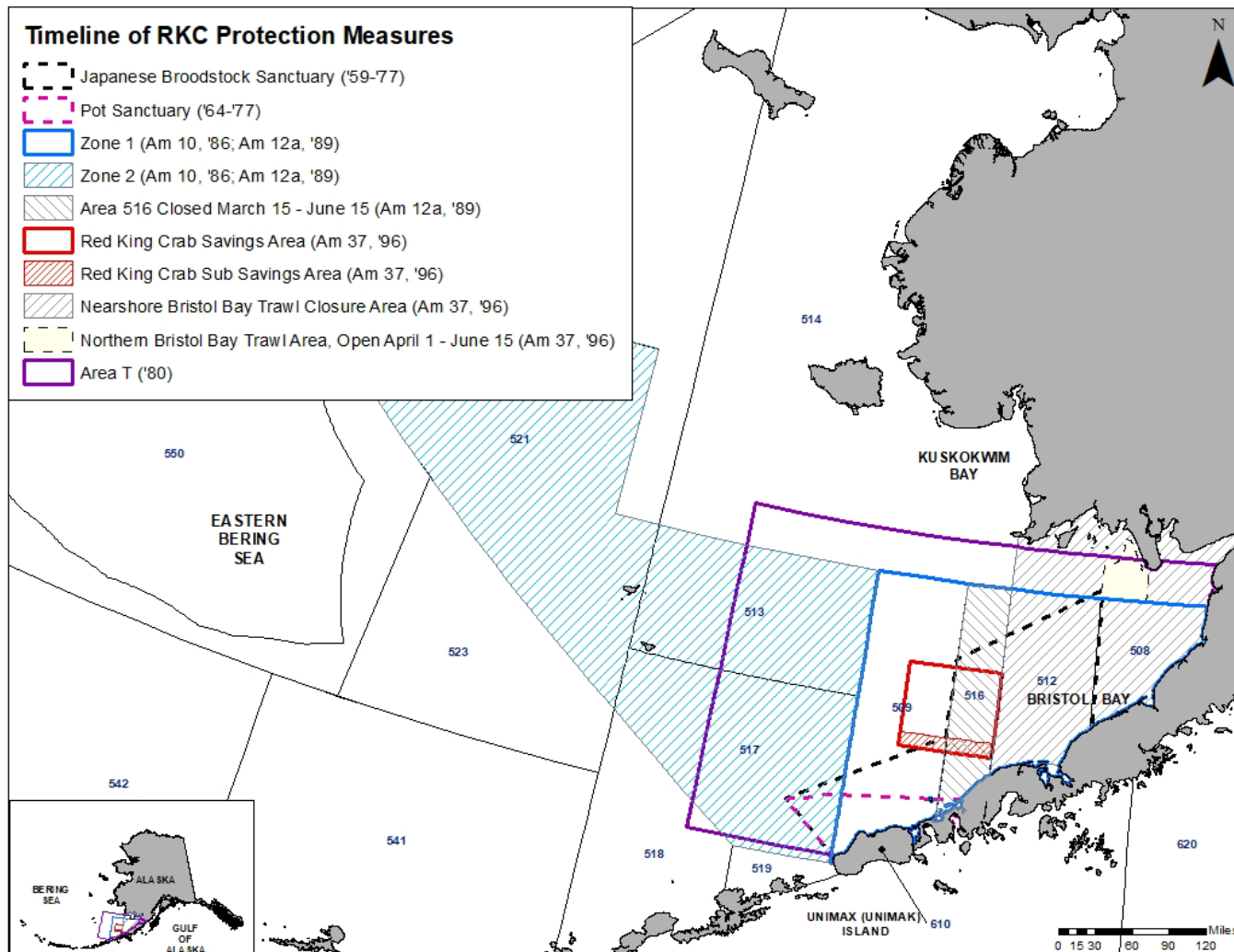


Crab year	OFL	ABC	TAC
2016/17	14,630,000	13,170,000	8,469,000
2017/18	12,350,000	11,110,000	6,601,000
2018/19	11,760,000	9,410,000	4,308,000
2019/20	7,500,000	6,000,000	3,797,000
2020/21	4,720,000	3,540,000	2,648,000
2021/22	4,910,000	3,920,000	0
2022/23	6,700,000	5,350,000	0

Table 3-53



MANAGEMENT AREA



ALTERNATIVES

Alt. 1: No Action

Alt. 2: Annual closure of RKCSA/SS to all commercial groundfish gears (i.e., PTR, NPT, POT, HAL)

- Trigger {
- Option 1:** Closure in effect if ADF&G did not establish a TAC for the BBRKC directed fishery in the preceding year
 - Option 2:** Closure in effect if total area-swept biomass for BBRKC is less than 50,000 mt (most recent EBS trawl survey)

Suboptions (apply to Alt. 2 regardless of Option selected):

- Extent {
- Sub. 1:** Exempt HAL gear (→ RKCSA closed to PTR, NPT, POT)
 - Sub. 2:** Exempt POT gear (→ RKCSA closed to PTR, NPT, HAL)

Alt. 3: Annual closure of NMFS Area 512 to Pacific cod pot fishing

Must select either Option 1 or 2 as an annual trigger



ALTERNATIVE 2

- “The existing closure of non-pelagic trawl gear is not changed” – RKCSS would only be open to NPT when **existing regs + Alt 2** are satisfied;
 - There is no loophole under Option 2 (50,000 mt) where RKCSEA is closed to other gears but RKCSS is open to NPT
 - Existing limitation on use of annual Zone 1 RKC PSC limit in RKCSS remains (25%)
- Total area-swept \neq length-based analysis (LBA) abundance estimates that are the basis of ADFG and Crab FMP harvest policies. Scenarios where area-swept $<$ 50,000 mt but BBRKC fishery was open.

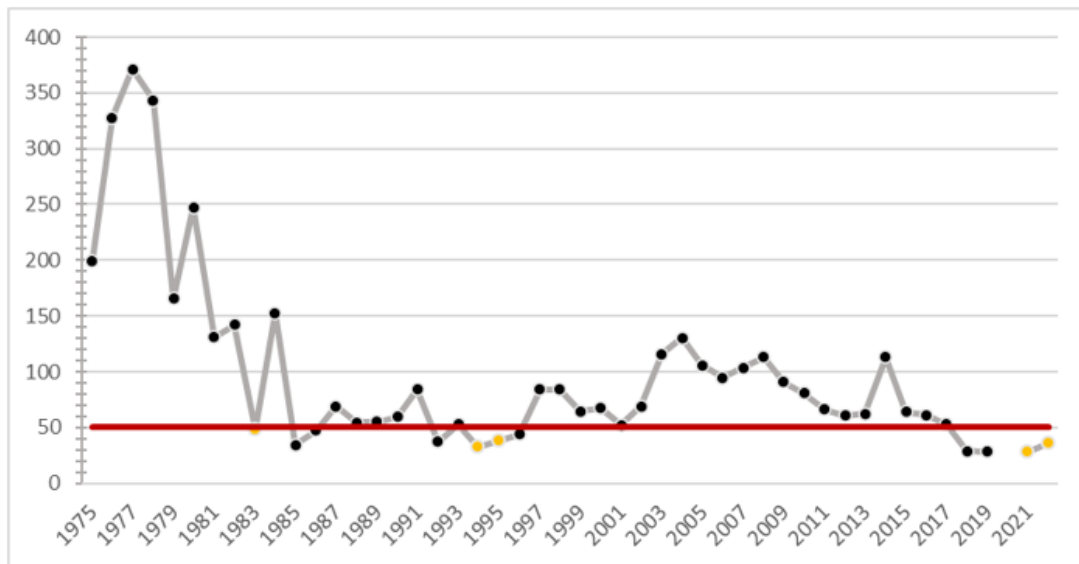


Figure 2-1 Total survey biomass “area-swept” estimate (mt), 1975-2022; survey years preceding a BBRKC directed fishery closure are highlighted in orange (Data source: Palof & Siddeek 2022, Table 9a)



FISHERY DESCRIPTION (SEC. 3)

- “Affected groundfish fisheries” – PTR, NPT, POT (cod), HAL (cod)
 - History & description of participation (recent trends; annual patterns)
 - Limitations on timing/location of fishing under existing regulations and fishery practices
- Catch and bycatch by gear, area and seasonality
- Area-breakouts: RKCSEA << Area T << Zone 1 << Bering Sea
- Vessel count and gross revenues (2018-22) compare RKCSEA to BS FMP area
- Area 512 participation/revenue data specific to Pacific cod pot fishery (O60, U60, CP)



FISHERY DESCRIPTION (SEC. 3)

- Pelagic Trawl
 - Reporting area proportions of salmon/herring bycatch in pollock fishery (2018-22) – **Table 3-15 (p.57)**
- Non-Pelagic Trawl
 - Zone 1 RKC PSC limits (**Table 2-1, p.28**) ~ PSC estimates (**Table 3-4, p.52**)
 - Lower PSC limit regime would have resulted in RKC PSC closures in most years for A80, 3 years for CDQ, and 1 year for TLAS PCod
- Pots (Pacific cod)
 - Cross-participation in Pacific cod and Crab (**Figure 3-7, p.46**)
 - RKCSA shift toward O60 CVs; RKCSA effort reduced in recent years
 - Area 512 participation (CV) increase since 2019 (**Figure 3-9, p.47**)
 - Tendering in Area 512 (**Section 3.2.3.1; Table 3-23/24, p.63**). Deliveries to tenders dominating in 512 and stand out relative to other areas.
 - **Table 3-20 (p.61)** shows that Areas 512 and 509/16 rank high in terms of total cod catch and RKC presence in catch composition (esp. 512)



FISHERY DESCRIPTION (SEC. 3)

- Community/processing information built around “SIA-type” data tables
- Recent participation within the RKCSA (across gear types) is an adequate reflection of the near future. Participation in Area 512 (Pot Cod) has shown more variation relative to longer-term trend.
- Approach to analyses like tax revenue effects reflects assumptions about recovery of RKCSA revenues through effort relocation; gross revenues maintained within a margin of annual variation, impacts on efficiency, and operational ability to address contingencies in environment, target, and non-target species.
- Certain community links can only be presented qualitatively (conf. data) – e.g. eastern Bristol Bay
- Data: area-specific vessel counts + community link; vessel area-revenues ~ all Alaska; community revenue dependency vis-à-vis harvesters/processors



FISHERY DESCRIPTION – BBRKC (SEC. 3.5)

- Crab EconSAFE: 2 years of BBRKC fishery closure + BSS closure → “*The BSAI crab industry, dependent communities, and other stakeholders currently face the prospect of a prolonged period of income and employment loss as a result of trends and closures in these and other crab fisheries. The scope and scale of structural changes within the crab industry and extended community that may ultimately be precipitated by the immediate crisis are unknown and difficult to anticipate with any clarity”*”
- Document provides scope and scale of the fishery since rationalization (e.g., **Table 3-54, p.81**), community engagement through ACEPO (data through 2021), and fishery valuations from recent Federal fishery disaster declarations
- 2017-2020 data on BBRKC active vessels, crew positions, crew compensation, captain shares, and community engagement (via ACEPO)
- High degree of linkage to other crab fisheries (snow, tanner) and PCod. Ability of a crab-focused vessel to continue participation relies on a suite of species that differ in terms of volume and value/lb.



ENVIRONMENTAL CONTEXT (SEC. 6)

- EA components: selected groundfish, BBRKC, seabirds, habitat
- Spatial/temporal changes in effort constrained by existing annual/seasonal area closures, seasonal TAC apportionments, and fishery-specific factors that dictate timing/location of effort
- Interannual variability in effort exists across all involved gears
 - Environmental conditions, target species aggregation, market size, comingling with PSC/non-target GF
 - Maximum footprint constrained by existing limits on participation, areas, resource availability, and fishing/processing logistics
- Effects of redistributed effort may be directly interpreted through FE/EFH, or less obvious if a change in total effort is presumed
 - Reduced participation
 - Increased effort at lower CPUE



ENVIRONMENTAL CONTEXT – BBRKC

- Molt/mate seasonality relative to groundfish (**Fig 3-1, p.35**)
- Summer trawl survey distribution (**Figs 6-3 – 6-6, p.117**)
- Ongoing RKC research (**Figs 6-7 – 6-8, p.123**)
- Groundfish/salmon predation
- Redistribution of pot effort; net effect RE: bycatch/predation
- RKC bycatch removals relative to biomass; effects incorporated in stock assessment
- Unquantified benefit of moving gear out of “core stock area”

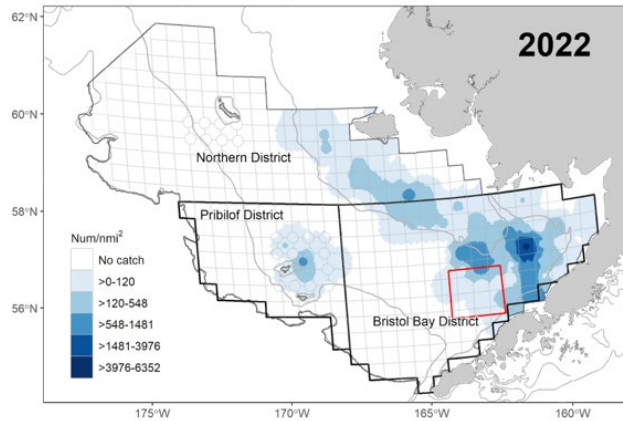


Fig 6-3: Mature Females (trawl survey)

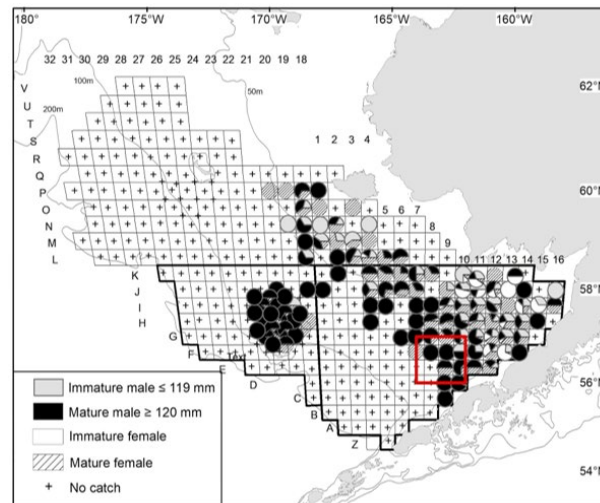


Fig 6-5: Sex/maturity ratios in 2022 trawl survey

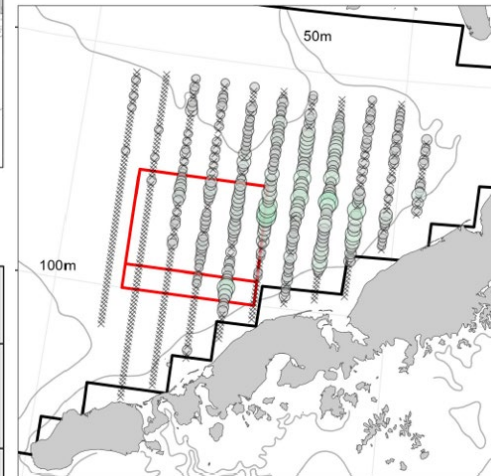


Fig 6-8: Mature Females (2023 pot survey)



ENVIRONMENTAL CONTEXT – HABITAT

- **EFH:** relative importance of BB region to BBRKC
- **Fishing Effects:** cumulative impact in portions of RKCSA
- **Seafloor contact:** by gear and by season
- Presumed redistribution of effort moves mobile gear away from key areas
- Redistribution of pot effort is less obvious; depends on two alternatives, voluntary choices, and fishery viability
- Net change in total effort is ambiguous; a likely scenario is more effort moved west/south of current footprint (A season)

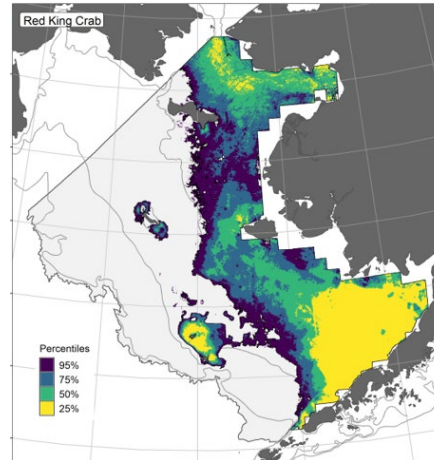


Fig 6-13: EFH

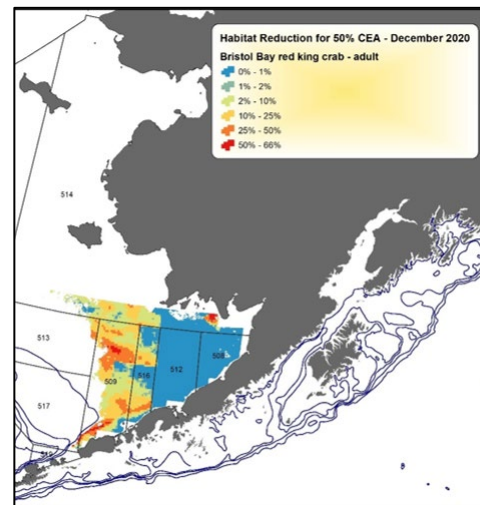


Fig 6-14: Fishing Effects

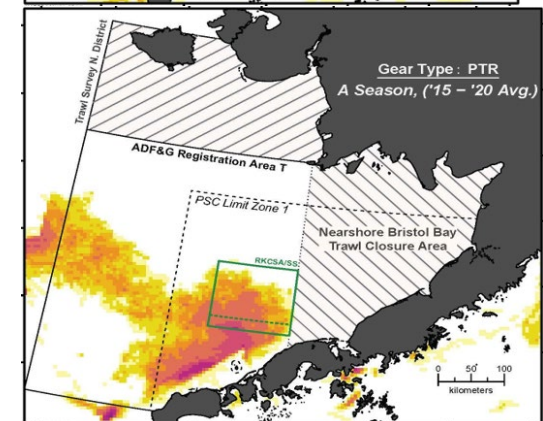
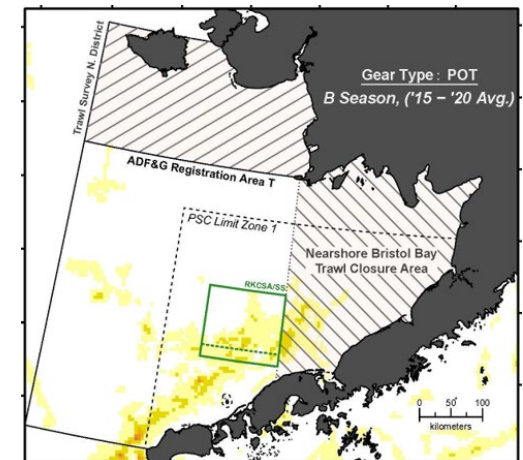


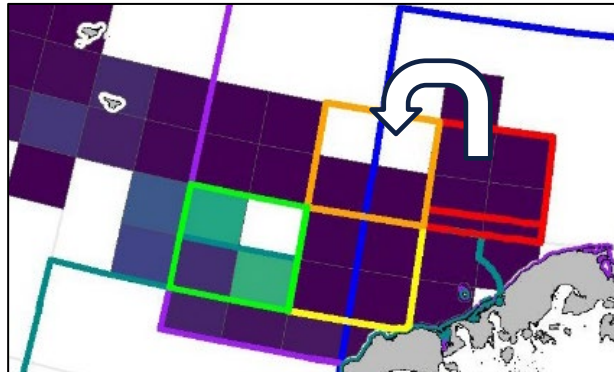
Fig 6-15: Bottom contact estimation



PSC DISPLACEMENT (APPENDIX 2)

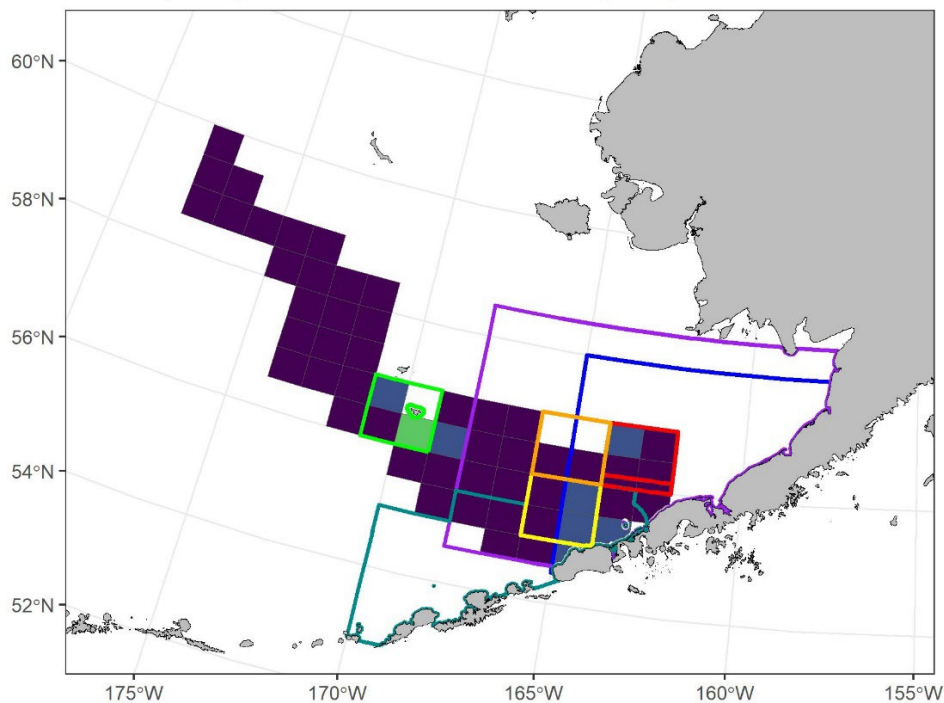
- Gives an idea of changes in PSC for affected species
- Dec 2022: Council suggested mapping PSC displacement over a range of years/seasons
 - Annual estimates (2020-2022) chosen to represent the Council motion
 - Chinook, non-chinook, herring, halibut, BBRKC, Opilio, and Bairdi
- Displaced to: adjacent area (**orange**), area of high PSC in the SCA (**yellow**), and an area of highest PSC rates (**green**) of equal size to the displaced area

$$Est. Increase = [(RKCSA GF catch) * (avg PSC rate)] - RKCSA PSC$$

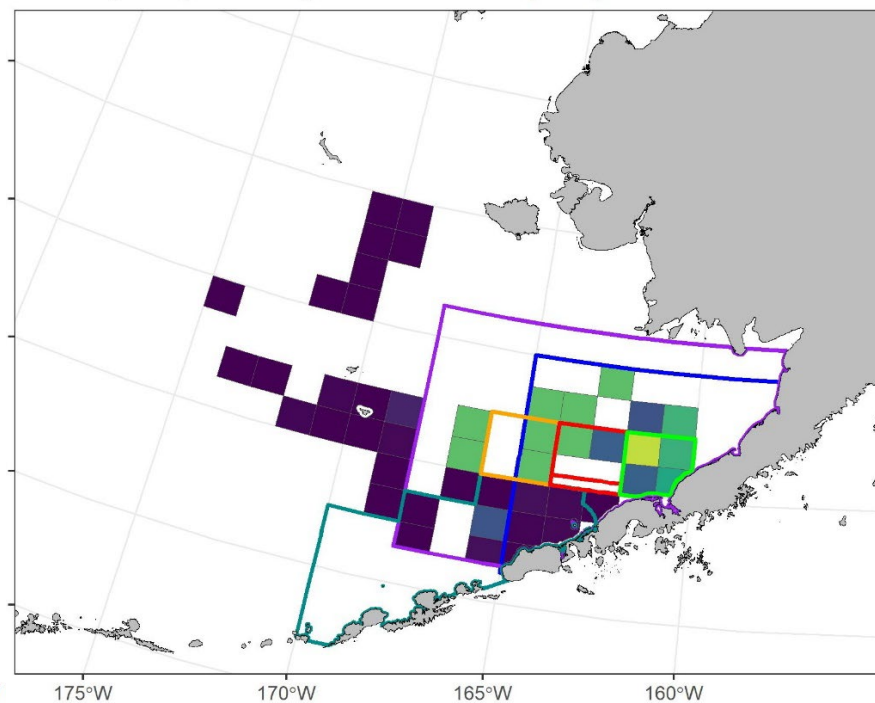


PSC DISPLACEMENT

Annual (2022) Chinook Salmon PSC Rate (PTR)



Annual (2022) Red King Crab PSC Rate (POT)



-  Adjacent
-  SSLCA
-  High Areas
-  RKCSA/SS
-  Area T
-  Zone 1
-  High Areas in SCA

PSC Rate



PSC DISPLACEMENT

- Maximum (worst-case scenario) increases:

Group	Max. increase	% increase of Area T PSC
Chinook	964 to 1,178	5-19%
Non-chinook	33,209 to 237,586	44-74%
BBRKC	3,462 to 21,702	8-51%

- Displaced areas of high non-chinook & BBRKC PSC rates consistent
 - Good for PSC avoidance measures
- Movement of pot gear into 512 resulted in highest BBRKC PSC
- Limited by mismatch in seasonal groundfish effort and PSC rates
 - Negligible B season PTR landings in the RKCSA when non-chinook PSC rates were very high, so these numbers would likely be much lower in reality
 - Future analysis to split seasonally



DISCUSSION OF ALTERNATIVES (SEC. 5)

- Relative to No Action, evaluating the alternatives requires the Council to weigh adverse impacts on groundfish fisheries against potential benefits to BBRKC
 - Impacts to GF are easier to point to...
 - e.g., revenue at risk; optionality; efficiency loss; cost to labor; cumulative effect of multiple GF fisheries becoming more constrained and less productive
 - ... but not necessarily easy to pin down the frequency and magnitude of those impacts on a fishery-by-fishery basis
 - i.e., assume that area closure will be in effect most/every year; new area closure is one piece in the puzzle of how successful a sector/company/vessel will be in its annual fishing plan
 - Other factors: “Was the RKCSA/SS important to that sector/vessel that year? Why/why not?”
 - Benefits to BBRKC are easy to envision but difficult to quantify; more difficult to “prove”
 - Direct benefits (bycatch): Where does GF effort shift? How big an issue is unobserved mortality? Are DMRs as good as they can be? What is the relationship between gear presence and mortality? Seasonal crab movement.
 - Indirect benefits (habitat): Questions outstanding about RKC life history. Is the RKCSA a valuable area to protect? Is it the most valuable? What about inshore areas (no trawl)? What about areas south and west of RKCSA that were thought of as core habitat decades ago?



DISCUSSION – WEIGHING COST/BENEFIT

Groundfish

- Participation, catch, bycatch, revenue by area & season
- Incidence of RKC pot catch in 512 and 509/16 (RKCSA)
- Narrative of annual fishing plan by “fishery” – highlighting variable contingencies that have been relevant in recent years
- Existing regulatory restrictions (spatial, PSC) and operational considerations
- Trends in use of/reliance on RKCSA and Area 512 (for harvesters, shore-based processors, and communities); why those might persist or change
- Noting where participants are co-reliant on other fisheries (crab/other), and impediments to diversification from current fisheries prosecuted

BBRKC

- Historical participation and value: fishery data; EconSAFE; ACEPO; disaster relief
- Trawl survey maps (male/female) relative to RKCSA/512
- Life-history (stock assessment and literature)
- Recent and ongoing efforts to fill movement/presence data gaps; some still at snapshot-stage
- Predation (PCod, salmon)
- EFH, Fishing Effects, bottom contact estimation



DISCUSSION

- “Revenue at risk” represents a maximum (unlikely) impact. Not equivalent to “forgone revenue”.
- Recent years show deemphasis of RKCSA for non-PTR gears – with caveats
 - Pots largely moved east into Bristol Bay
 - RKCSS has been closed to NPT; A80 is a diverse fleet with some operators more flatfish dependent and dually constrained by RKC and halibut PSC limits
 - Longer history includes periods of RKCSA/SS use across most sectors/subsectors
- PTR patterns exemplify balancing of target catch rates and size/quality against avoidance of non-crab PSC species; RKCSA reliance weighted to A season; response options may vary across CP/CV
- Pot cod (O60 CV) fishery is most likely to forgo revenue, esp. under paired Alts. 2&3. Spillover effort into state-waters fisheries unlikely. Choice to voluntarily avoid RKCSA in B season could come under pressure. Response options maybe tied to tender availability.
- PTR, NPT, and HAL primarily exposed to “operational risks” (most associated with A season)
- Harvester revenue recovery by switching to other fisheries is highly constrained by LLP/rationalization programs, status of crab fisheries, and practicality (timing, location relative to processing markets)
- Near-term impacts likely localized to vessel/company level. Impacts to shore-based plants in high-volume processing communities presumed negative but low magnitude relative to total revenues coming from the affected areas and assumption of some relocated effort.



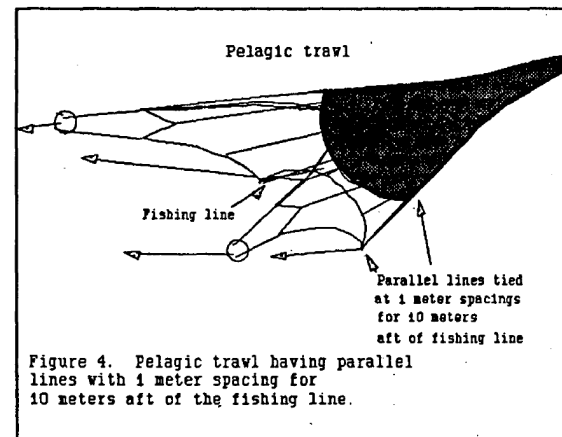
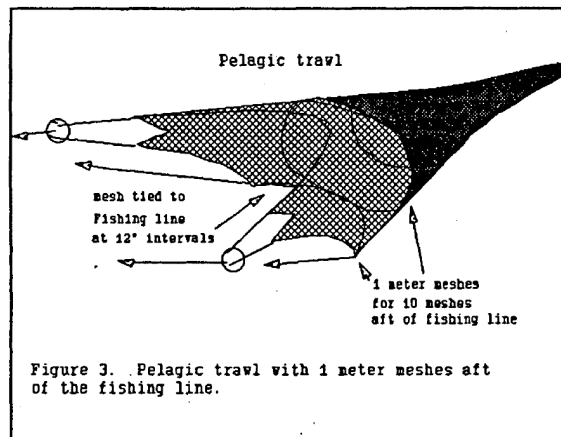
SECTION 4: PTR GEAR AND PERFORMANCE STD.

Evaluation of Pelagic Trawl Gear Definition and Performance Standard



HISTORY OF PELAGIC TRAWL GEAR DEFINITION

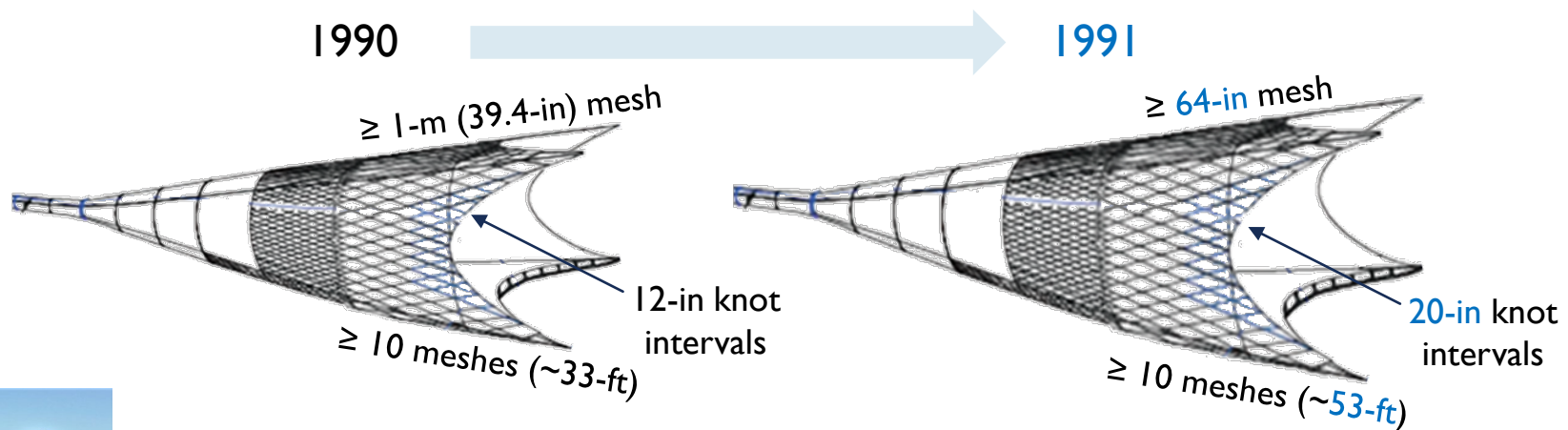
- **1987:** “A trawl on which neither the net nor the trawl doors (or other trawl-spreading device) operates in contact with the seabed, and which does not have attached to it protective devices, such as rollers or bobbins, that would make it suitable for fishing in contact with the seabed.”
- **1990:** Emergency Interim Rule (1990) modified definition to promote escape of halibut and crabs
 - Closures in bottom trawl (has rollers/bobbins) fisheries to reduce halibut PSC
 - Loopholes allowed continued bottom fishing by removing bobbins or rollers, or adding weight to pelagic gear, which led to higher halibut bycatch
 - Pelagic trawls using 1-m (3.3-ft) mesh reduced drag, and also reduced bycatch
 - New: (1) stretched mesh \geq 1-m for 10 meshes, 12-in webbing spacing at fishing line, or (2) parallel line spacing \geq 1-m for 10 meters, and no plastic discs, bobbins, rollers, or other chafe-protection on foot rope
 - *Removed details about contact with the seabed*



HISTORY OF PELAGIC TRAWL GEAR

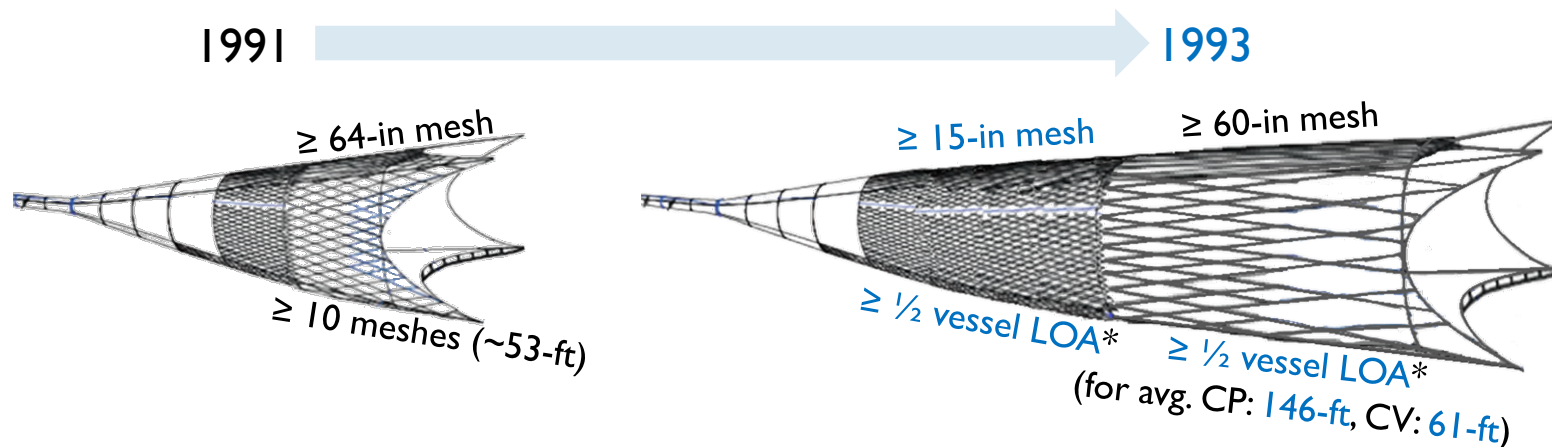
- **1991:** FMP Amendments 16 & 21

- Suggested PTR should be defined as it is fished (not fished on the bottom, but may contact bottom at times), and maximize catch of groundfish, while **minimizing bycatch of halibut and crab**.
- EA: *“The purpose of the large mesh sizes in back of the fishing line is to provide escape panels for halibut and crab in case the pelagic trawl contacts or comes near the seabed”*



PELAGIC TRAWL GEAR

- **1991-1992:** Some fishermen continuing to modify and fish as non-pelagic gear
- **1993 (current):** regulatory definition of PTR refined, with objective to “*reduce halibut and trawl bycatches by discouraging or preventing trawl operations on the sea bed when halibut and crab PSC allowances have been reached.*”



- Also added to prevent non-pelagic operation:
 - No floatation (except to 200-lb buoyance for net-sounder device), no chafing gear on footrope or fishing line, and no metal components forward of mesh $> 5.5\text{-in}$
 - No more than one fishing line and one footrope for a total of 2 weighted lines on the bottom of the trawl between the wing tip and fishing circle
 - Performance standard of no more than 20-crab onboard at any time



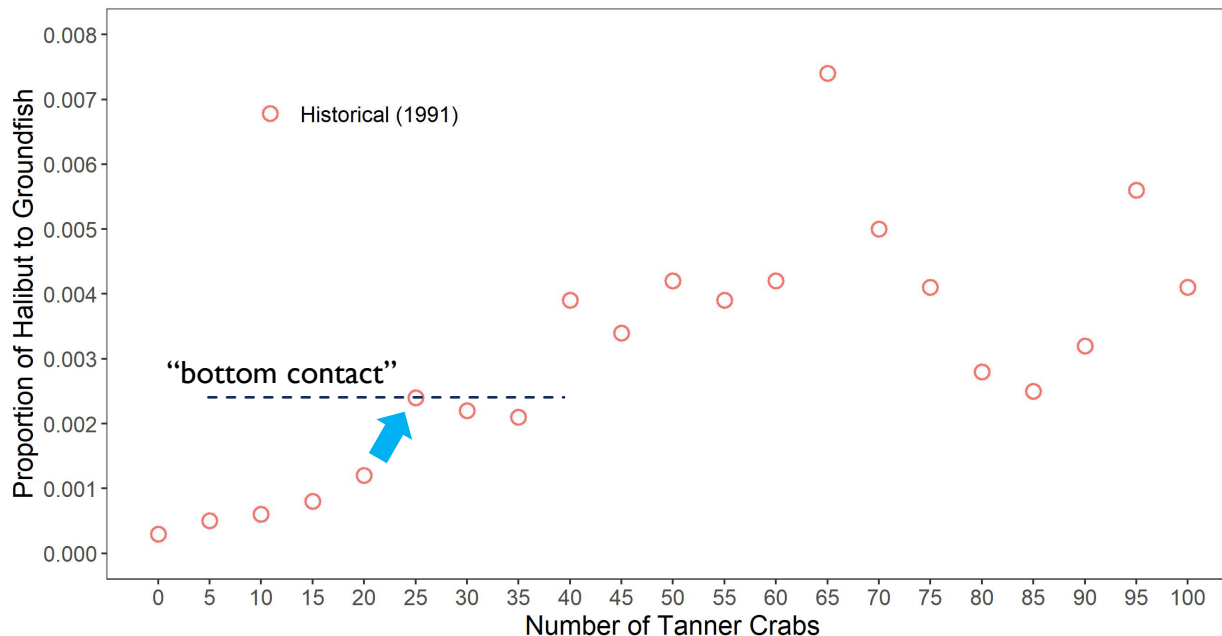
PELAGIC TRAWL GEAR

- Recent concern whether the **codend** is included in the definition of pelagic trawl gear
 - Current definition: no flotation (except 200-lb buoyancy for net sounder)
 - Definition of “codend” at 600.10: the terminal, closed end of a trawl net
 - Added in 1996 after pelagic trawl gear was defined
 - NMFS AKR does not believe the codend was intended to be included
- Council may wish to clarify
 - Council may also consider revisions to allow for gear innovation (ex. Salmon excluder), and simplify compliance monitoring by removing outdated or inapplicable portions (e.g., parallel line trawls)



PERFORMANCE STANDARD

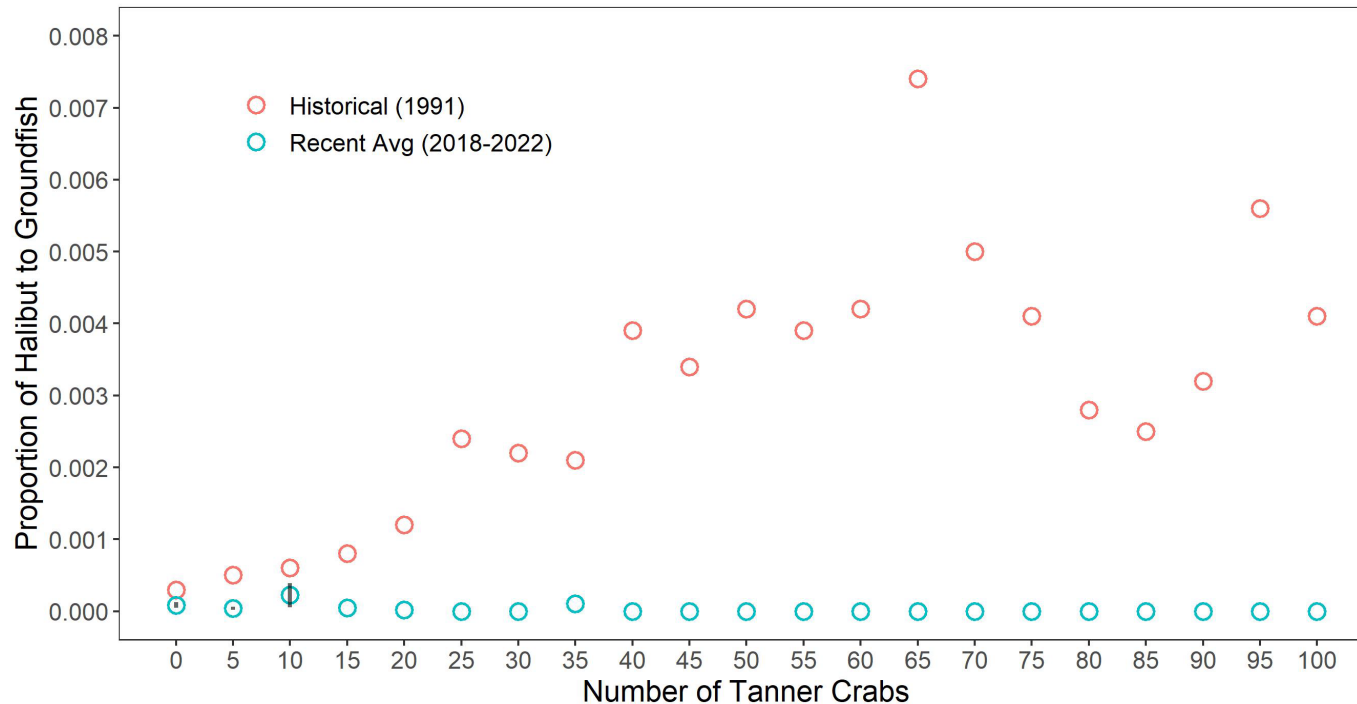
- To “*reduce halibut and trawl bycatches by discouraging or preventing trawl operations on the sea bed when halibut and crab PSC allowances have been reached.*”
 - Implemented as the *means* to discourage or prevent trawl operations on sea bed
 - Modified in 2001 to apply at all times
- 1991 observer data: as halibut bycatch doubled when > 20 crab caught, the Council considered > 20 crab as likely the result of operating a trawl on the sea bed



PERFORMANCE STANDARD

- Evaluation: Same analysis for recent years (2018-2022)
 - Substantially lower **halibut** bycatch rates

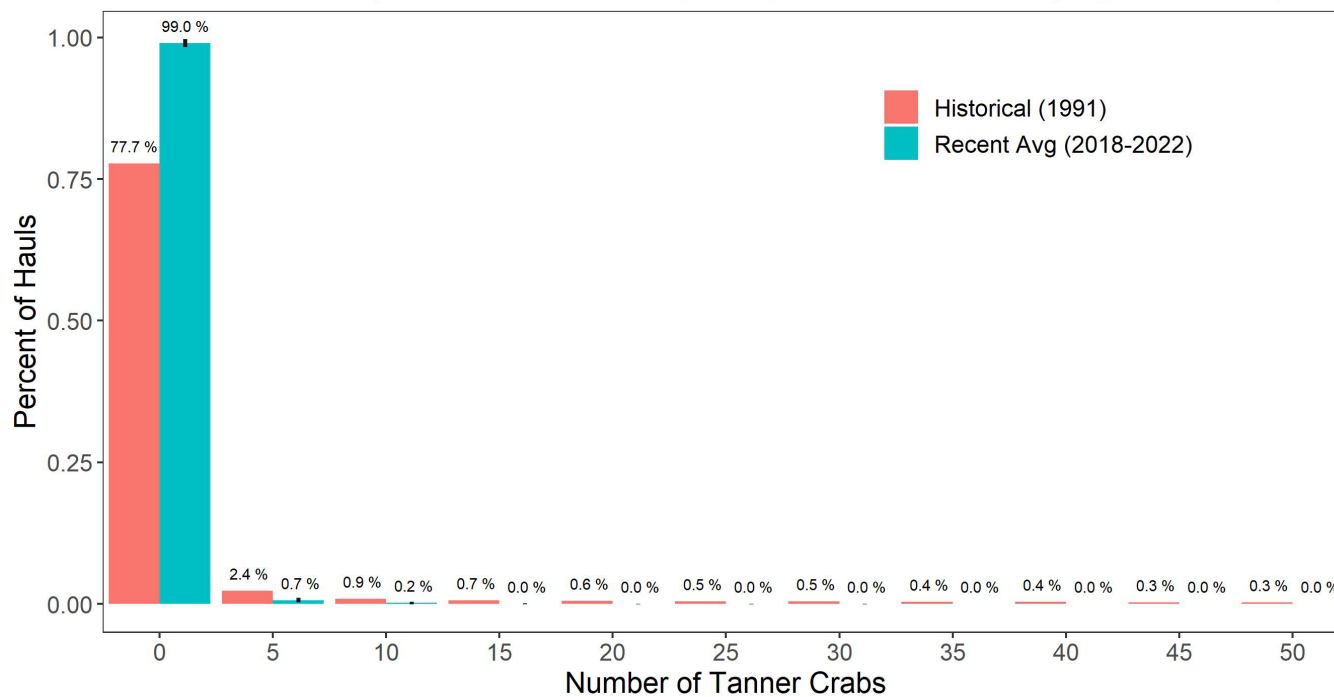
Halibut Bycatch: Historical (1991) vs Recent Average (2018-2022)



PERFORMANCE STANDARD

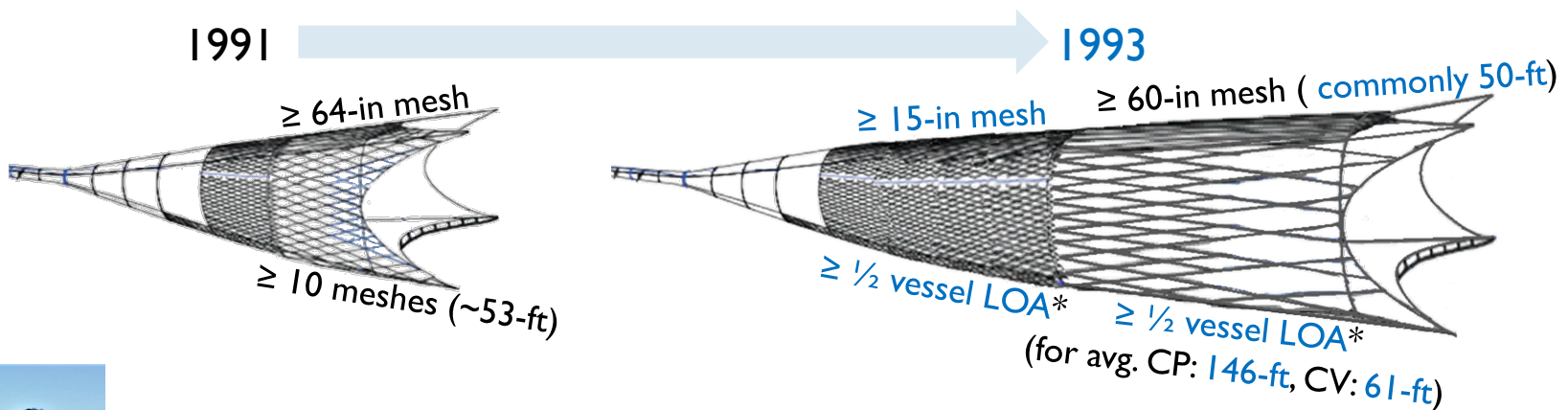
- Evaluation: Same analysis for recent years (2018-2022)
 - Substantially lower **crab** bycatch rates – percent of hauls catching zero crabs increased from ~78 to 99%

Tanner Crab per Haul: Historical (1991) vs Recent Average (2018-2022)



ARE COUNCIL OBJECTIVES MET?

- 1993 objective: “*reduce halibut and trawl bycatches by discouraging or preventing trawl operations on the sea bed when halibut and crab PSC allowances have been reached.*”
 - Successful in reducing halibut and crab bycatch through definition
 - Unlikely due to the discouraging or prevention of trawl operations on the sea bed
 - Likely due to large mesh size intended to reduce such bycatch compared to 1991



PERFORMANCE STANDARD

- **Performance standard does not appear to be meeting the objective as a means of “discouraging or preventing trawl operations on the sea bed”**
 - Reported contact of 20-100% used in Fishing Effects models
- **Logistical Challenges**
 - OLE only learns about performance standard violations from observers
 - Most crab observed in the forward portions of the net (outside of sample)
 - On-deck challenges for observer (dangers, limited view, determining whole or partial crab, and determining “at any particular time”)
- **Is seafloor contact important?**
 - Areas such as RKCSA prohibit non-pelagic trawling, but allow pelagic
 - Impacts of seafloor contact on RKC are relatively unknown and subject to study
 - If important, technology (sonar, echo sounder, tilt sensors, or others) may provide a potential path forward with proper testing and development



SUMMARY/RECOMMENDATIONS

- Consider revising definition of “pelagic trawl gear” to:
 - clarify if the codend is intended to be regulated,
 - allow for gear innovation (ex. Salmon excluder), and
 - simplify compliance monitoring by removing outdated or inapplicable portions (e.g., parallel line trawls)
- If seafloor contact is important, consider revising performance standard to integrate technology



Questions?

