

# Status of Tanner Crab in Central Region

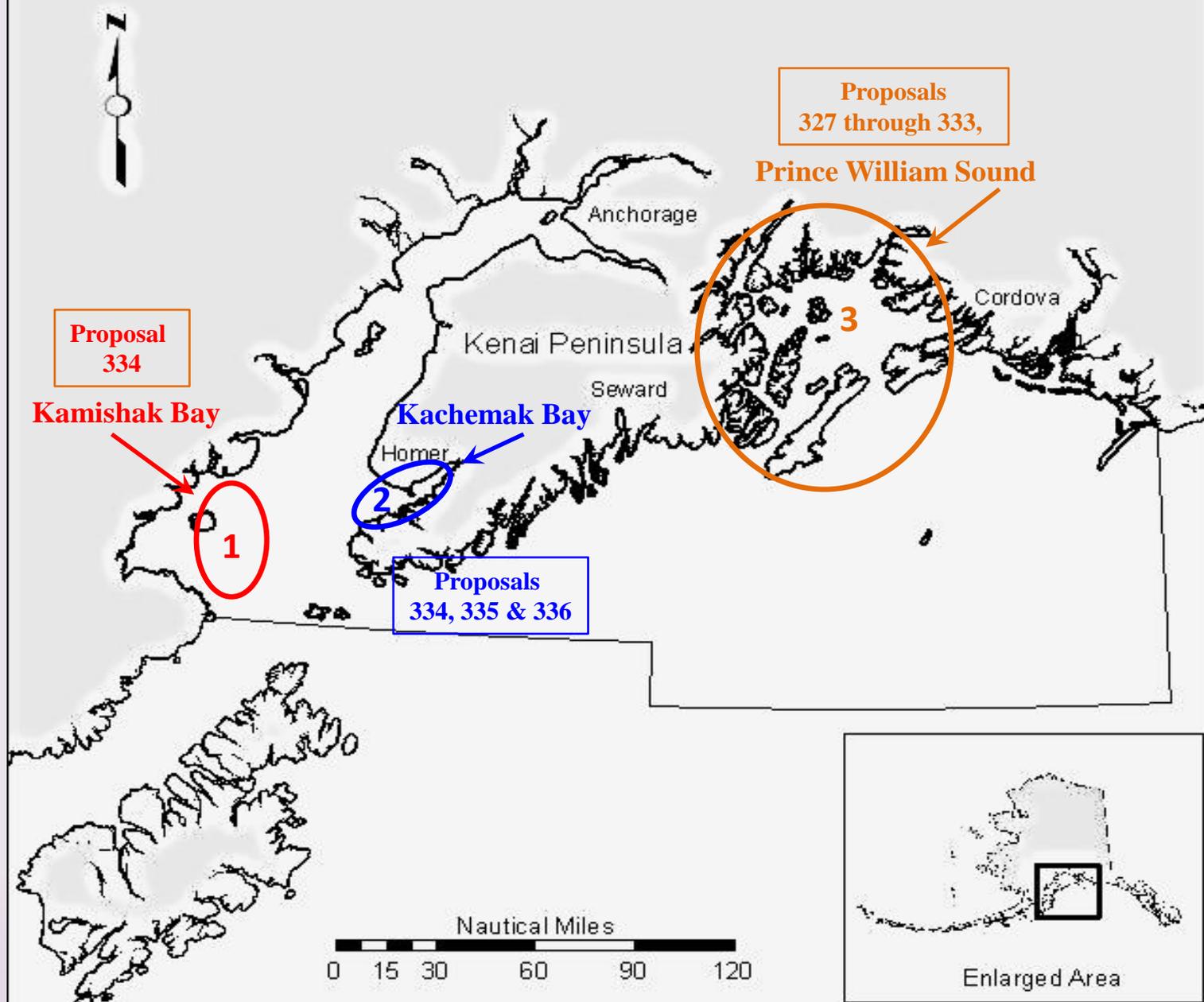
Dr. Kenneth J. Goldman  
Alaska Department of Fish and Game  
Division of Commercial Fisheries  
Groundfish/Shellfish Research Program

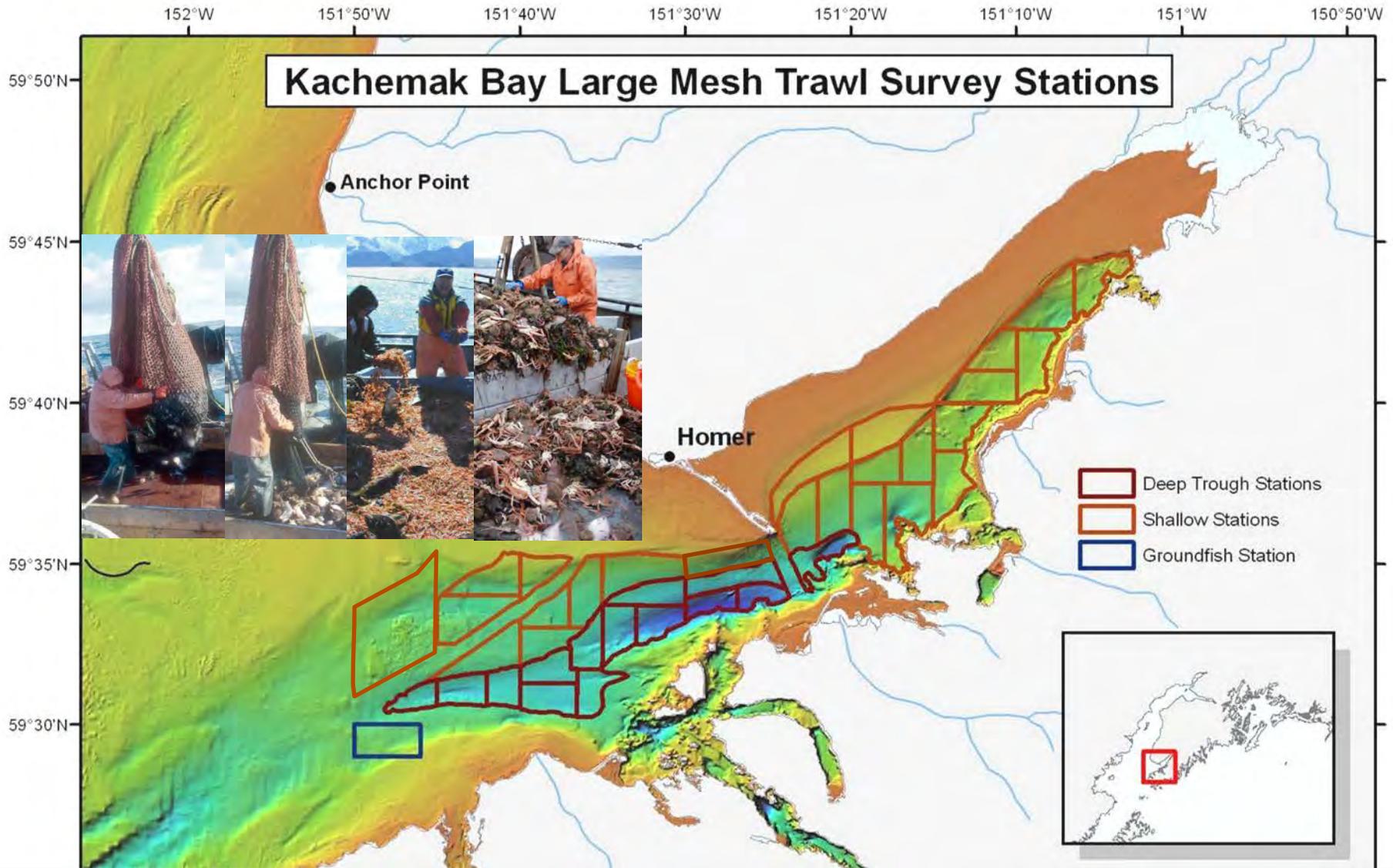


# Outline

- **Central Region Surveys – Tanner Crab Estimates for Kachemak Bay, Kamishak Bay and Prince William Sound**
- **Large vs. Small Clawed Crab – chela height/carapace width**
- **Tanner Crab Biology and Soft Shell Discard Mortality**
- **Future Central Region Goals**

# Central Region Research Surveys

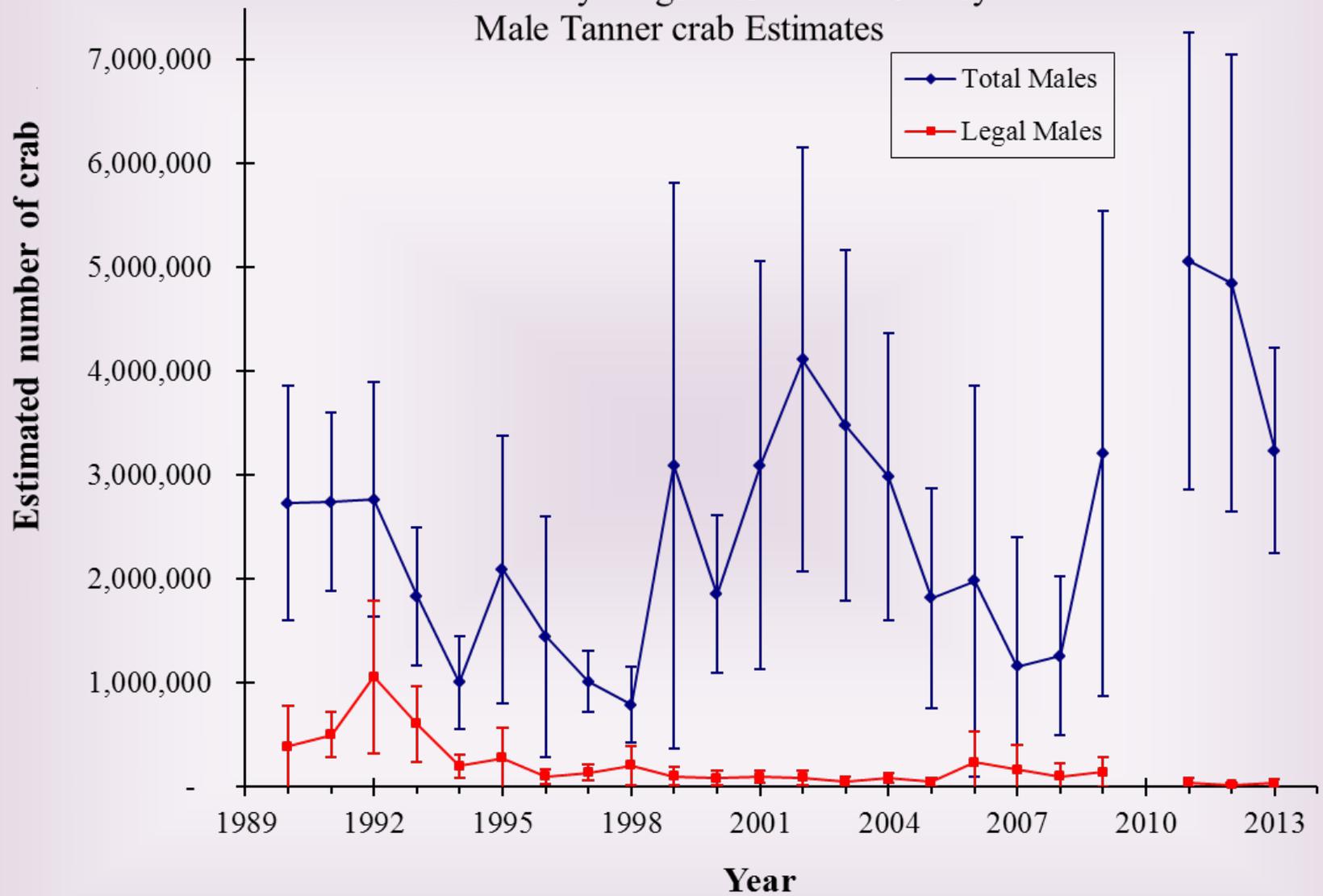




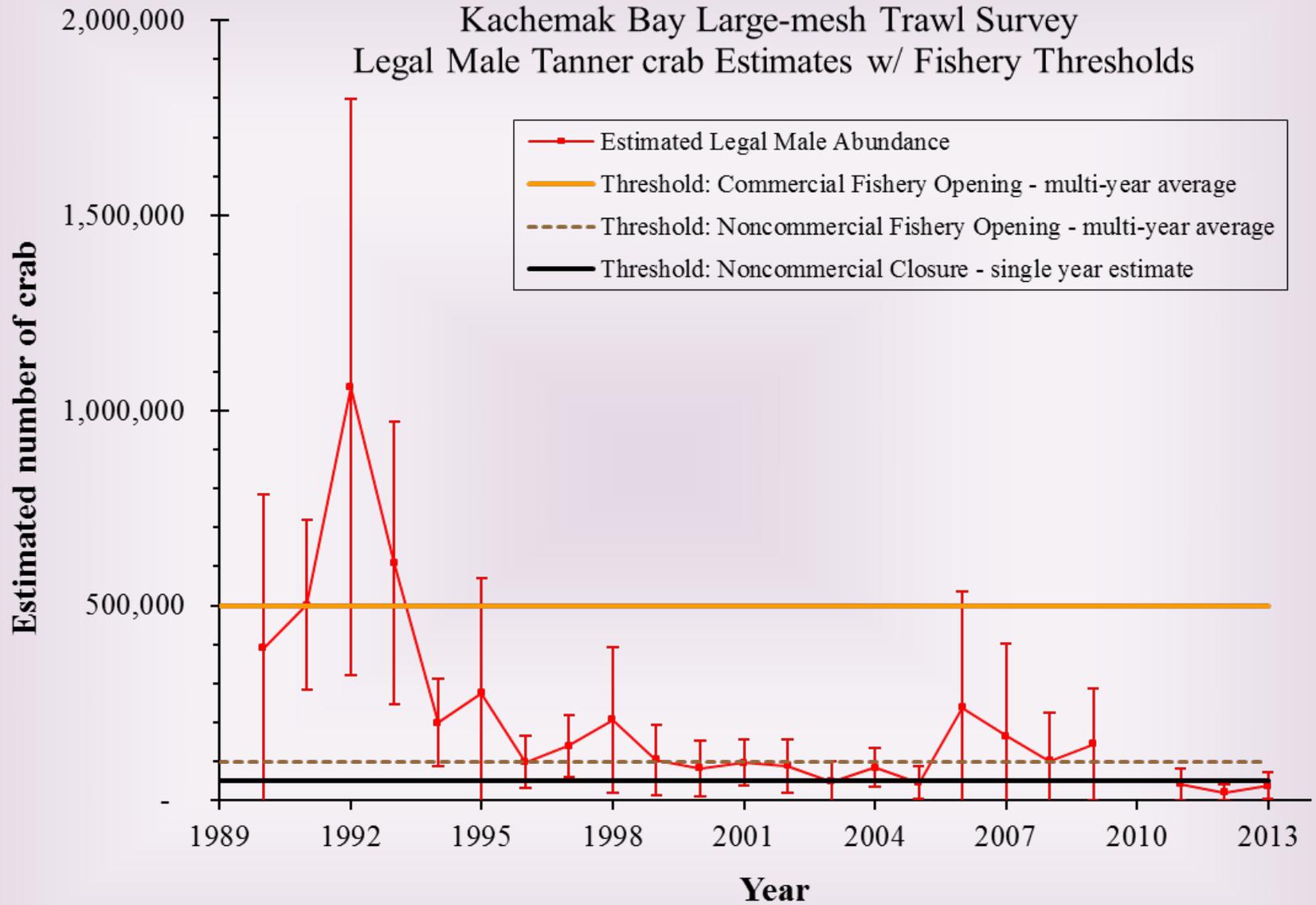
- Survey timing in Kachemak Bay currently relegated to late June: Not ideal, but is a balance between catching and killing numerous soft shell crab in late May and early June and the current noncommercial fishery opening date (time to complete survey results, print permits, notify the public, etc.)

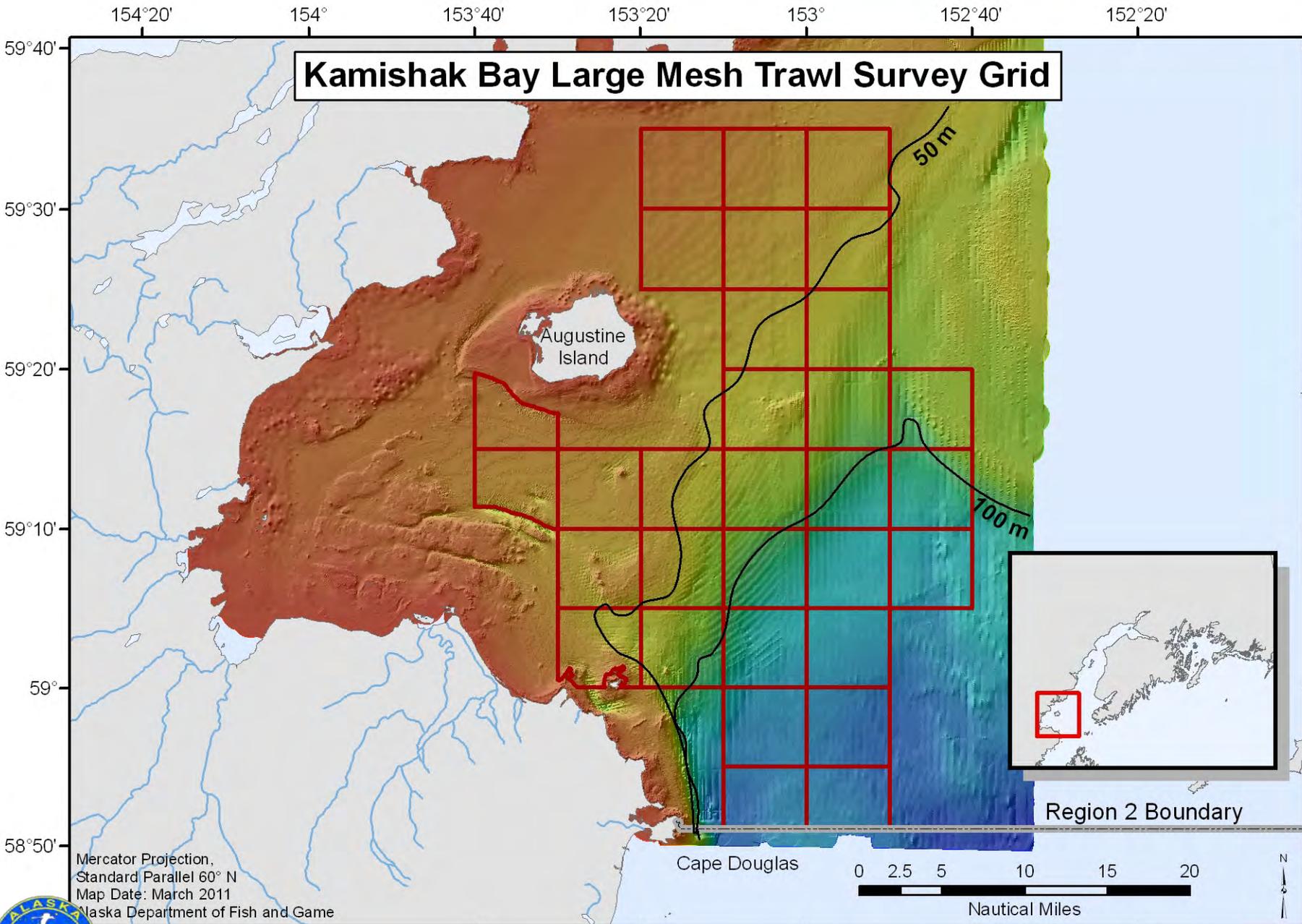


# Kachemak Bay Large-mesh Trawl Survey Male Tanner crab Estimates

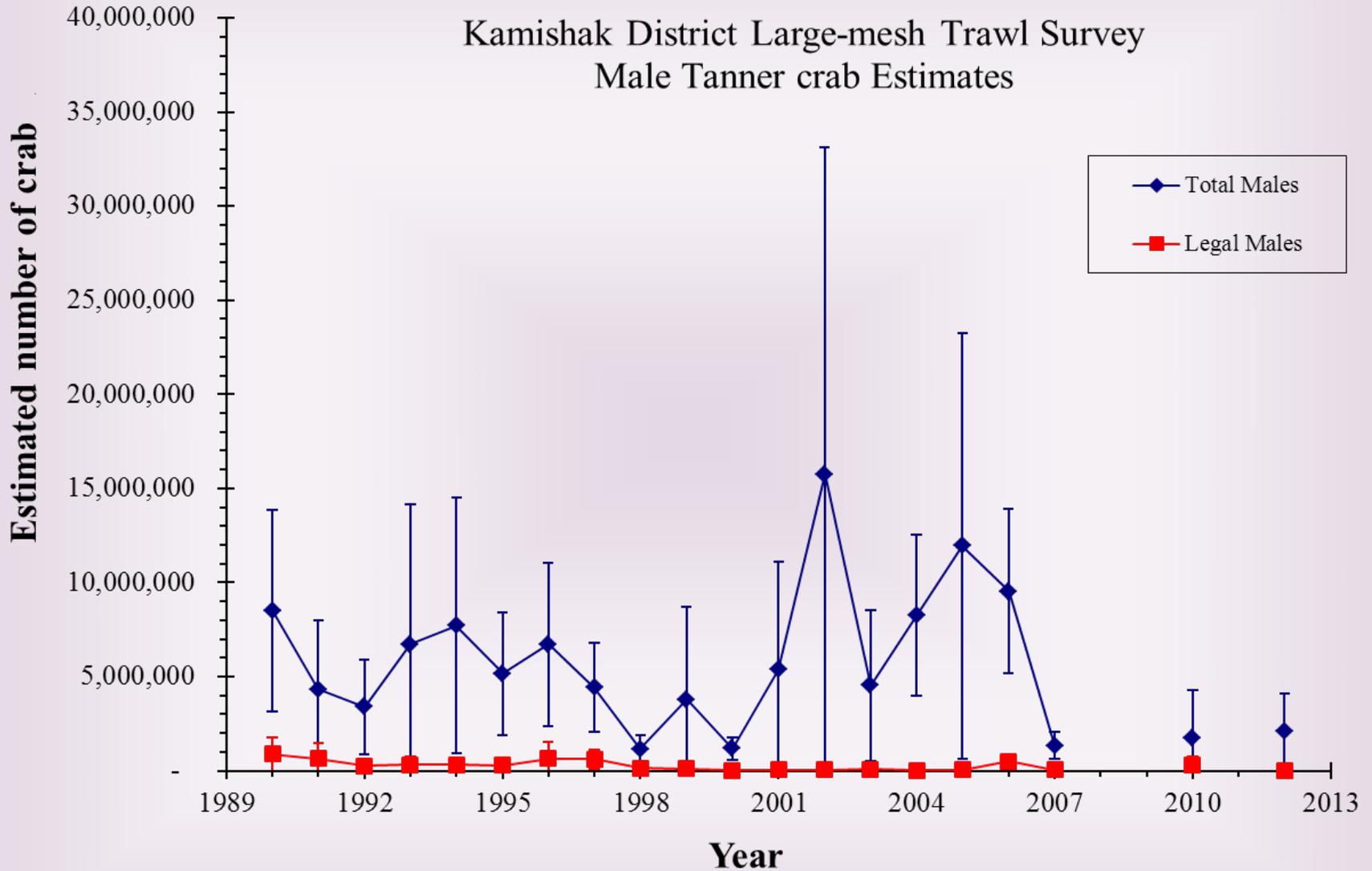


## Kachemak Bay Large-mesh Trawl Survey Legal Male Tanner crab Estimates w/ Fishery Thresholds



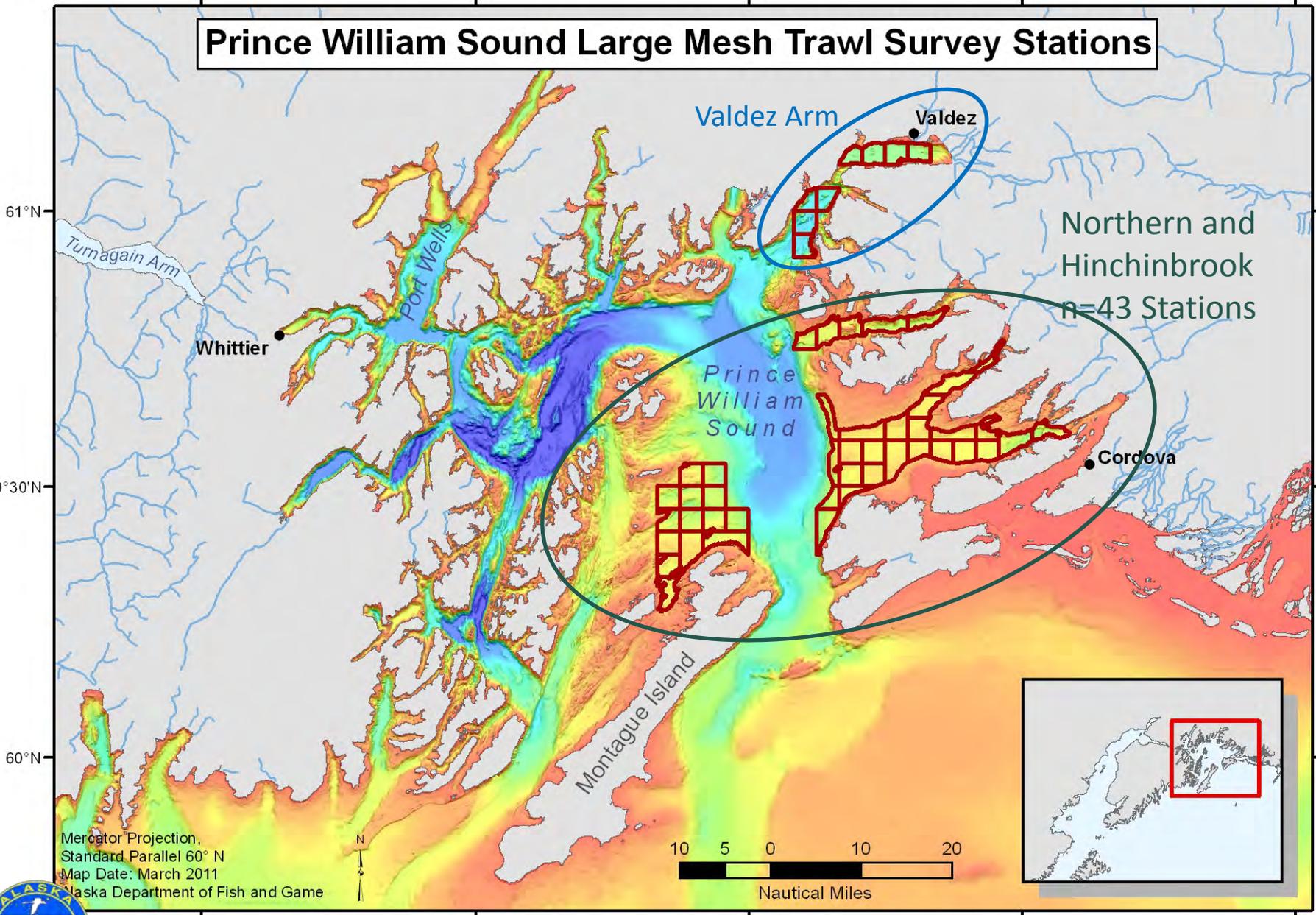


# Kamishak District Large-mesh Trawl Survey Male Tanner crab Estimates



149°W 148°W 147°W 146°W 145°W

# Prince William Sound Large Mesh Trawl Survey Stations



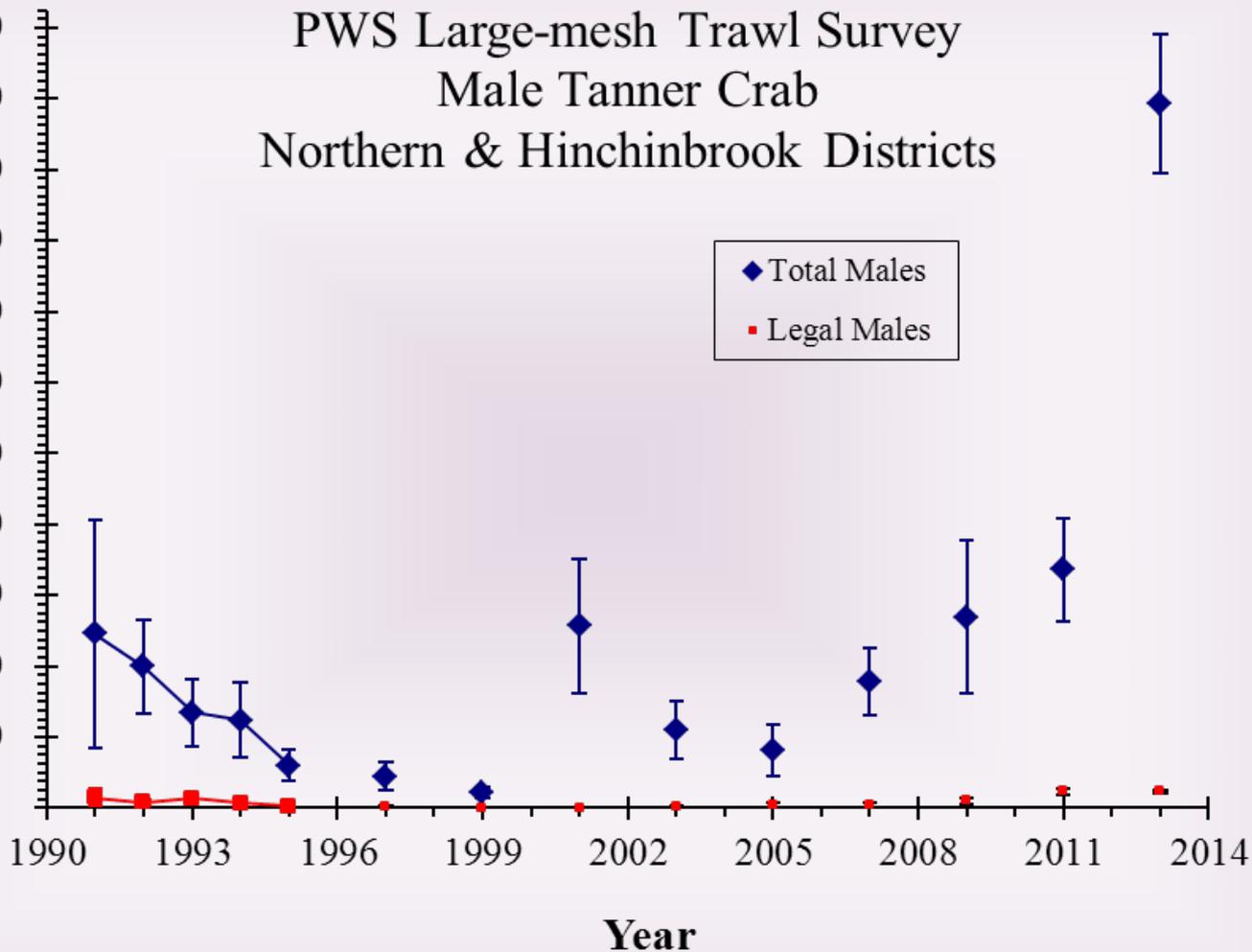
Mercator Projection,  
Standard Parallel 60° N  
Map Date: March 2011  
Alaska Department of Fish and Game



PWS Large-mesh Trawl Survey  
Male Tanner Crab  
Northern & Hinchinbrook Districts

Estimated number of crab

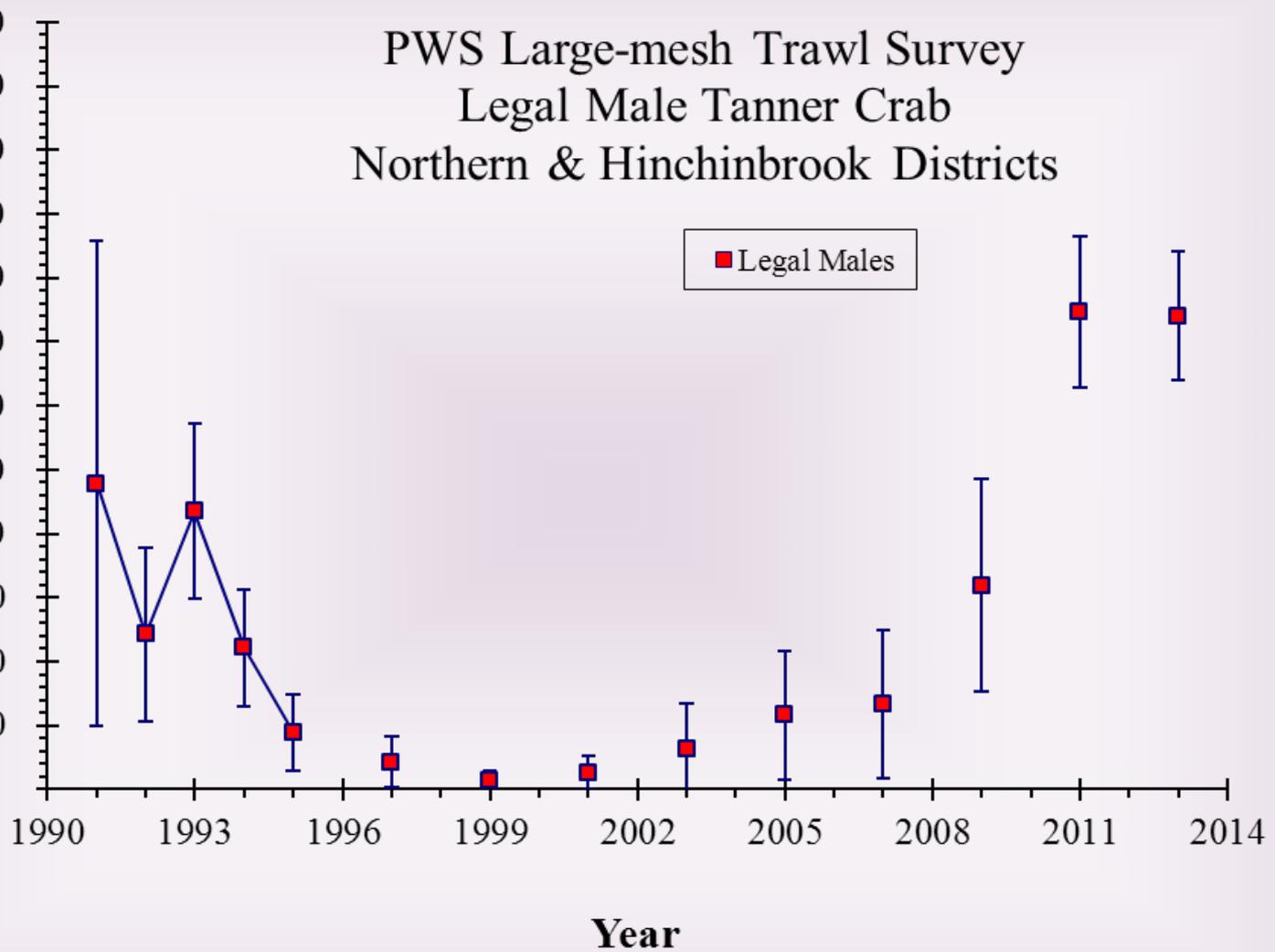
◆ Total Males  
■ Legal Males



# PWS Large-mesh Trawl Survey Legal Male Tanner Crab Northern & Hinchinbrook Districts

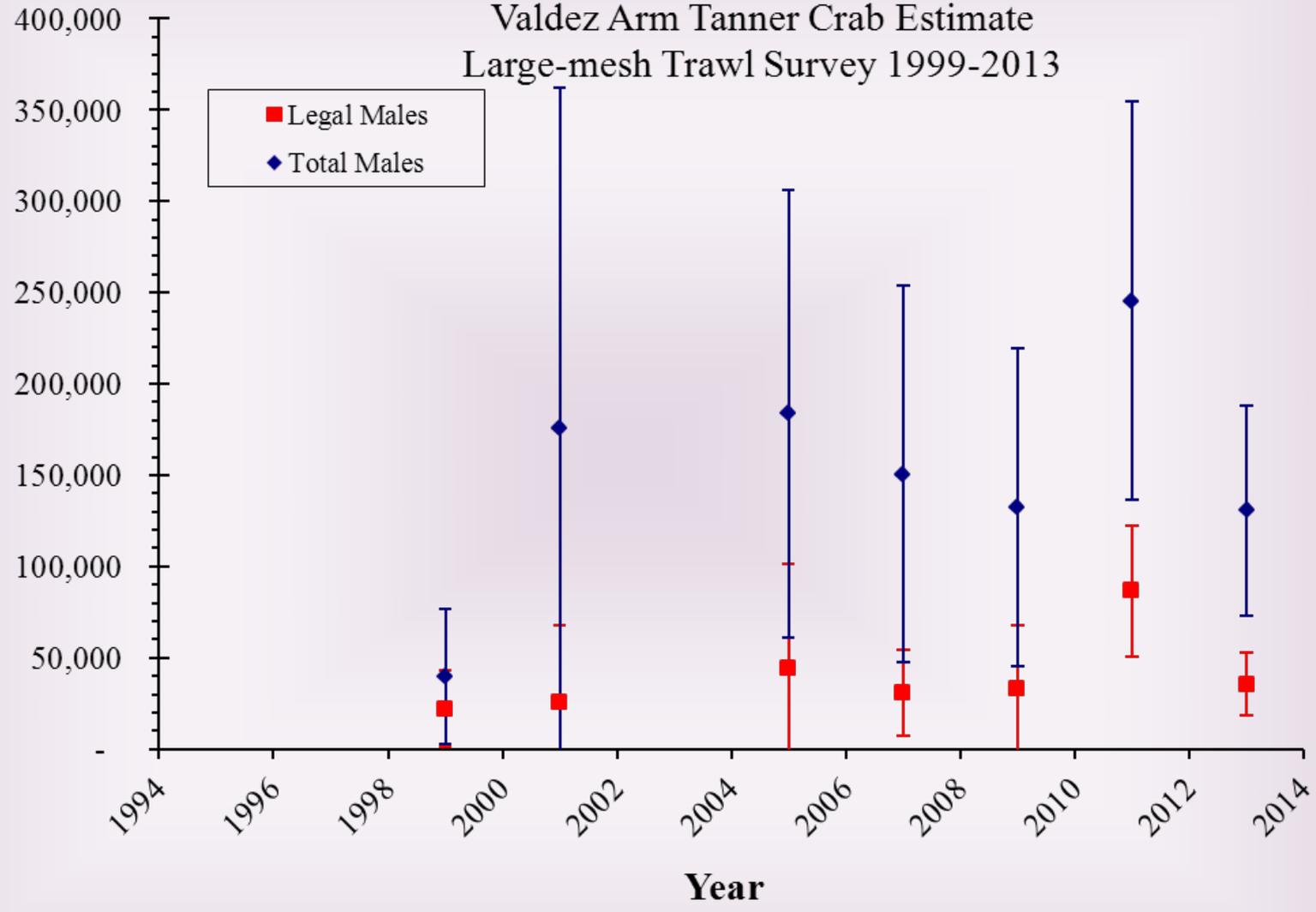
Estimated number of crab

Legal Males



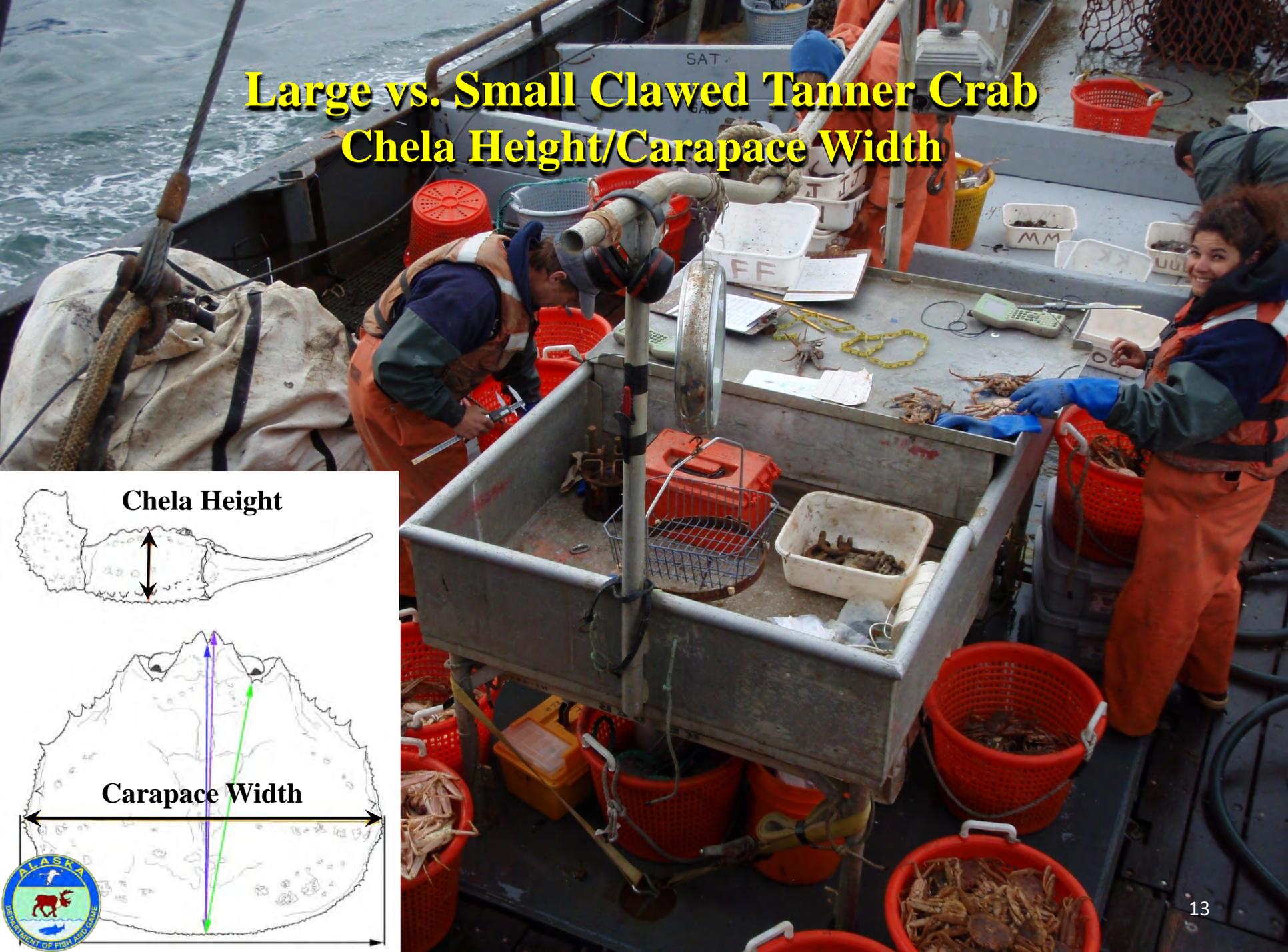
### Valdez Arm Tanner Crab Estimate Large-mesh Trawl Survey 1999-2013

Estimated number of crab

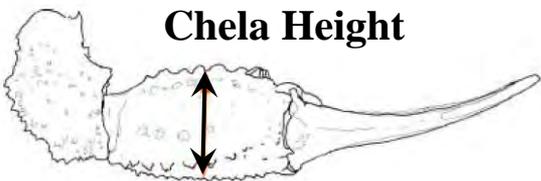


# Large vs. Small Clawed Tanner Crab

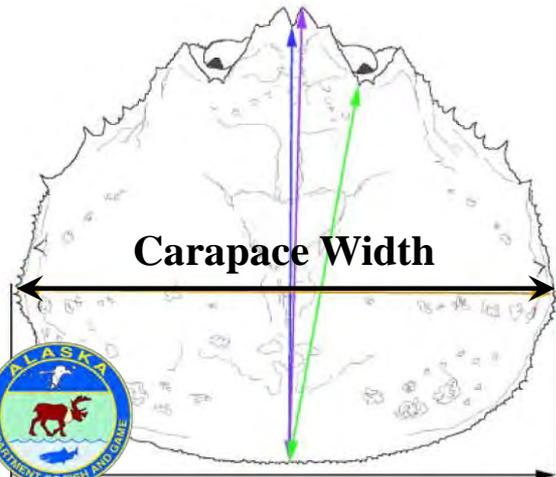
## Chela Height/Carapace Width



Chela Height



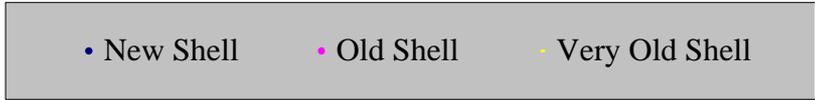
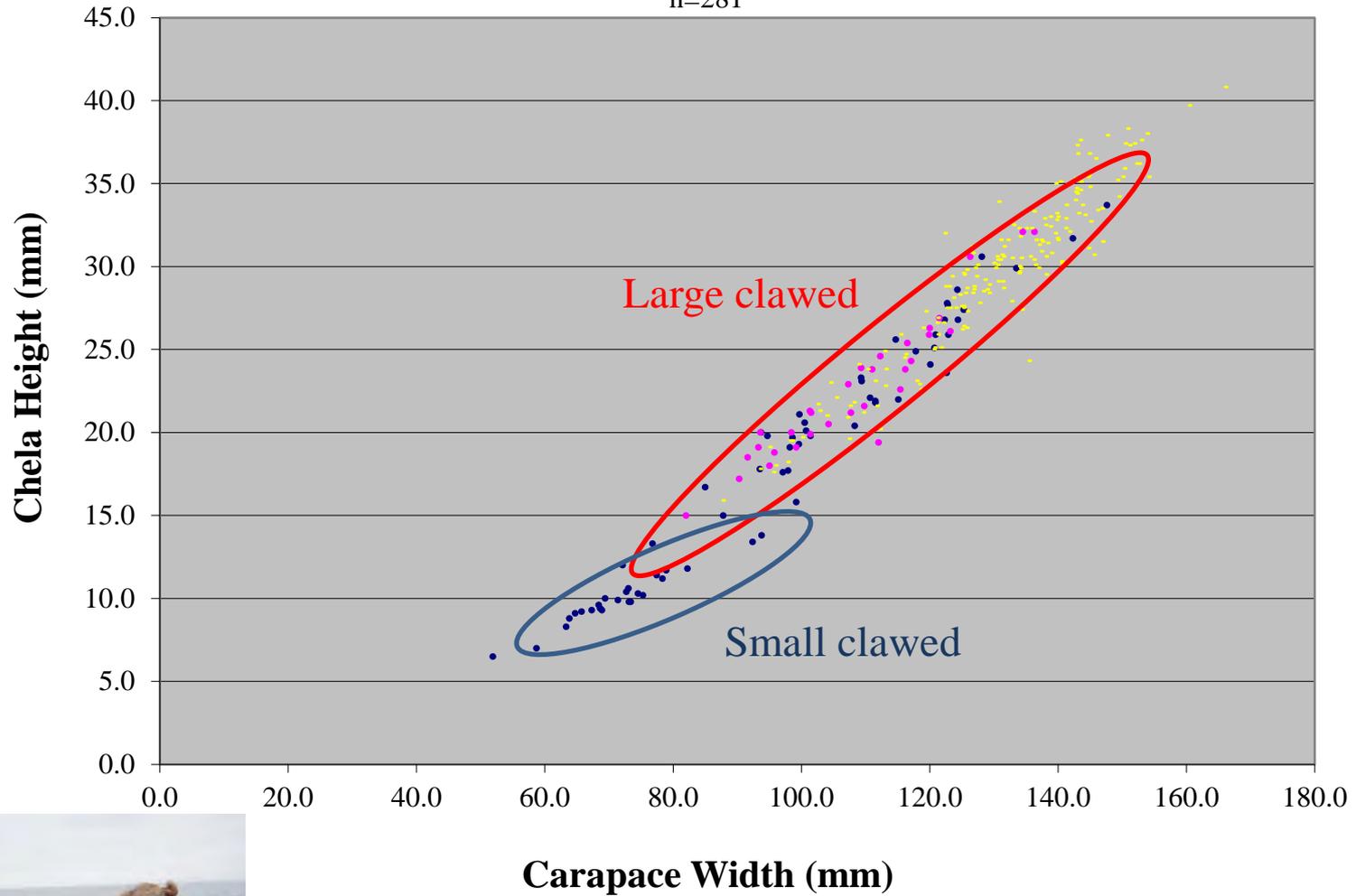
Carapace Width

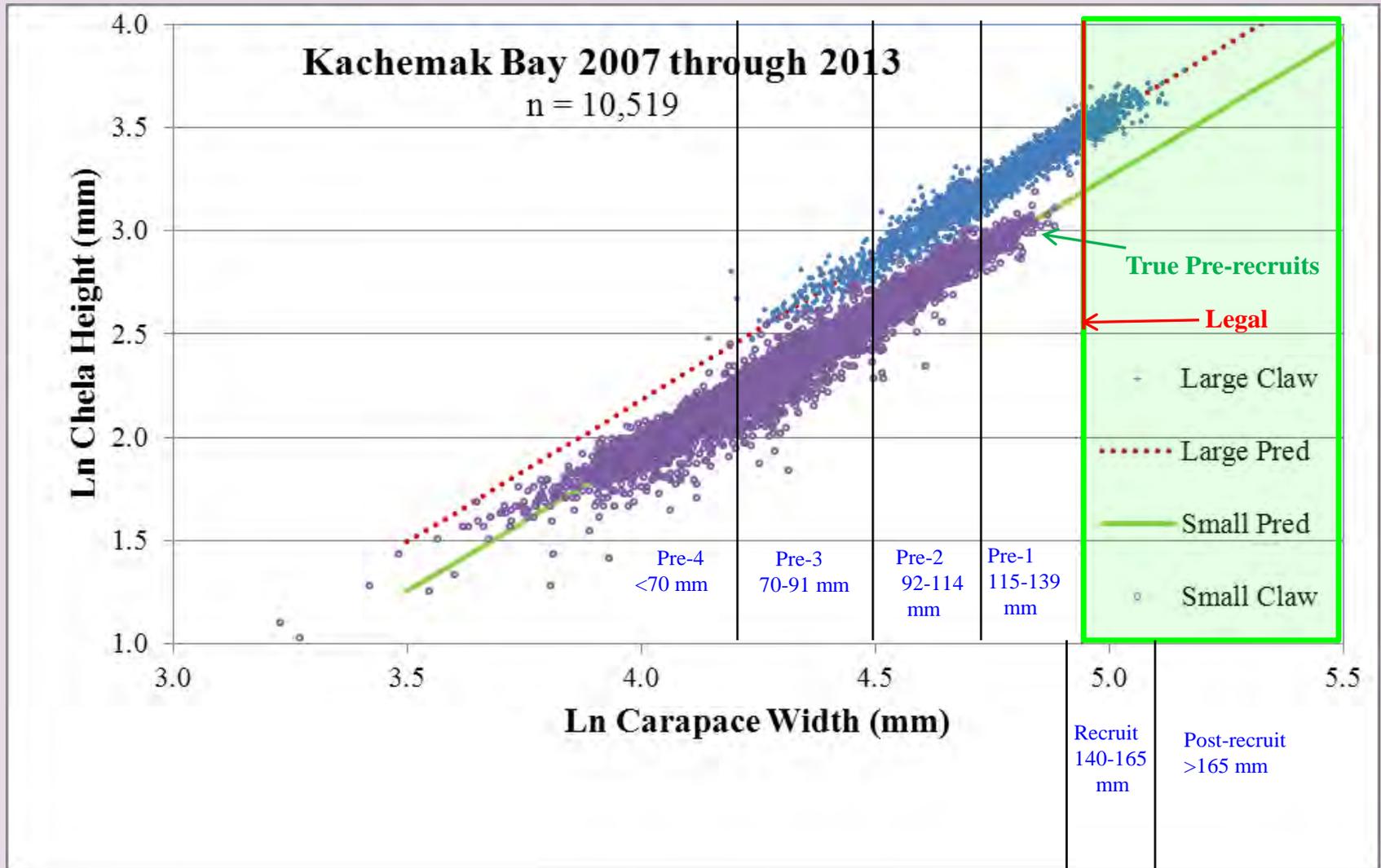


# 2010 Kamishak Large-mesh Trawl Survey

Large and Small Clawed Tanner Crab

n=281

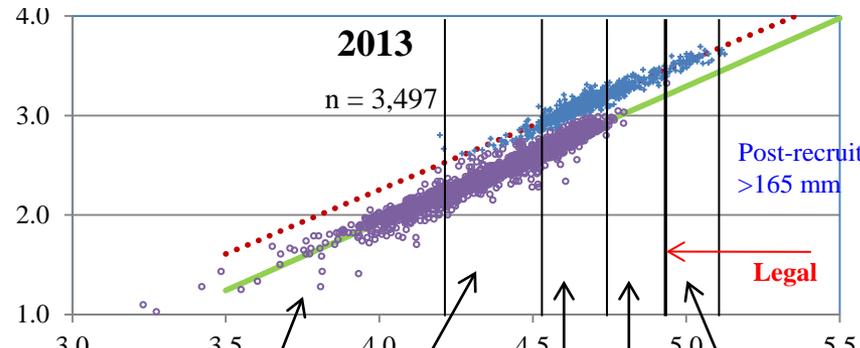
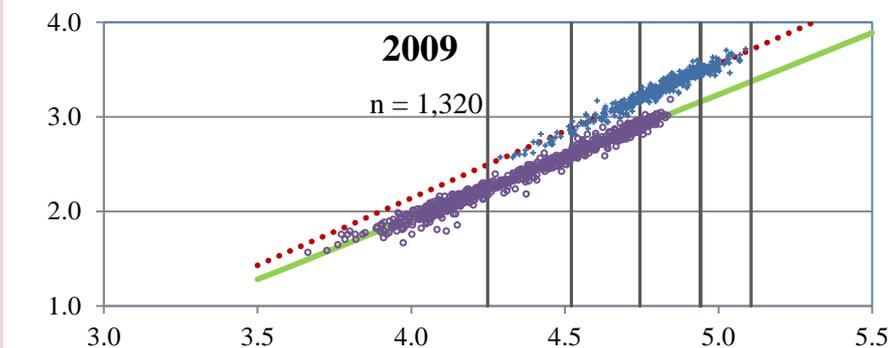
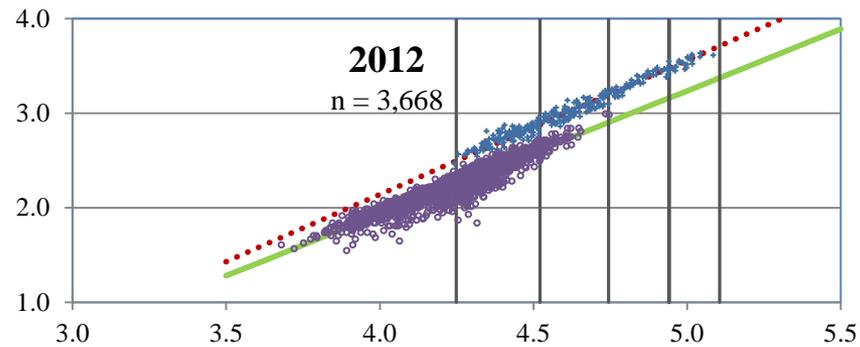
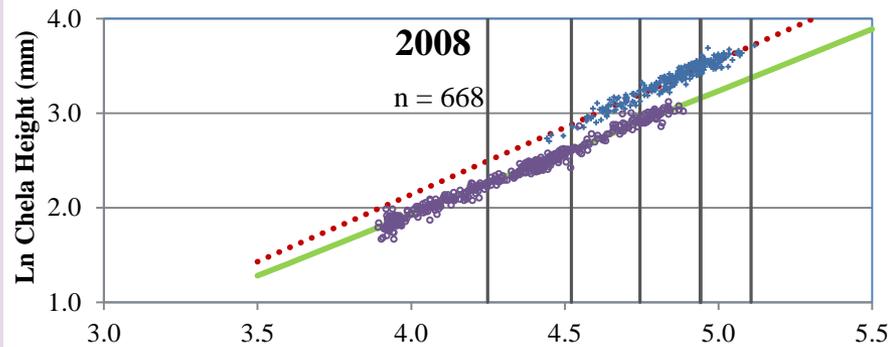
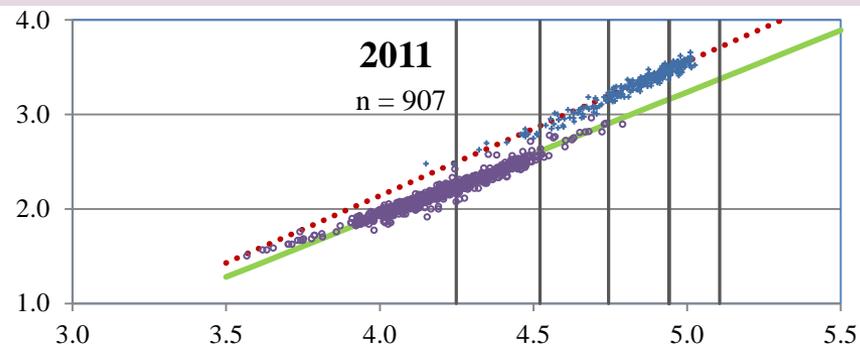
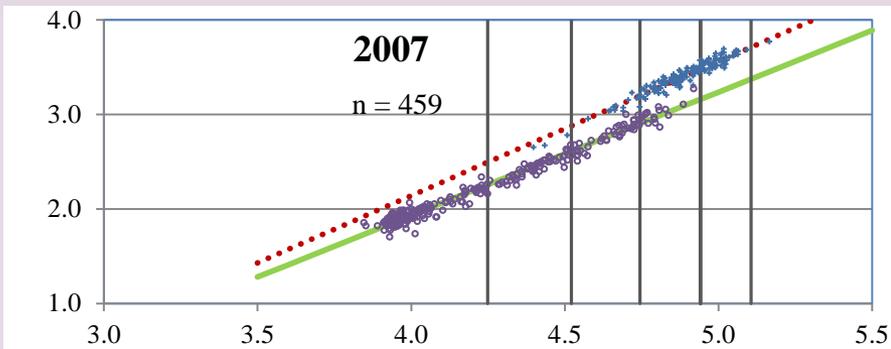




skip molt = will skip at least one molt

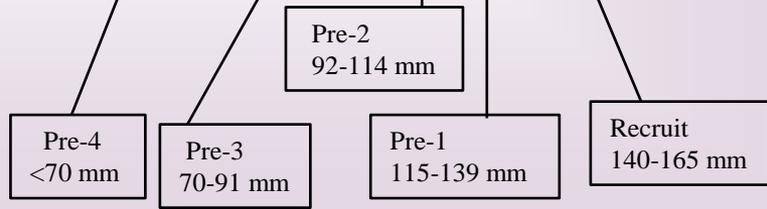
terminal molt = will not molt again





Ln Carapace Width (mm)

**Large Claw & Small Claw Tanner Crab in Kachemak Bay**



# Tanner Crab Biology

## Kachemak Bay

- Following mating, egg release occurs through late March followed by molting
- Survey data show Tanner crab in Kachemak Bay undergo a protracted molting period that lasts until ~mid-June (but some late molting crab do occur into July)
- Upon molting (ecdysis) crab begin to undergo two major, energetically demanding physiological processes simultaneously:
  1. Hardening of the new shell
  2. Filling in of the body and leg meat
- Kachemak Bay Tanner crab are currently in a skip and terminal molt status  
skip = will skip at least one molt      terminal = will not molt again



# Tanner Crab Biology

## **Capture, handling and discard of Tanner crab when their shell is hardening and meat filling in has been shown to increase mortality**

- Increased discard mortality on females, juvenile and mature males and legal males that are in soft shell condition
- Increased likelihood of limb loss due to handling soft crab, which can decrease the increment of growth in the next molt and potentially inhibit the next molt
- Excessive handling mortality of soft shell females could reduce population egg production and subsequent recruitment (e.g. Kruse et al. 1994 showed a 45% higher mortality than hard shell Dungeness crab)
- Lower survival of discarded soft shell males (both legal and sublegal) from handling could reduce future population and fishery productivity
- Increased mortality from predation may occur due to displacement from home range, lack of shelter at site of release, impaired activity levels and reduced aptitude for defense against predators

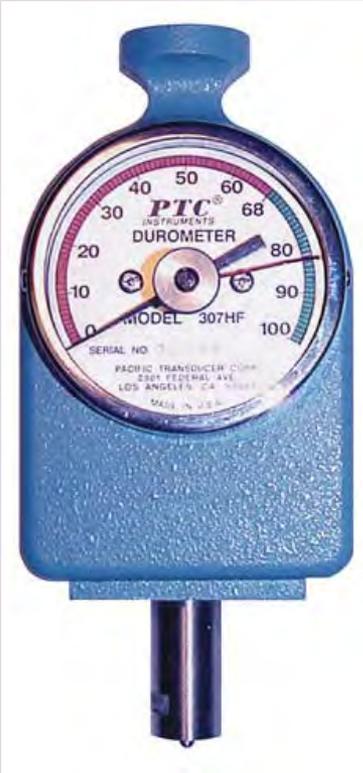
\* Above are all referenced in 90-04-FB: BOF  
policy on king and Tanner crab resource management



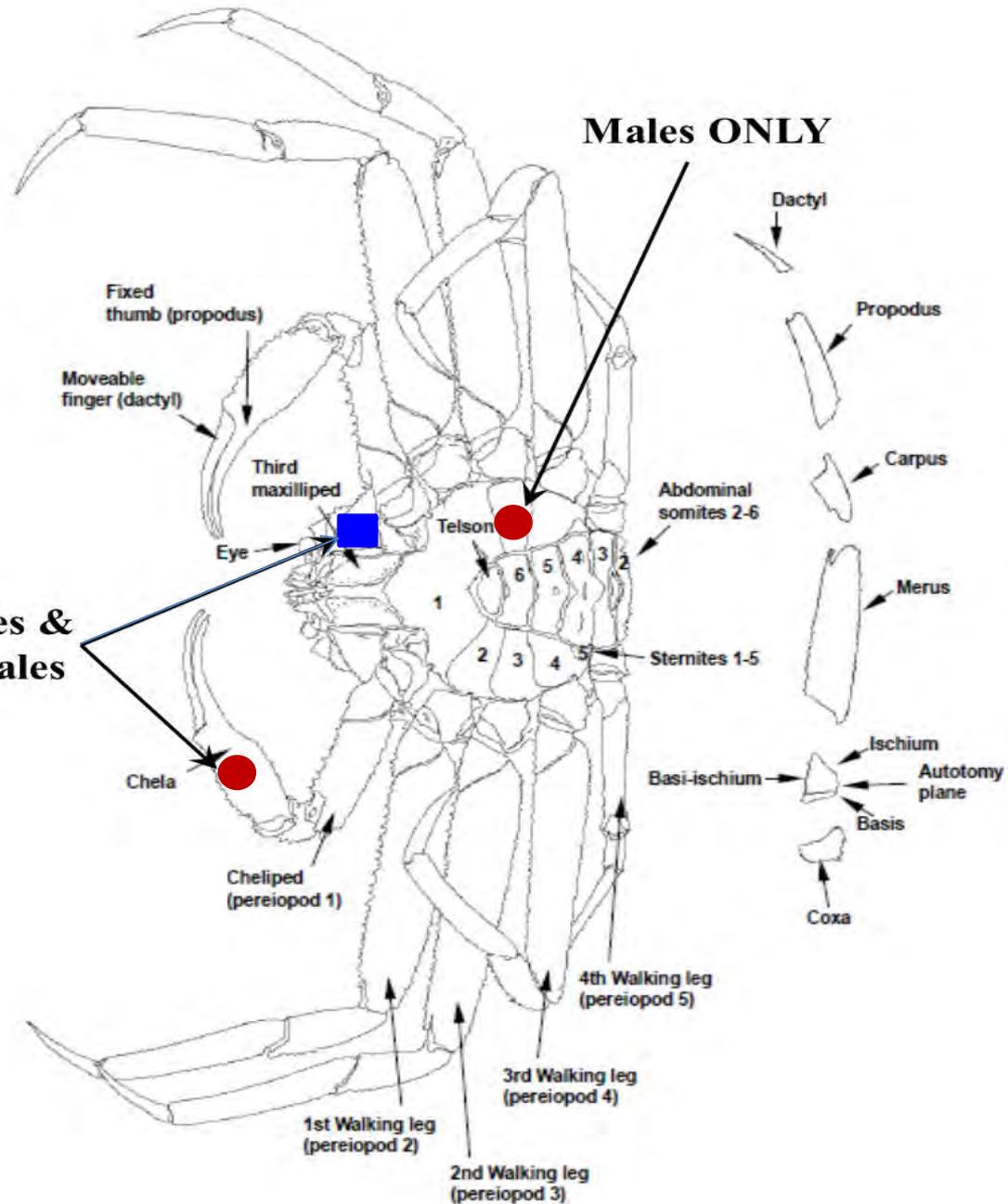
# **Kachemak Bay Shell Hardness Study**



# Shell Hardness



**Males & Females**



# Durometer Use in Fisheries Management

## Literature on the use of durometers in crab fisheries suggests the following:

(e.g. Foyle et al. 1989: Field Testing Shell Hardness Gauges for the Snow Crab Fishery. Can. Ind. Rep. Fisheries and Aquatic Sciences, No. 193)

- If durometer unit measurements (DU) are <60, crab are considered soft
- Between 60 and 80 DU, crab are considered hardening
- Above 80 DU, crab are considered hard shelled

Additionally, where meat amount and quality are important factors, it is recommended that fisheries should only target crab with DU values greater than 60

### Application in current fisheries:

Choi, J.S., Zisserson, B.M., and Cameron, B.J. 2012. Assessment of Scotian Shelf Snow Crab in 2011. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/024. iv + 95 p.

Soft-shelled crab are defined by shell hardness of <68 DU

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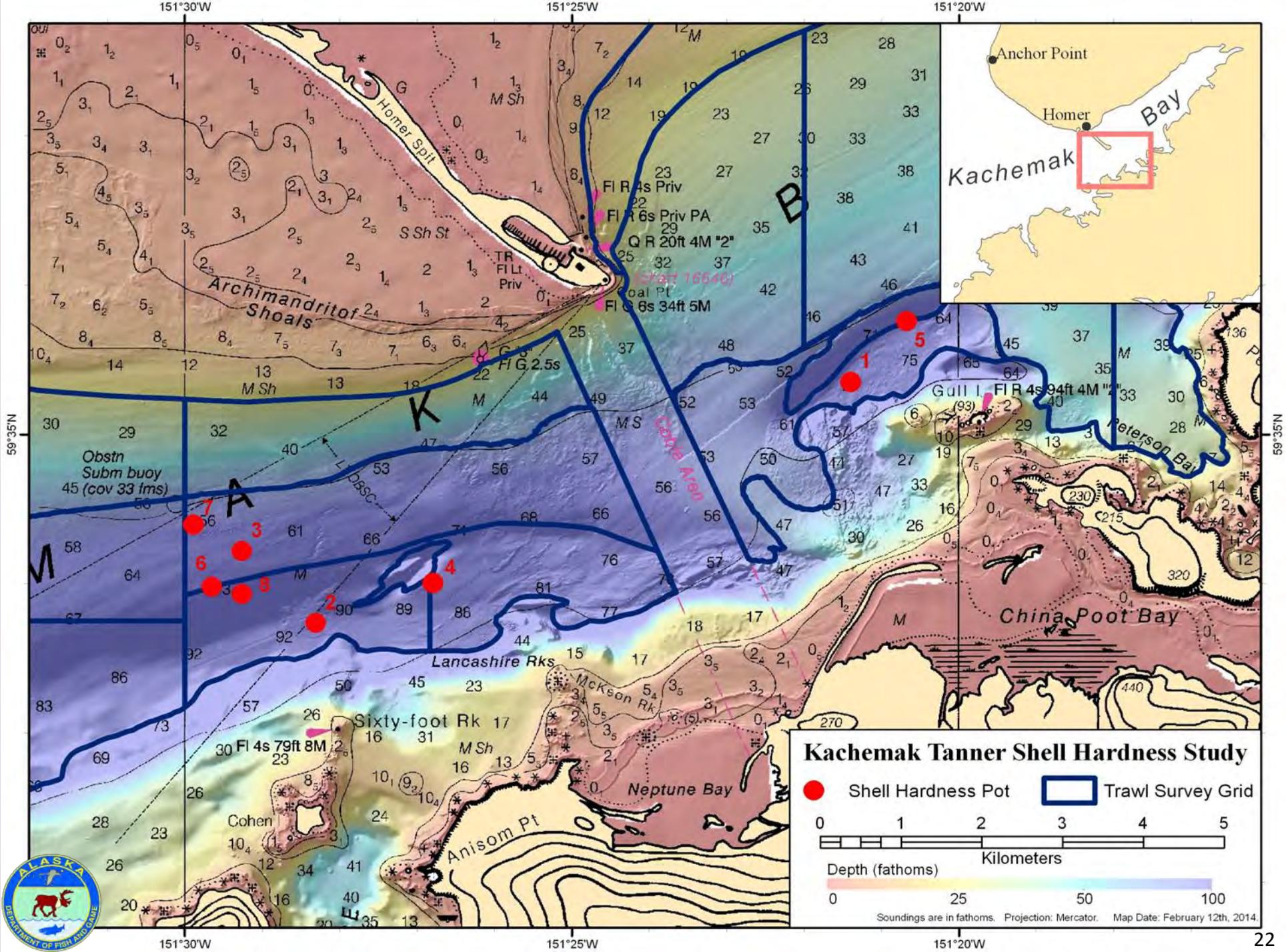
DFO. 2013. Assessment of snow crab in the southern Gulf of St. Lawrence (Areas 12, 19, 12E and 12F) and advice for the 2013 fishery. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/002.

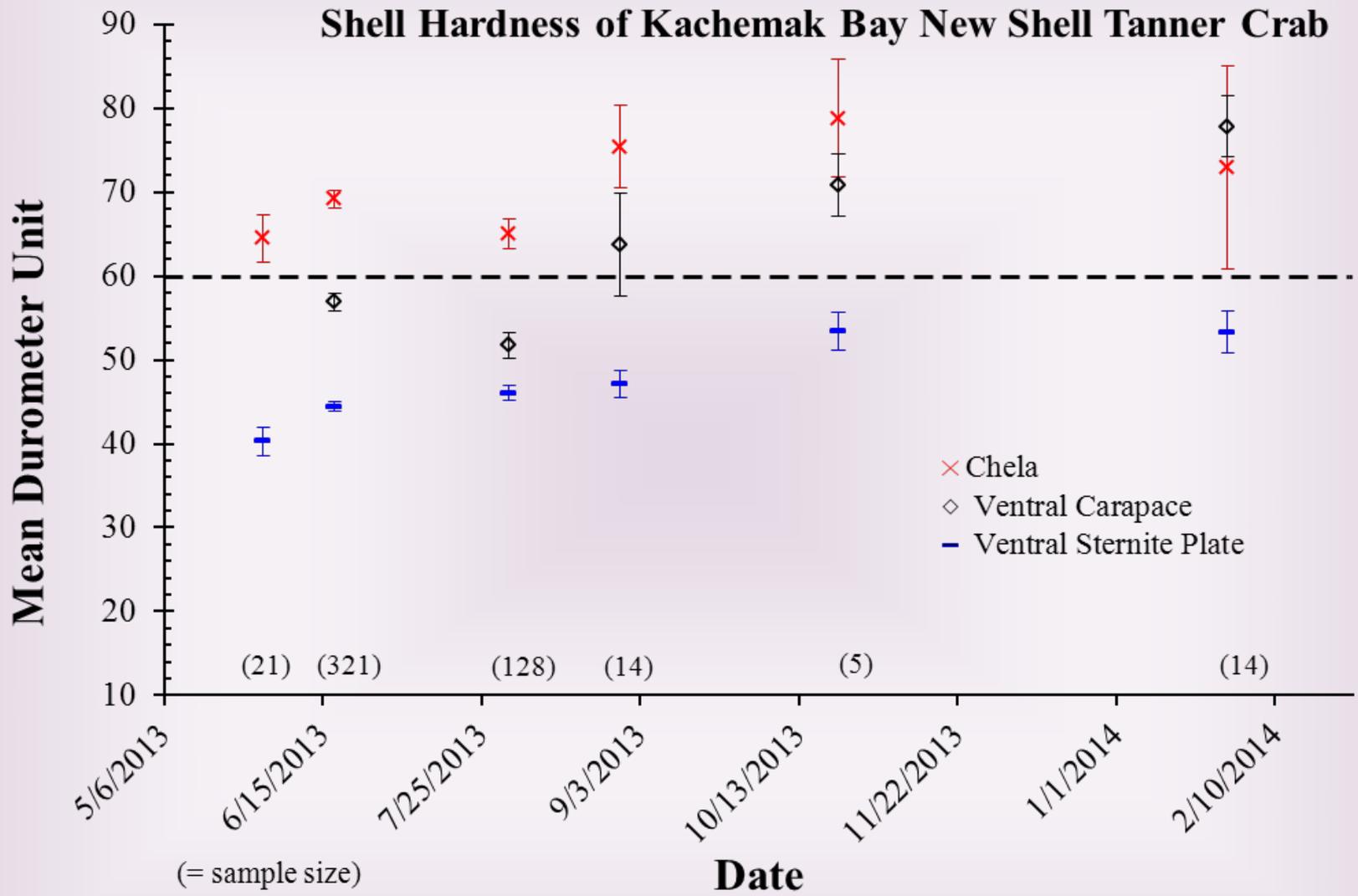
Soft-shelled crab are defined by shell hardness of <68 DU

At-sea soft-shelled crab catch monitoring: Allows for closure of portion(s) of fishing areas when the proportion of the catch of males in soft shell conditions exceeds 20%

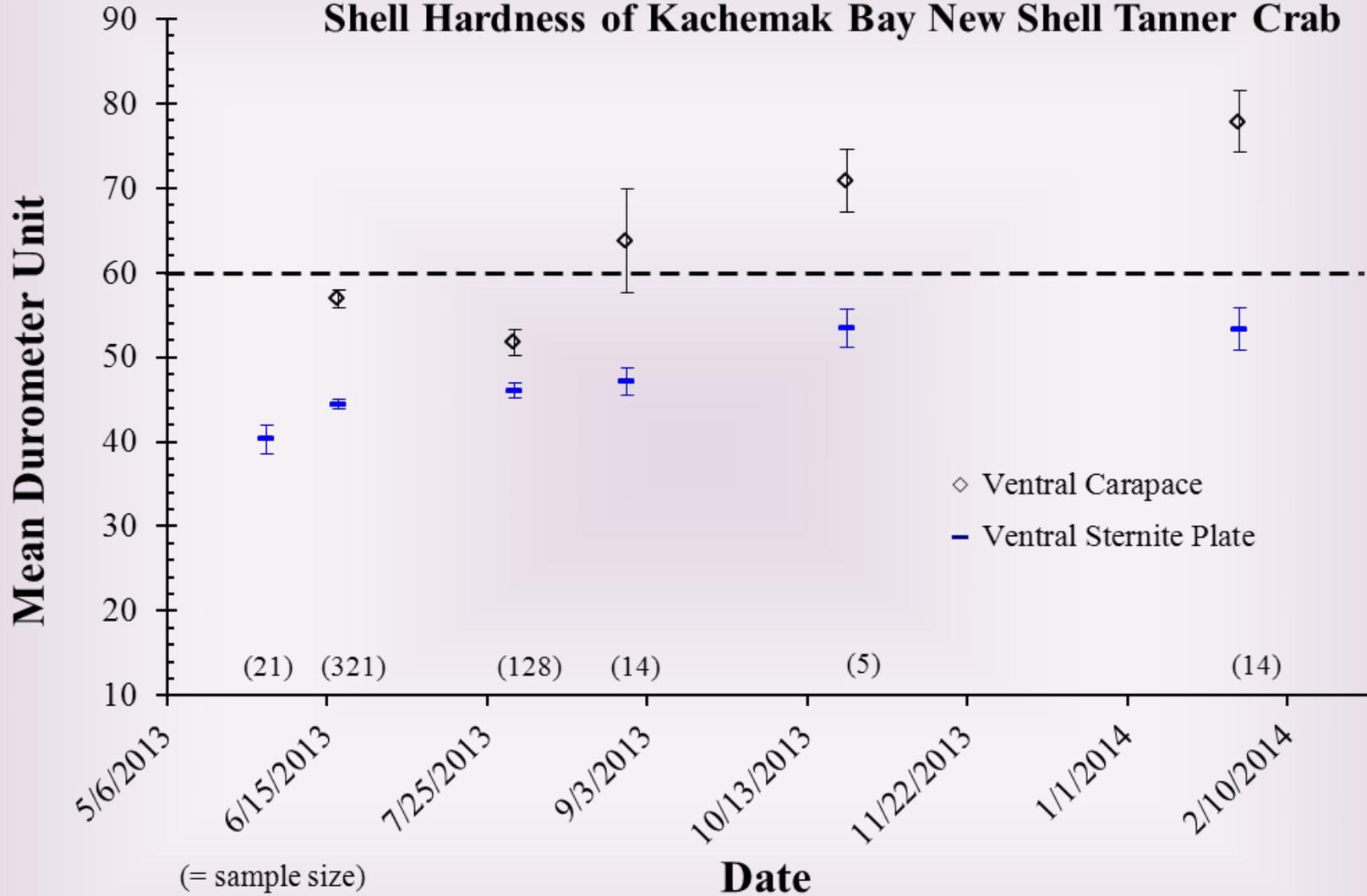
The protocols are in place to maximize the yield and the reproductive potential of the resource



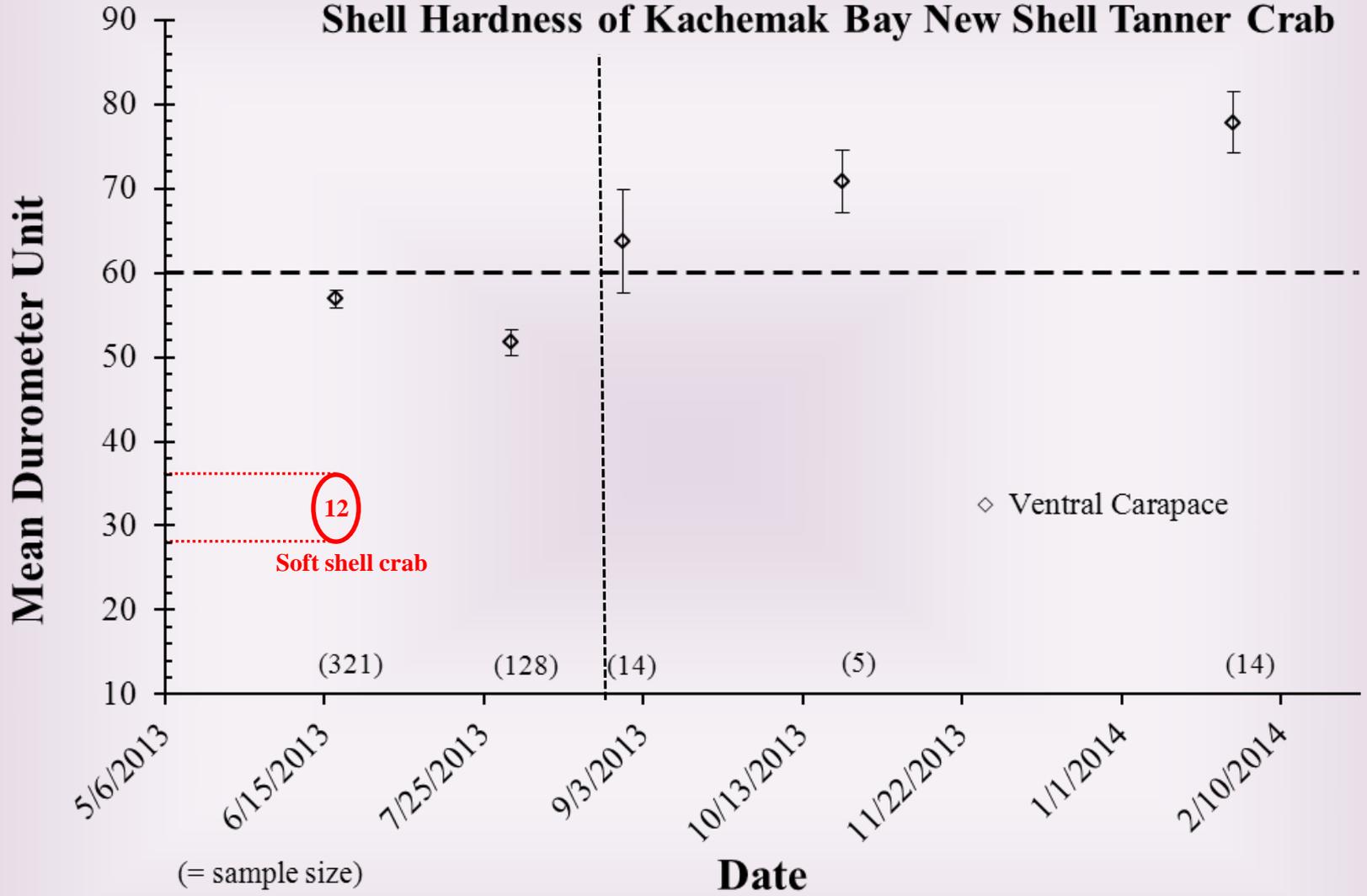


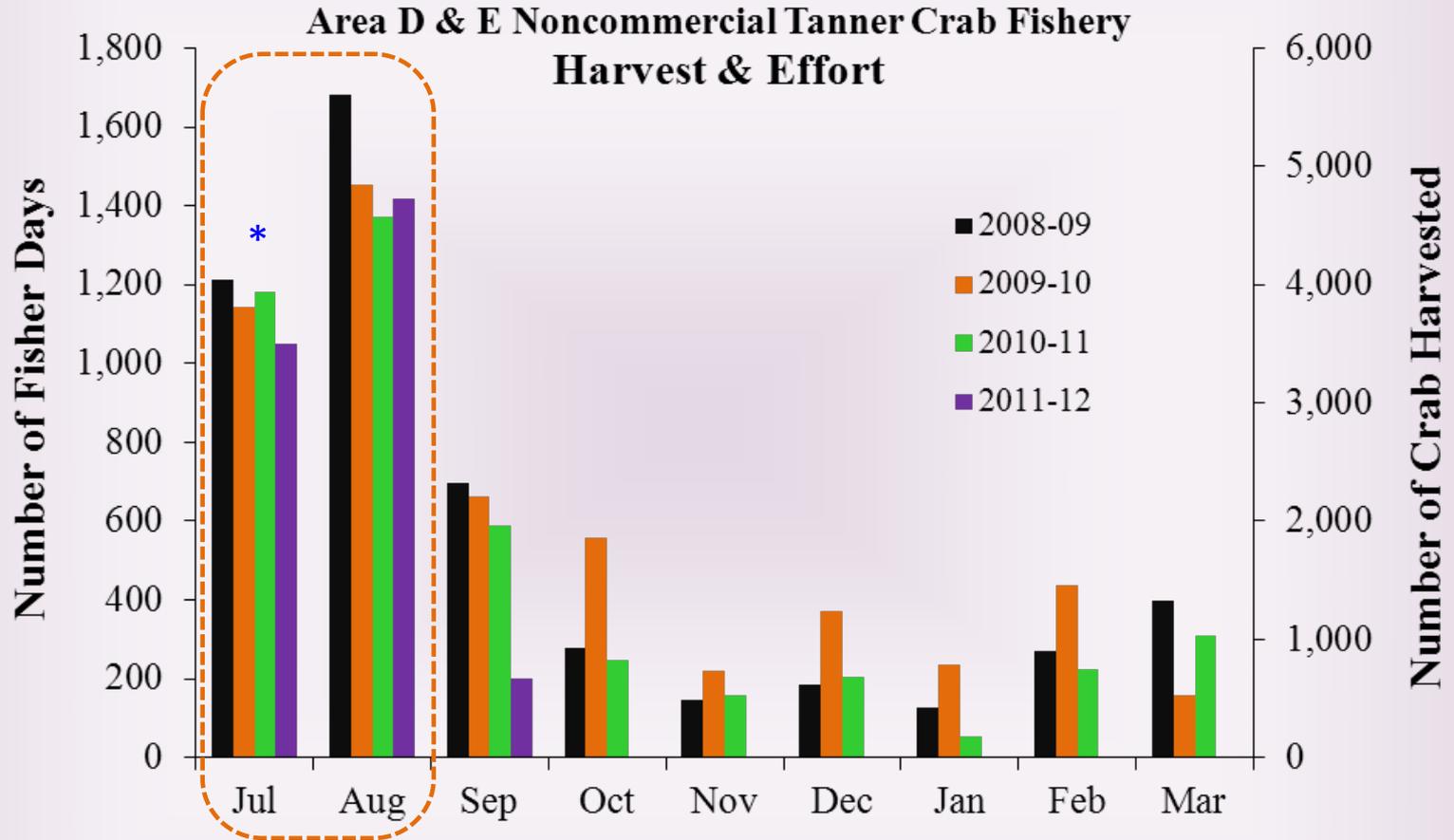


## Shell Hardness of Kachemak Bay New Shell Tanner Crab



# Shell Hardness of Kachemak Bay New Shell Tanner Crab





\* Fishery start date July 15<sup>th</sup>



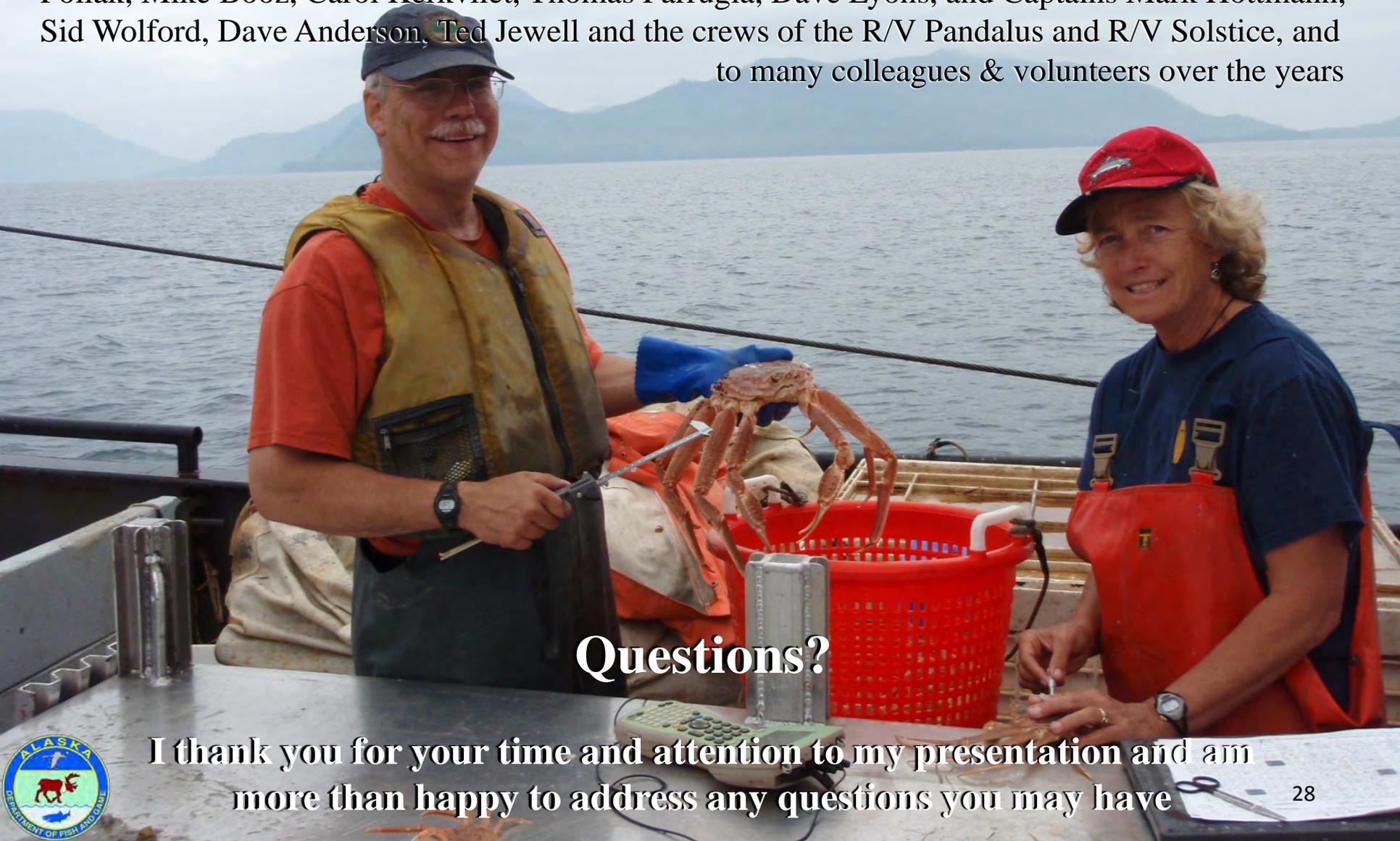
## Future Central Region Goals

- Evaluate carapace length categories for Kachemak Bay, Kamishak Bay and PWS: Do they line up with pre-recruit categories we currently use?
- Evaluate current fisheries management thresholds for noncommercial and commercial fisheries in Kachemak and Kamishak Bays: Are adjustments are in order?
- Evaluate current legal size: Is an adjustment is in order?
- Begin to incorporate chela height-carapace width data into management
- Develop a PWS Tanner crab management plan: likely based on Kachemak and Kamishak Bay management plans



# Acknowledgements

Many thanks to Rich Gustafson, Mike Byerly, Josh Mumm, Jan Rumble, Maria Wessel, Karen Swartzbart, Charlie Trowbridge, Bob Berceci, Tom Sigurdsson, Joe Loboy, Carla Milburn, Andy Pollak, Mike Booz, Carol Kerkvliet, Thomas Farrugia, Dave Lyons, and Captains Mark Hottmann, Sid Wolford, Dave Anderson, Ted Jewell and the crews of the R/V Pandalus and R/V Solstice, and to many colleagues & volunteers over the years



Questions?

I thank you for your time and attention to my presentation and am more than happy to address any questions you may have

