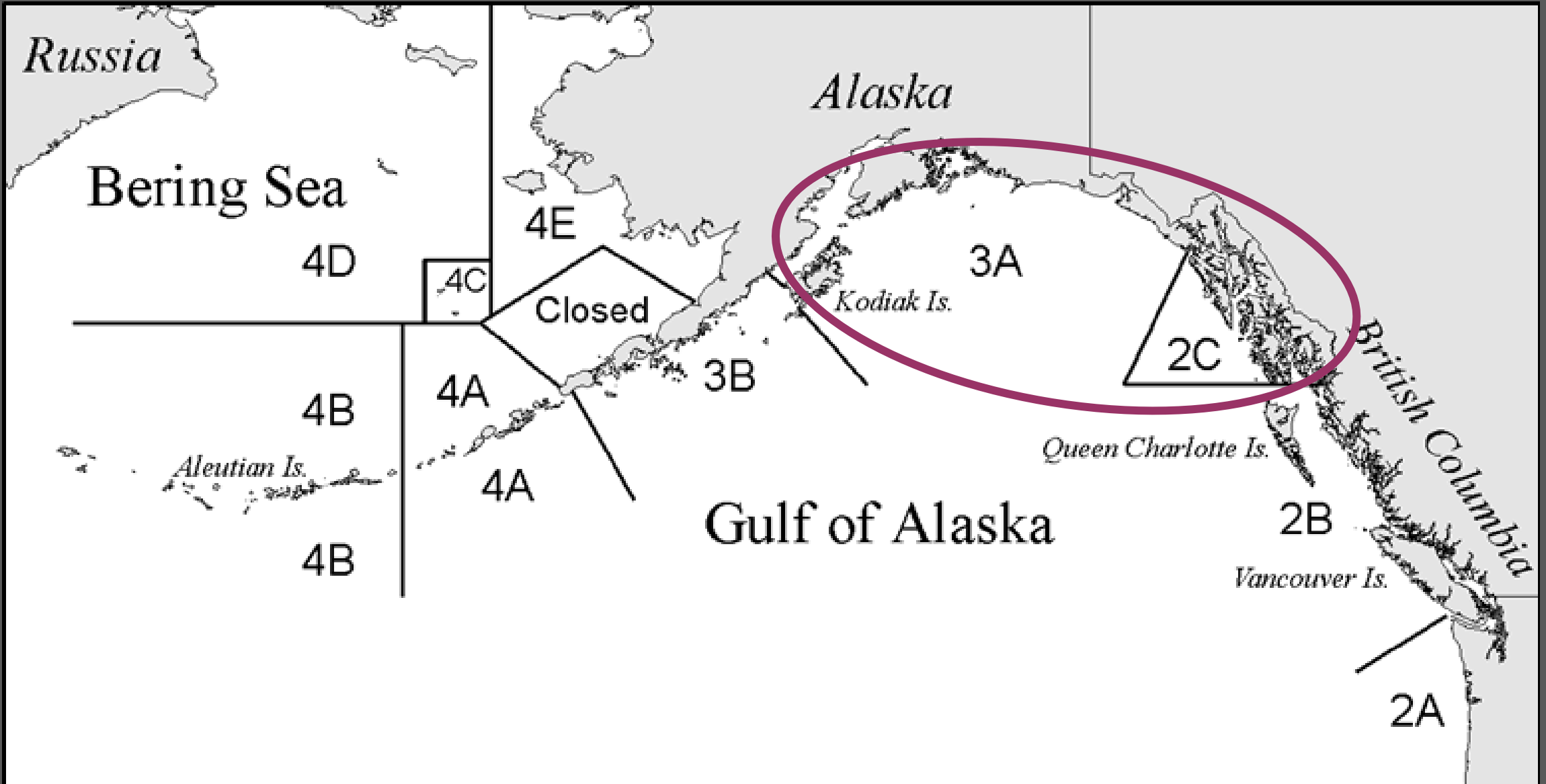




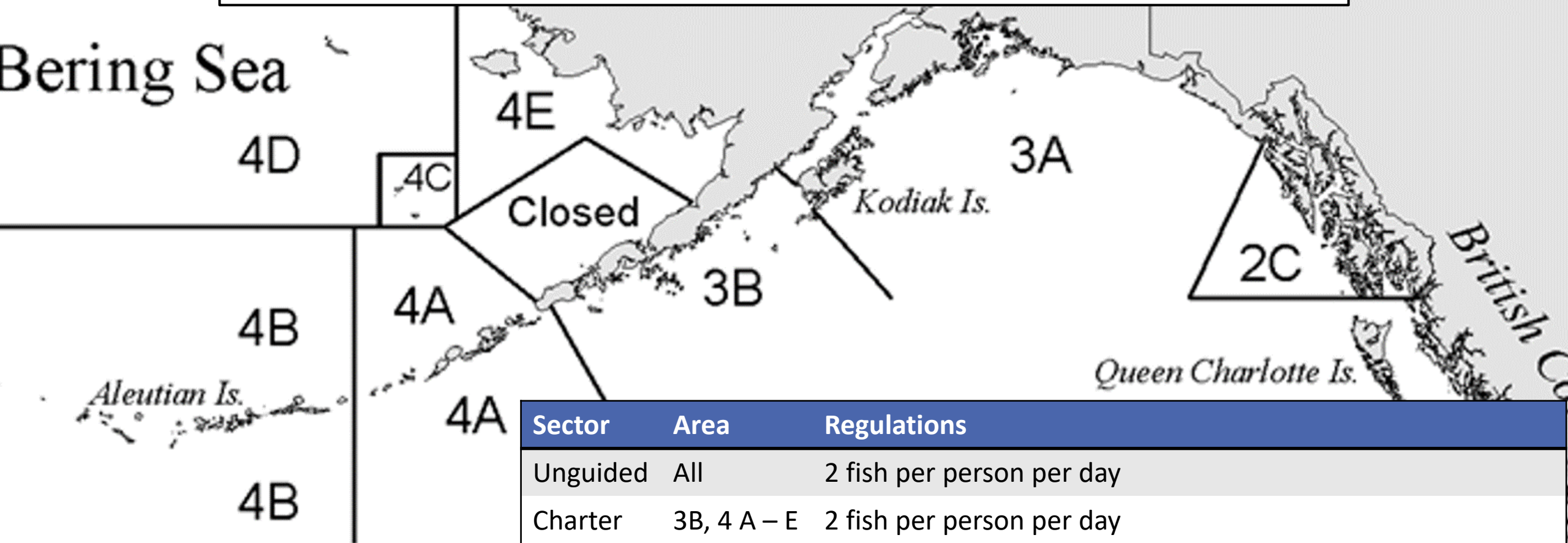
# Alaska's Approach to Estimating Recreational Discard Mortality of Pacific Halibut

Sarah Webster and Scott Meyer

Alaska Department of Fish and Game –  
Division of Sport Fish



# 2019 Recreational Halibut Regulations



Sector	Area	Regulations
Unguided	All	2 fish per person per day
Charter	3B, 4 A – E	2 fish per person per day
Charter	2C	1 fish per person per day, reverse slot limit – less than or equal to 38 inches, greater than or equal to 80 inches
Charter	3A	2 fish per person per day, 1 any size, 1 less than 28 inches, 4 fish annual limit, 1 trip per vessel and permit per day, no fishing on Wednesdays, no fishing on 5 Tuesdays

# Why estimate release mortality?

- Substantial number of halibut released each year
- All halibut mortality must be accounted for in stock assessment
- Release mortality is included in catch limits



How is release  
mortality  
estimated?

$$\begin{array}{l} \text{Release Mortality} \\ = \\ \checkmark \text{ Number of Released Halibut} \\ \times \\ \times \text{ Release Mortality Rate} \\ \times \\ \times \text{ Average Weight of Released Fish} \end{array}$$

# Statewide Harvest Survey

## SALTWATER SPORT FISHING

Go to Page 7 for Cook Inlet/Kachemak Bay saltwater  
Go to Page 12 for shellfish

Number of Household Anglers who fished. Do not include visiting friends, relatives, or other party members outside your household.  
Sum of Each Household Angler's Days Fished. Count any part of a day as one whole day.  
If multiple household anglers fish the same day, include that day in each angler's sum.  
Example: In the example below, 2 household anglers fished the same day. One angler returned a second day, and fished again at the same site. Sum of Each Household Angler's Days Fished would equal 3.  
**DO NOT INCLUDE FISH HARVESTED UNDER SUBSISTENCE REGULATIONS**

Saltwater Fishing Sites	See Mapsite Booklet	Fished from	No. of Household Anglers	No. of Household Trips	Sum of Each Household Angler's Days Fished	King Salmon Large	King Salmon Small	Steelhead (Coho) Salmon	Red (Sockeye) Salmon	Pink Salmon	Chum Salmon	Flow No.	Record additional saltwater species on Page 9
Site Name	Area Code Letter	Site Number	1	2	3	1	2	3	4	5	6	7	

**SALTWATER CHARTER** — You paid to be personally directed or accompanied during your fishing trip

Example: ABC Inlet	X	999	√		2	2	3		4	2			Example
1													1
2													2
3													3
4													4
5													5
6													6
7													7
8													8

**SALTWATER NONCHARTER** — You did not pay to be personally directed or accompanied during your fishing trip

9													9
10													10
11													11
12													12
13													13
14													14
15													15
16													16
17													17
18													18
19													19
20													20

\*Saltwater King Salmon Size Categories:  
In Area Code Letters A-H "Large" are king salmon 28 inches and over, "Small" are king salmon less than 28 inches  
In Area Code Letters I-Z, "Large" are king salmon 20 inches and over, "Small" are king salmon less than 20 inches

## SALTWATER SPORT FISHING

Go to Page 7 for Cook Inlet/Kachemak Bay saltwater  
Go to Page 12 for shellfish

Row No.	Halibut	Rockfish	Lingcod	Pacific Cod	Sablefish (Black Cod)	Steelhead Trout	Dolly Varden Arctic Char	Cutthroat Trout	Smelt	Shark	Other Fish (Specify)
	1	2	3	4	5	6	7	8	9	10	Other Fish Name

**SALTWATER CHARTER** — You paid to be personally directed or accompanied in your fishing activities

Example (Continued)	2	2									Example: Hump Greenling	2	1
1													
2													
3													
4													
5													
6													
7													
8													

**SALTWATER NONCHARTER** — You did not pay to be personally directed or accompanied during your fishing trip

9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

# Saltwater Guide Logbook

Alaska Department of Fish & Game  
2015 Saltwater Sport Fishing Charter Trip Logbook Page 150000 -01  
RETURN TO 333 RASPBERRY ROAD, ANCHORAGE, ALASKA 99518-1365 • QUESTIONS CALL (907) 267-2369

**TRIP INFORMATION**

DATE FISHED: \_\_\_\_\_ 2015 \_\_\_\_\_ AM / PM  
 2015 GUIDE REGISTRATION NUMBER: \_\_\_\_\_  
 CHARTER HALIBUT PERMIT (CHP) NUMBER: \_\_\_\_\_  
 TARGETED SPECIES / LOCATION FISHED: \_\_\_\_\_  
 COMMUNITY OR PORT WHERE TRIP ENDED: \_\_\_\_\_  
 GUIDED ANGLER FISH (GAF) PERMIT NUMBER: \_\_\_\_\_

**INDIVIDUAL ANGLER AND CATCH INFORMATION**

Complete one line below for each angler who fished the trip. Record sport fishing license number, status for all anglers under 18 years of age, and sex for anglers under 18.

Angler No.	License Number	Status	Sex	SPECIES																			
				Halibut	Rockfish	Lingcod	Pacific Cod	Sablefish	Steelhead	Dolly Varden	Cutthroat	Smelt	Shark	Other									
1																							
2																							
3																							
4																							
5																							
6																							
7																							
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20																							

CERTIFICATION: I certify that the information provided herein is accurate and true, and that I am not in violation of any laws or regulations. I understand that providing false information may result in a fine or imprisonment.

# Creel Sampling



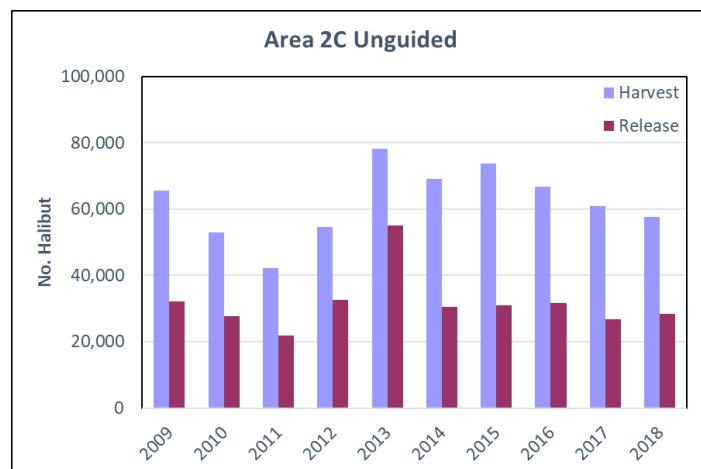
# Number of Released Halibut

# Number of Halibut Harvested and Released

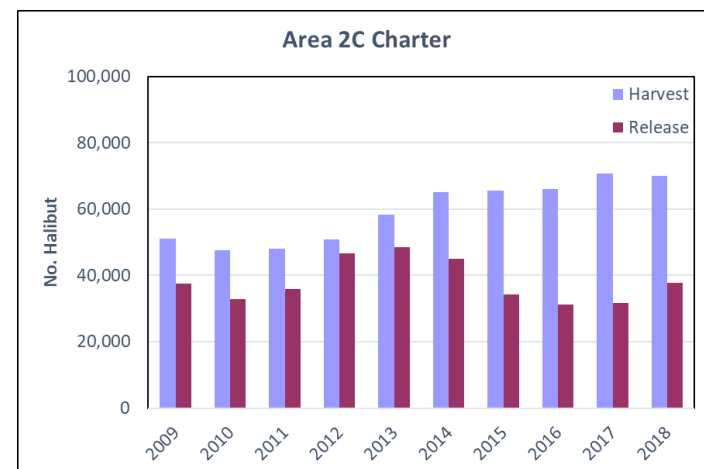
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From Statewide Harvest Survey  
Unguided

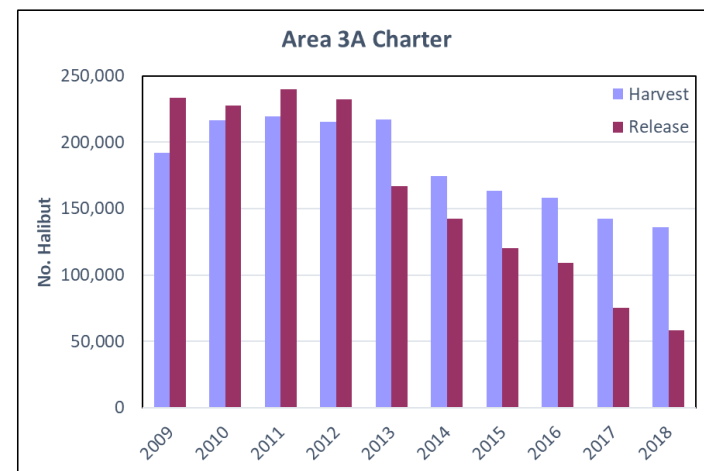
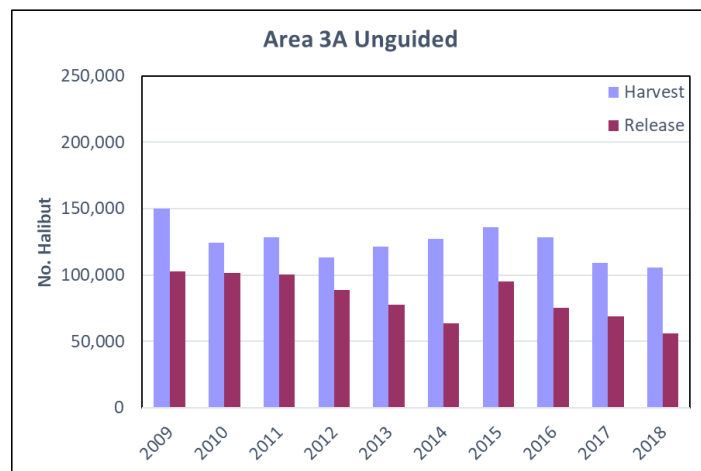
2C

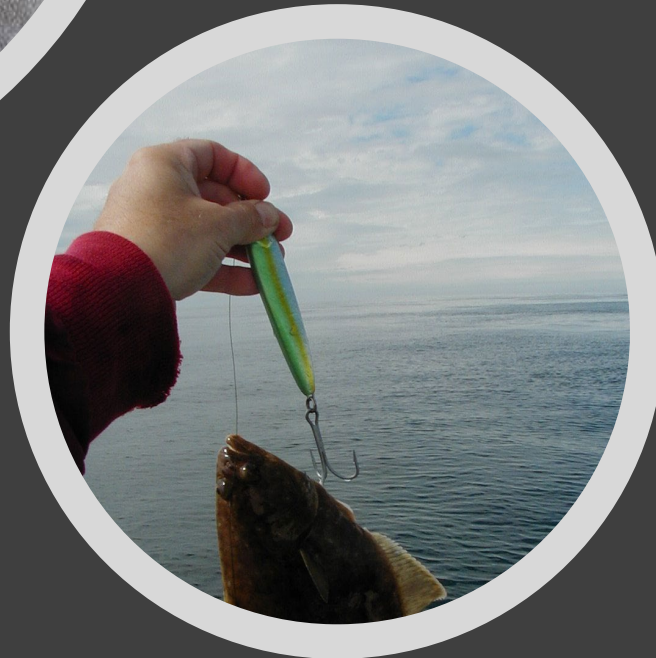


From Saltwater Guide Logbook  
Charter



3A





# Release Mortality Rate

- Type of hook
- Hooking location
- Use of bait
- Length of time on hook
- Handling time
- Temperature
- Release method
- Species-specific physiology
- Fish size



# Gear Specifications

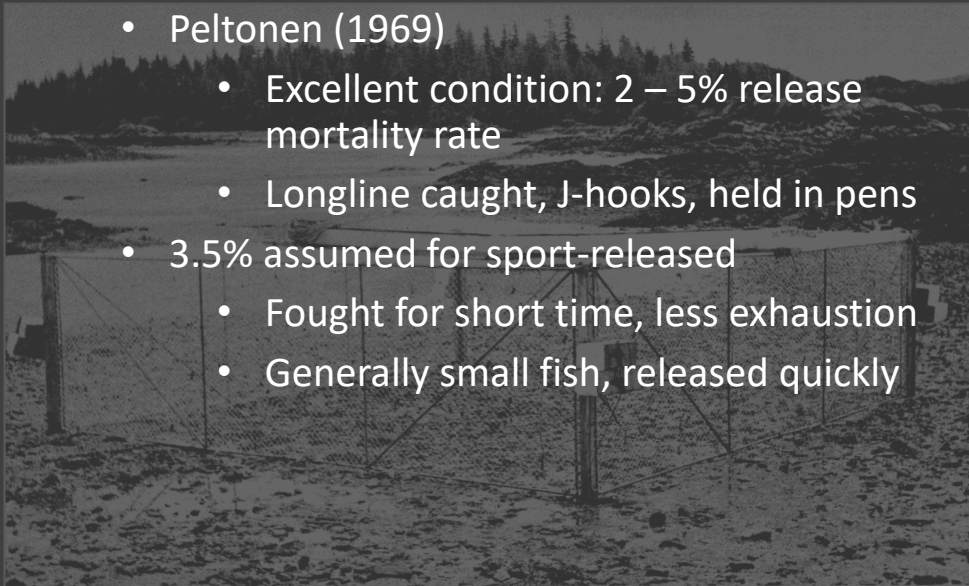
- Hook type varies by target
- Circle Hooks
  - Most common halibut gear
  - Usually corner of mouth
- Other Hooks (J-hooks, Treble, Jigs)
  - More common for salmon, rockfish fishing
  - Can hook deeper or in other locations



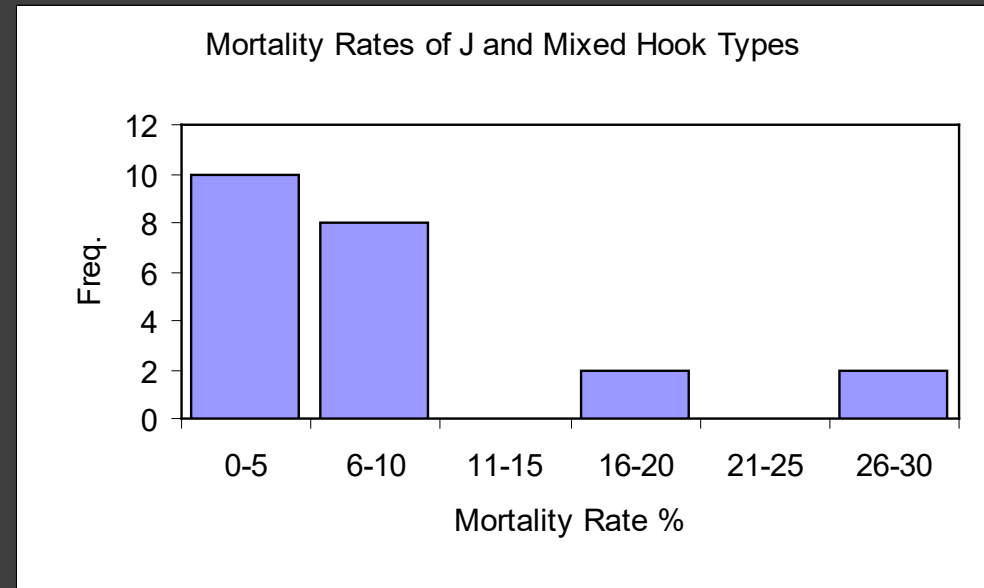
# Assumed Mortality Rate by Hook Type

- Circle – 3.5%

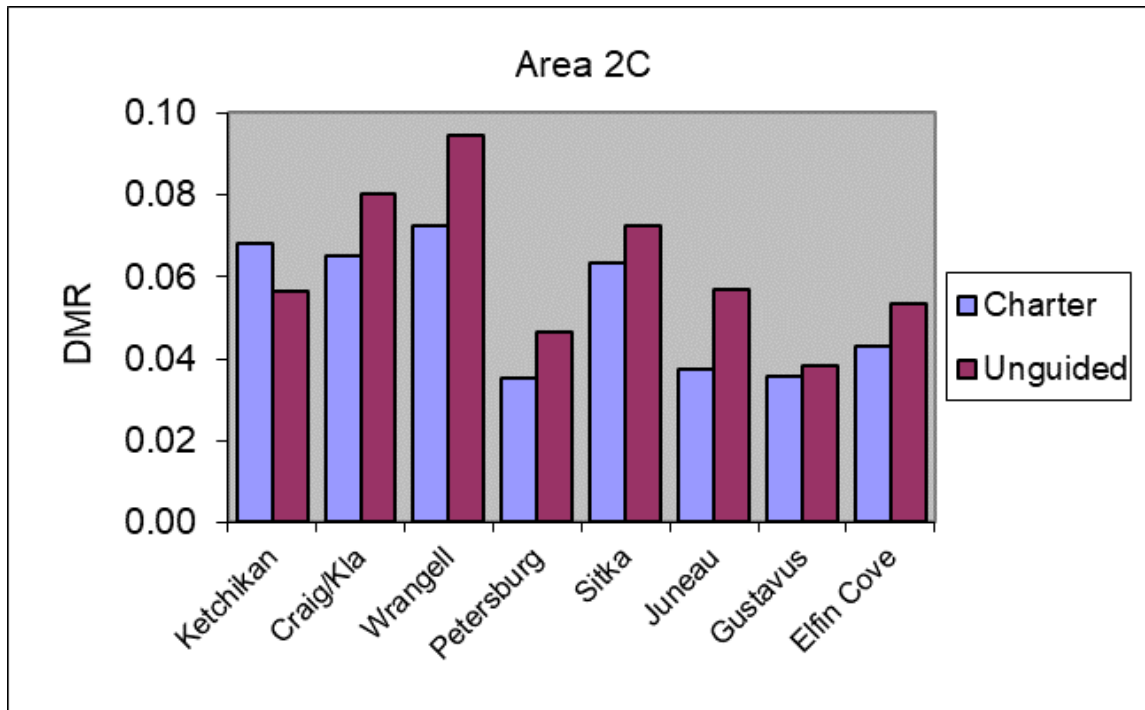
- Peltonen (1969)
  - Excellent condition: 2 – 5% release mortality rate
  - Longline caught, J-hooks, held in pens
- 3.5% assumed for sport-released
  - Fought for short time, less exhaustion
  - Generally small fish, released quickly



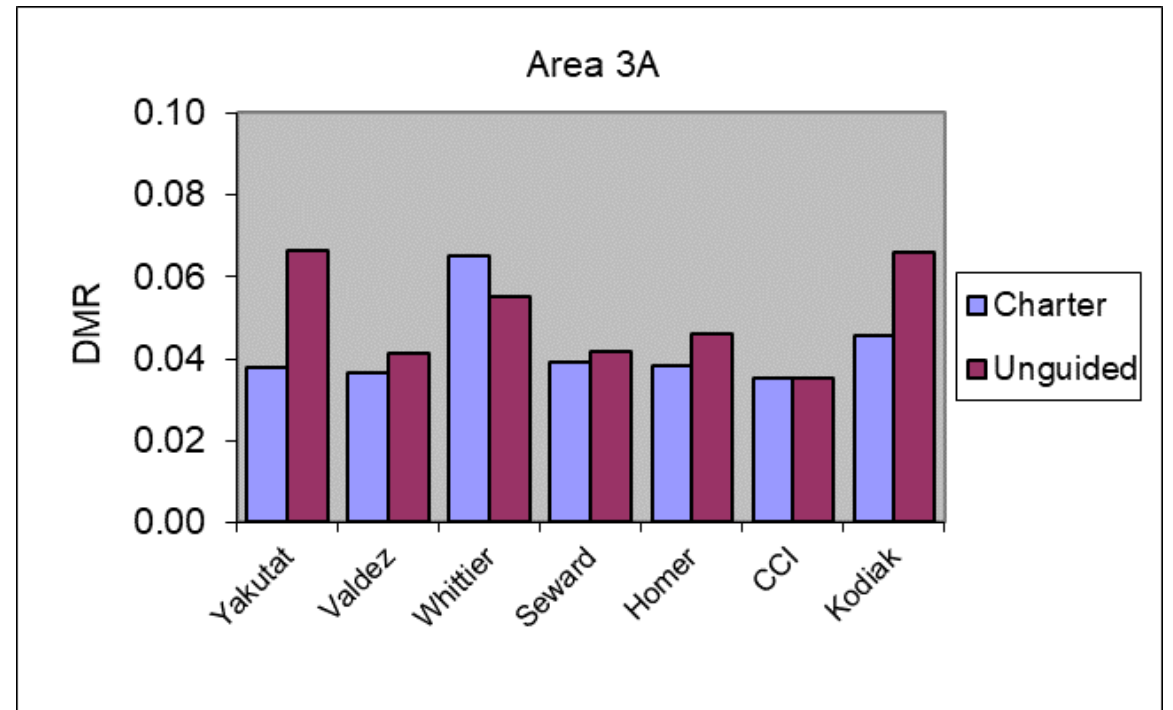
- Other –10%



# Release Mortality Rates Vary by Port and Sector



Unguided → 7%  
Charter → 6%



Unguided → 6%  
Charter → 5%

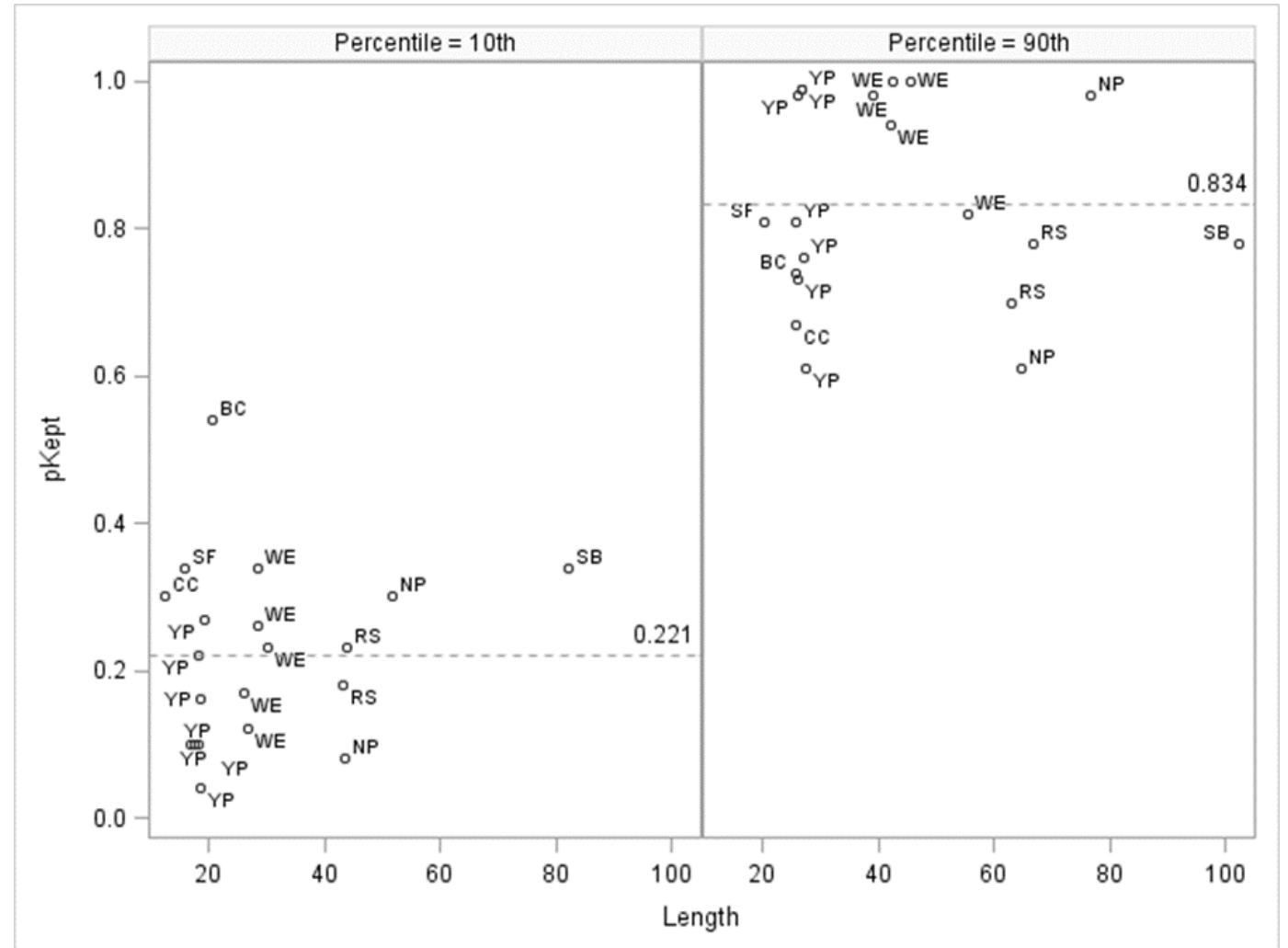


## Average Weight of Released Fish

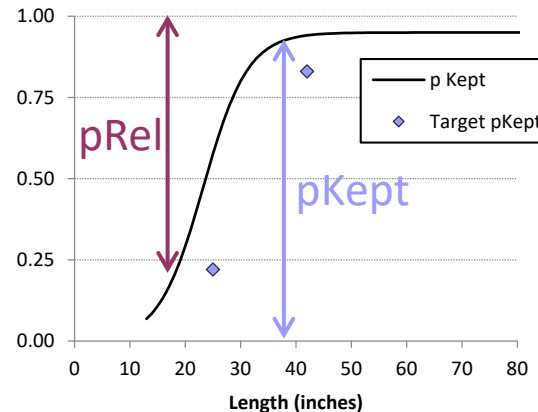
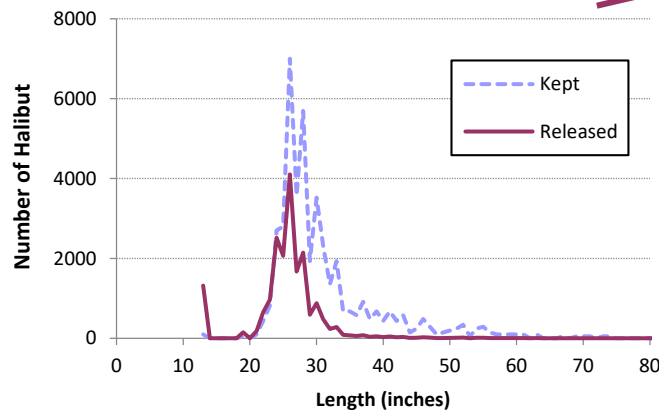
- Currently no sampling of released fish
  - Sampling would be extremely expensive
  - High variability in sizes of discards among ports, vessels, sectors
- Average size of released fish is modeled using retention probabilities

# Proportion of Fish Retained in Other Recreational Fisheries

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*Release Mortality = Number of Released Halibut × Release Mortality Rate × Average Weight of Released Fish*

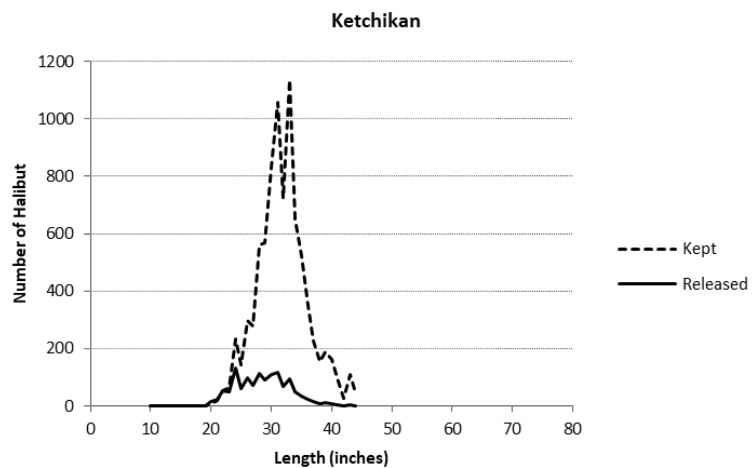
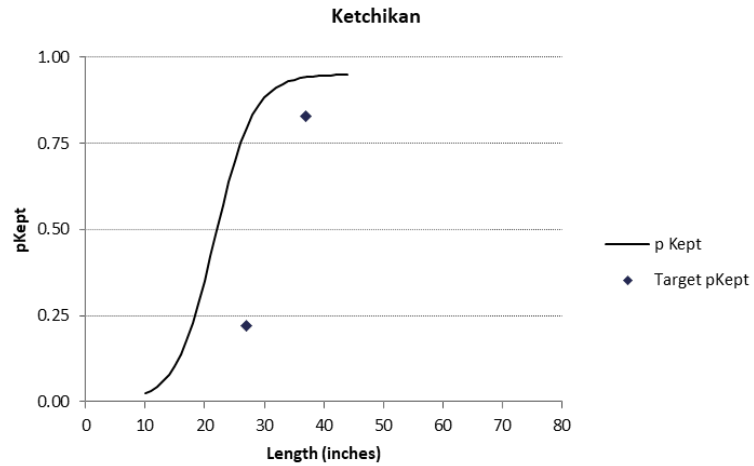


$$p_L = \frac{p_\infty}{1 + \exp(-\kappa(L - \gamma))}$$

$p_\infty$  = the theoretical maximum retention probability ( $p_\infty \leq 1$ ),  
 $\kappa$  = a slope parameter, and  
 $L$  = length to the nearest inch (for compatibility with size limits), and  
 $\gamma$  = the length at the inflection point of the curve.

# Estimating Size of Released Halibut

# Additional Limitations in 2C Charter Sector



- Creel interviews provide data on release size categories
- Under protected slot:
  - Use logistic model
- Within protected slot:
  - Size limits in place since 2010
  - Use 2010 data to estimate release length
- Over protected slot:
  - Use 2010 data to estimate release length

# Estimation of Release Mortality in Recreational Halibut Fishery

- Number of Released Fish
  - Statewide Harvest Survey
  - Guide Logbook
  - Creel Sampling
- Release Mortality Rate
  - 1969 Peltonen Study, Literature Review
  - Ongoing IPHC Study – Claude Dykstra & Josep Planas
- Average Weight of Released Halibut
  - Logistic curve to estimate retention probability by length
  - Observers, Self-reporting, Creel Sampling, New Project Potential



*Release Mortality = Number of Released Halibut × Release Mortality Rate × Average Weight of Released Fish*



# Thanks

- Jim Hasbrouck (ADF&G Anchorage)
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