



**NOAA**  
**FISHERIES**

# Council Request 6889 – Presentation on the Use of Discards in Stock Assessment

SEFSC staff

Presented to the Gulf of Mexico Fisheries  
Management Council December 1, 2020

# Council Request Objectives:

- The Council would like to better understand the methods by which dead discards are accounted for, and the uncertainty inherent in these estimates.
- As requested, this presentation focuses on **recreational discards**. Commercial discards modeled using similar approaches.
- We will discuss:
  - 1) How discards are accounted for in the models
  - 2) Describe uncertainty
  - 3) Whether dead discards are included in the OFL, ABC and ACL – short answer is no



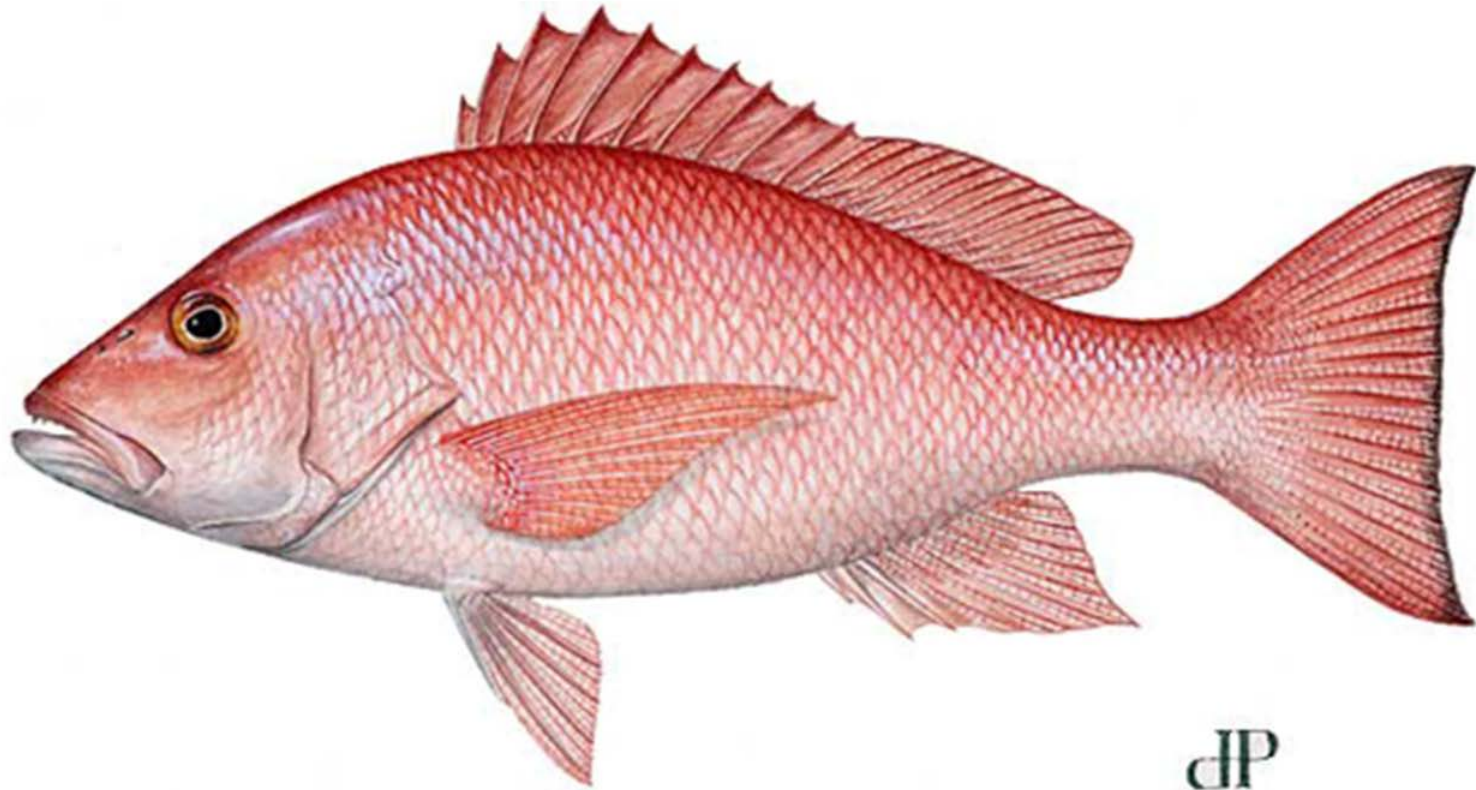
# MRIP Discard Definitions

- **Type A** = fish landed whole, retained and observed by interviewers
- **Type B1** = fish reported as killed by the fishers, not observed by interviewers. All dead. Can be retained but not observed, used for bait, partially eaten by predator etc, or discarded. Landings generally assumed to equal A+B1.
- **Type B2** = fish reported as released alive by the fishers, not observed by interviewers.
- Most assessment models fit to B2 (fish released alive).
- **Dead discards** (or what we use for modeling) are  $B2 \times$  discard mortality rate
- Discards from recreational fisheries are mostly below the minimum size limit. When no length composition data are available, we typically assume fish are discarded below the size limit, and apply a discard mortality to estimate the dead discards.

# Commercial discards

- Estimated using commercial observer program data.
- Modeled similarly to recreational discards.
- Discards from commercial fisheries are mostly below the minimum size limit. When no length composition data are available, we typically assume fish are discarded below the size limit, and apply a discard mortality to estimate the dead discards.

# Red Snapper (SEDAR 52)

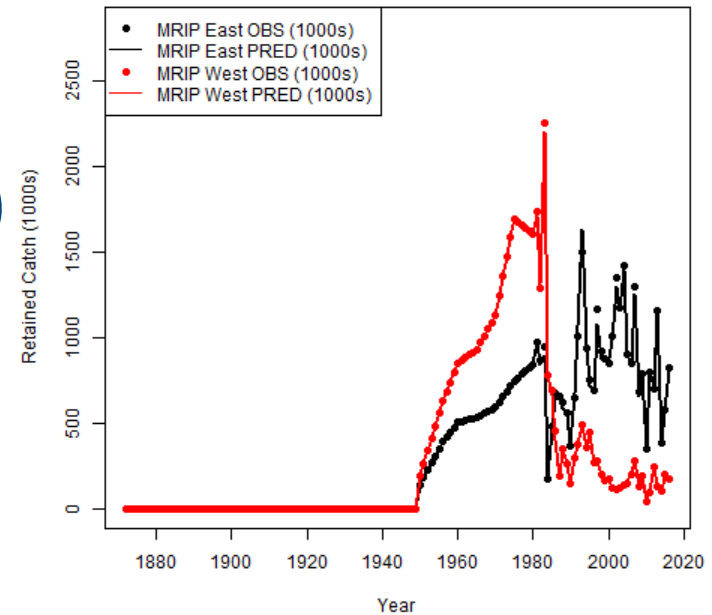


# Data fit and uncertainty

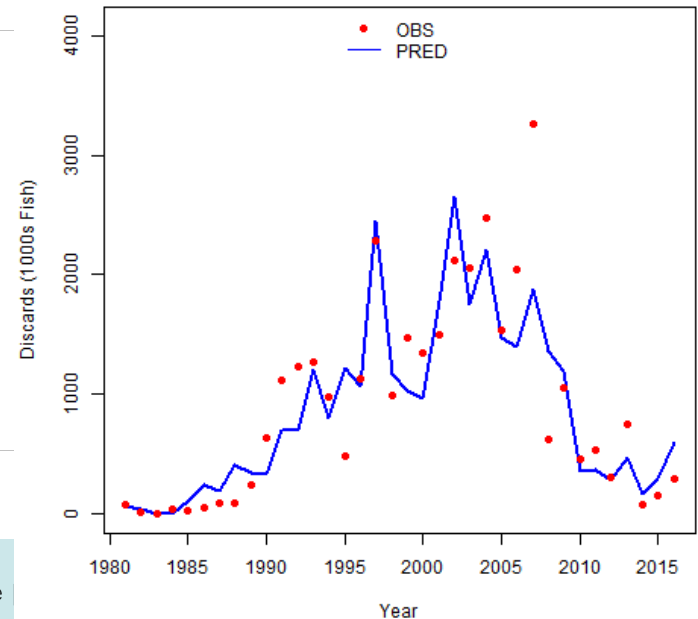
- Fit to recreational landings (A+B1, numbers)
  - Near perfect fit because CV assumed to be 0.05
- Fit to recreational discards (B2, released alive)
  - Not identical because CV was assumed to be 0.3
  - Dead discards obtained by applying time-varying retention and discard mortality estimates

Sector	Venting (Y/N)	Year (Pre/Post 2008)	East		West	
			Closed	Open	Closed	Open
Recreational	N	Pre	0.21	0.21	0.22	0.22
Recreational	Y	Post	0.118	0.118	0.118	0.118
Commercial vertical line	N	Pre	0.74	0.75	0.87	0.78
Commercial vertical line	Y	Post	0.55	0.56	0.74	0.6
Commercial longline	N	Pre	0.74	0.81	0.87	0.91
Commercial longline	Y	Post	0.55	0.64	0.74	0.81

## Landings example



## Live Discards example



# Rec. catch data in red snapper assessment

- Red Snapper has 6 recreational fleets

Name	Fleets	A	B1 (Open + Closed)	B2
Open season MRIP (East Gulf)	CH, P	✓	✓	✓
Open season MRIP (West Gulf)	CH, P	✓	✓	✓
Open Season Headboat (East Gulf)	Hbt	✓	✓	✓
Open season Headboat (West Gulf)	Hbt	✓	✓	✓
Closed season Rec. (East)	CH, P, Hbt			✓
Closed season Rec. (West)	CH, P, Hbt			✓

\*CH = For-hire Charter, P = Private vessels, Hbt = For-hire Headboat

\* A = Landed catch, B1 = Released Dead (Discard), B2 = Released Alive (Discard)

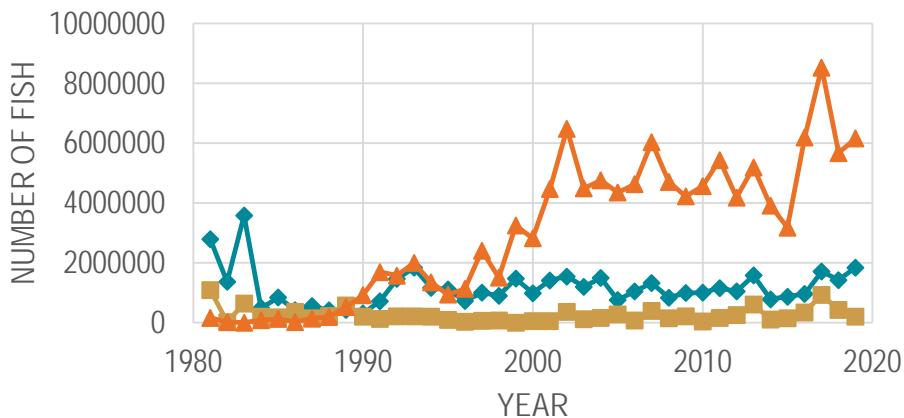
- Open and Closed Season B1's are included in the OPEN season fleets

# Red Snapper Recreational Catches (MRIP-FES Query Nov. 20, 2020).

- Note: This is a direct extraction from MRIP query tool (<https://www.st.nmfs.noaa.gov/SASStoredProcess/do?>). These estimates were not available for SEDAR 52 which used MRIP-CHTS estimates.

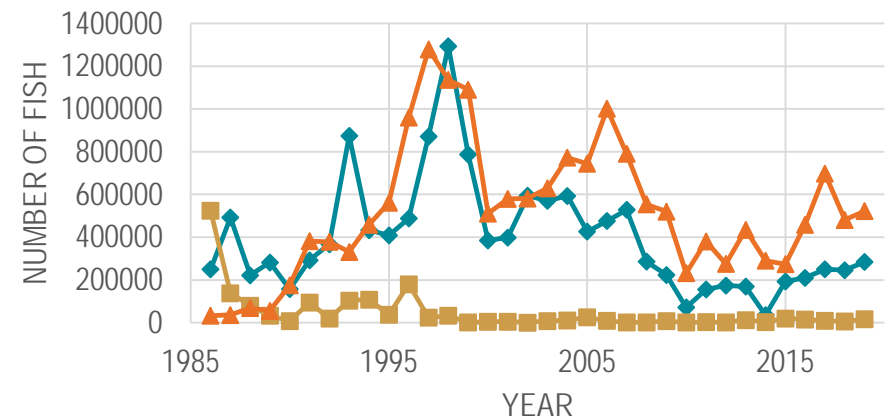
## PRIVATE BOAT

—◆— Observed Harvest (A) —■— Reported Harvest (B1)  
—▲— Released Alive (B2)



## CHARTER BOAT

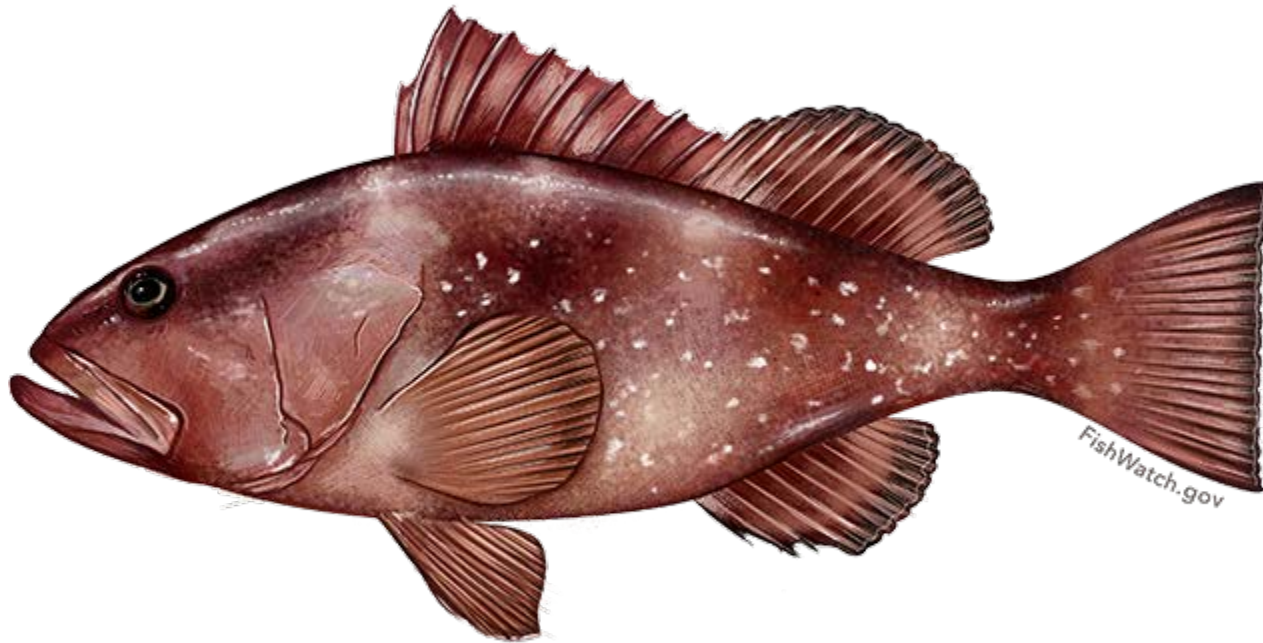
—◆— Observed Harvest (A) —■— Reported Harvest (B1)  
—▲— Released Alive (B2)





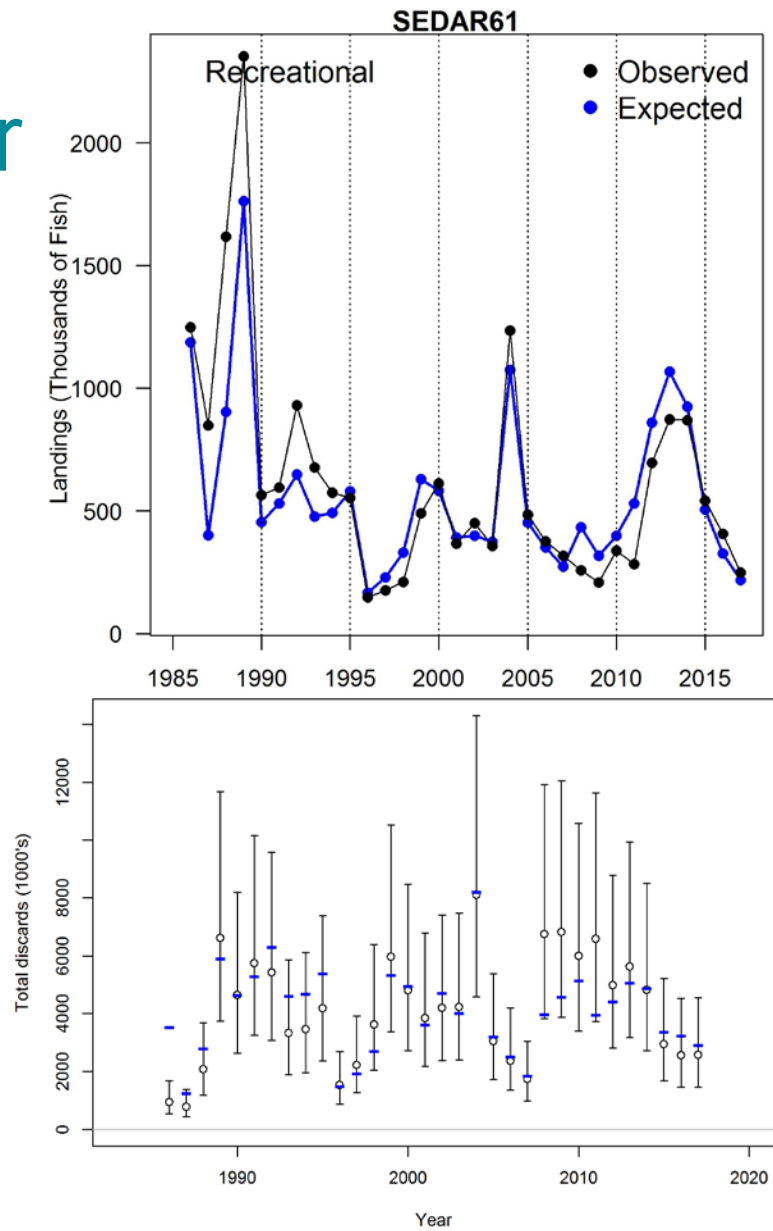
# Red Grouper (SEDAR 61)

- This is the most common approach for Gulf of Mexico stock assessments. CVs applied to landings and discards are species-specific.



# SEDAR 61 Gulf red grouper

- Fit to recreational landings (A+B1, numbers)
  - Difference in observed and predicted due to  $CV = 0.3$  (i.e., not perfect fit)
- Fit to recreational discards (B2, numbers released alive)
  - Not identical because  $CV = 0.29$
  - Dead discards obtained by multiplying by discard mortality
    - 11.6% - mean overall depth integrated estimate from Sauls et al. 2014 (SEDAR41-RD16)



# Uncertainty of Discards

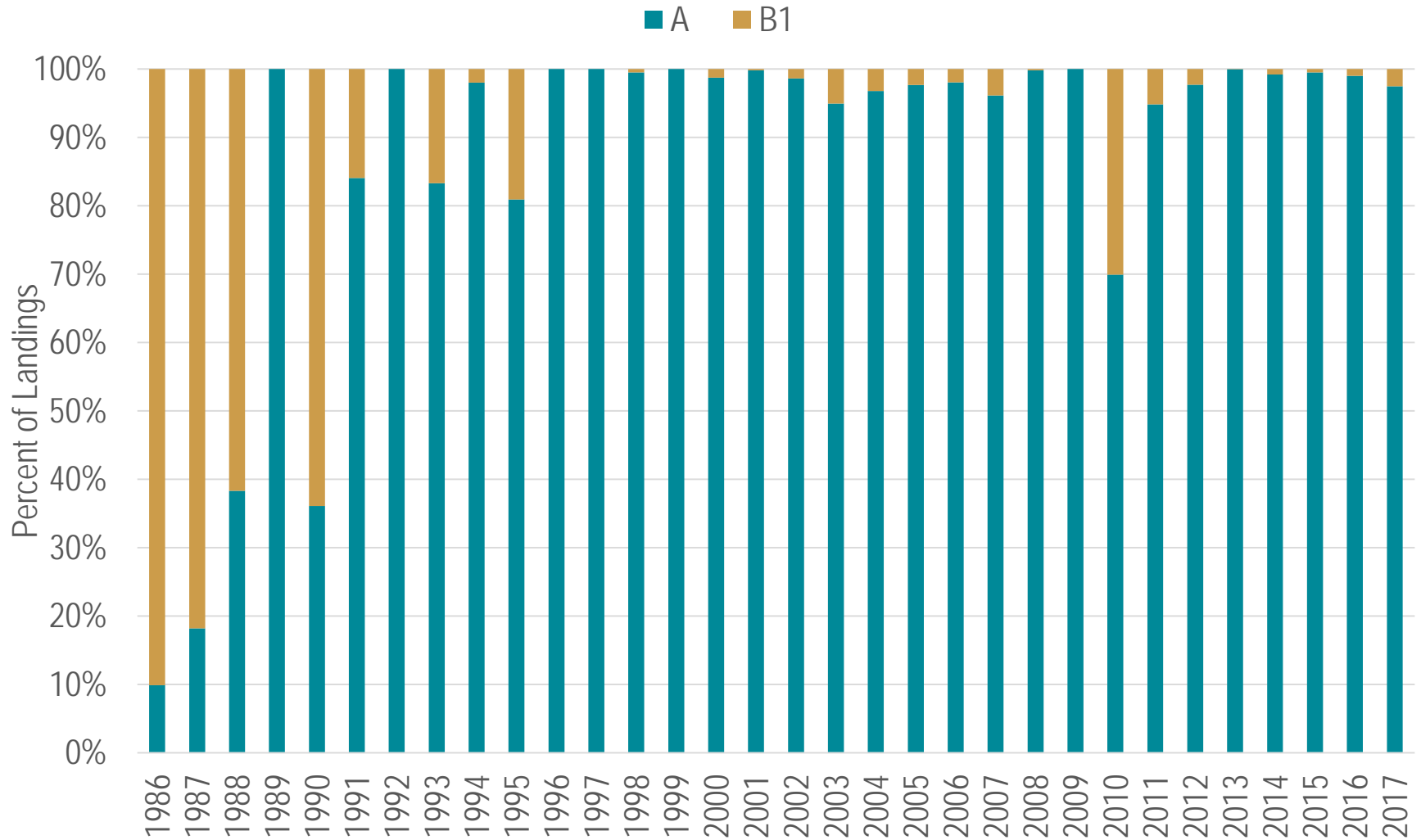
Fleet	Data Input	Error
Recreational	Numbers (B2)	0.29 (expert opinion, reduced from 0.5 by SEDAR42 Review Panel)

Fleet	Data Input	Error
Commercial Vertical Line	Numbers	0.29 (expert opinion, reduced from 0.5 by SEDAR42 Review Panel)
Commercial Longline	Numbers	0.29 (expert opinion, reduced from 0.5 by SEDAR42 Review Panel)
Commercial Trap	Numbers	0.29 (expert opinion, reduced from 0.5 by SEDAR42 Review Panel)

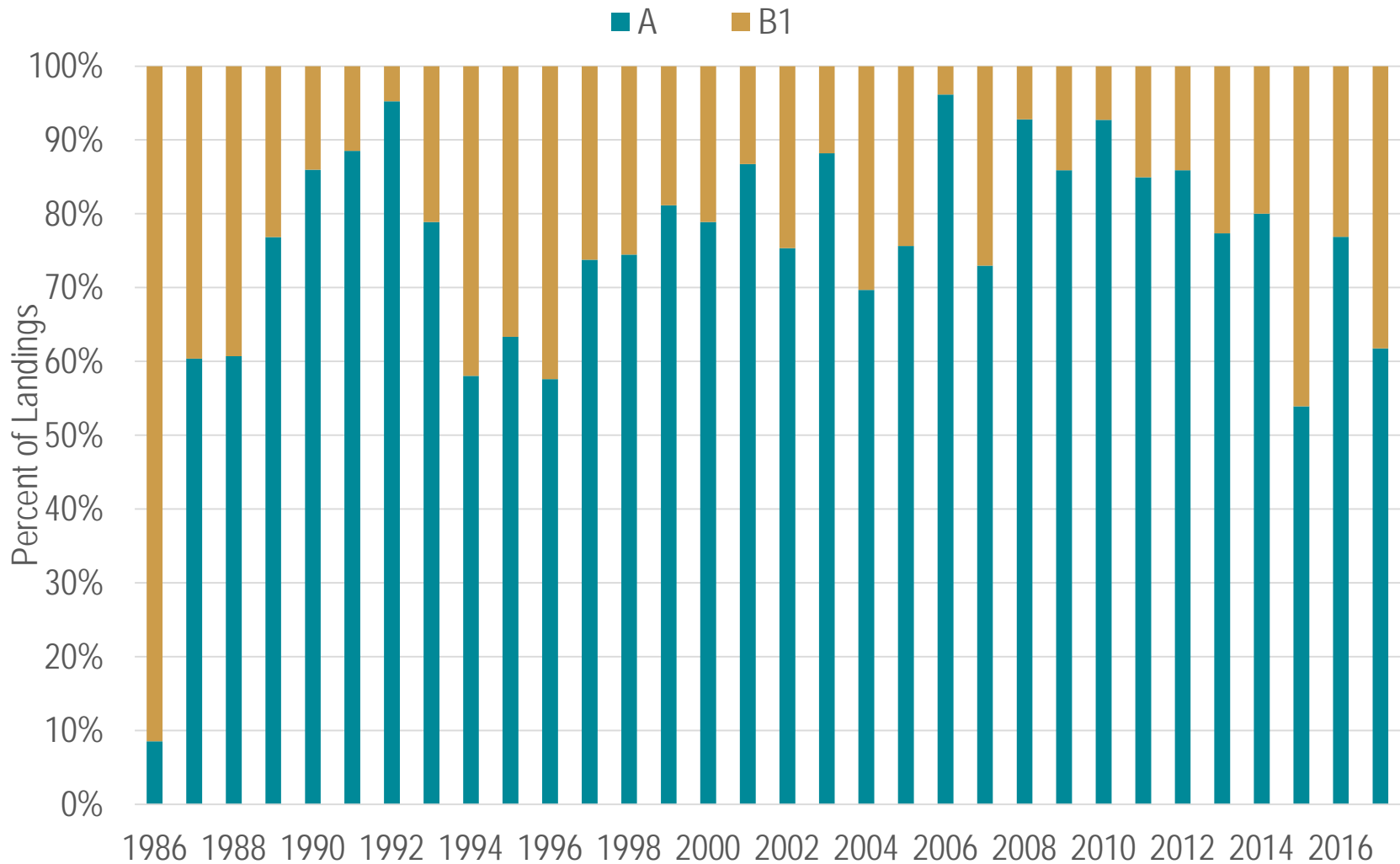
# Gulf red grouper - headboat discards

- Single recreational fleet used for Gulf red grouper; headboat discards were added to charter/private discards
  - 1986-2003: estimated using MRIP CH:SRHS discard ratio from 2004-2006 as a proxy for the SRHS discards
  - 2007-2017: used SRHS discard estimates
- No CV provided for headboat discards

# Gulf red grouper - charter A vs B1 (numbers)



# Gulf red grouper - private A vs B1 (numbers)



# King Mackerel (SEDAR 38U)



# SEDAR 38U Gulf King Mackerel

- Similar to Red Grouper, except
  - Four Directed Fleets: COM\_VL, COM\_GN, REC PR+CH, REC HB.
  - Landings assumed to be near certain ( $CV \cong 0.0$ ).
  - For HB discards, used MRIP CH discard ratio as a proxy 1981-2003. Used SRHS discards for 2004-2017
  - Discards used  $CV = 0.2$  (COM) and  $CV = 0.4$  (REC)
  - Discard mortality assumptions:
    - 25% discard mortality from commercial vertical line fisheries,
    - 22% discard mortality for the recreational headboat fishery
    - 20% discard mortality for recreational private and charter.



# Conclusions

- OFL, ABC and ACL does not include dead discards – defined as live release ( $B2 \times$  discard mortality)
- OFL, ABC and ACL does include A's (retained) and B1's (retained but not observed, used for bait, partially eaten by predators, etc)
- To consistent with assessment, quota monitoring should count A's and B1's against the quota

# Questions?

# Additional Slides

# Gulf red grouper - recreational selectivity

- Length-based selectivity pattern estimated from composition data
- Retained fish determined by applying **retention curves** for 2 periods:
  - 1986-1990: all fish caught assumed to be retained
  - 1990-2017: federal size limit of 20 inches TL
    - Inflection point of **retention curve** fixed at size limit
    - Estimated asymptote of **retention curve** (some fish above size limit discarded)

1990-2017  
pattern:

Size Limit: 48.79 cm FL

