



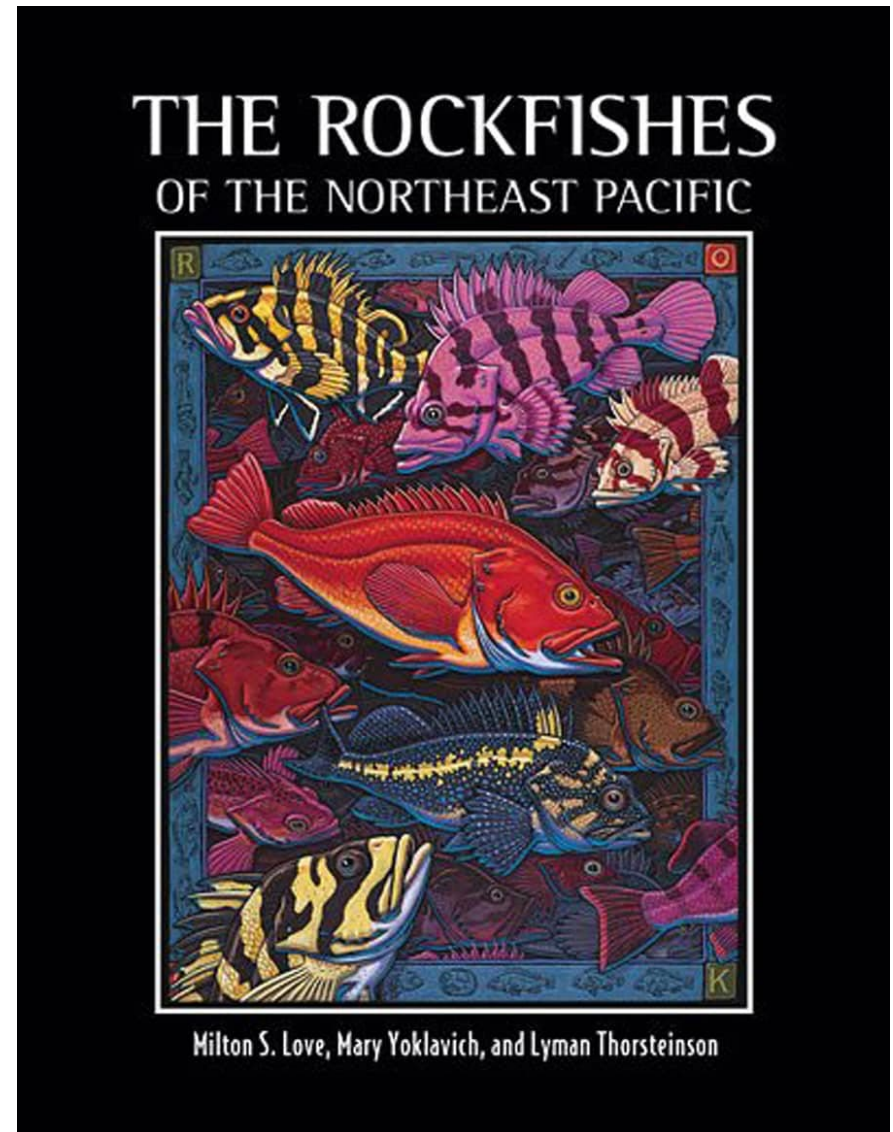
NOAA
FISHERIES

Preparing fishery dependent data for stock assessment models

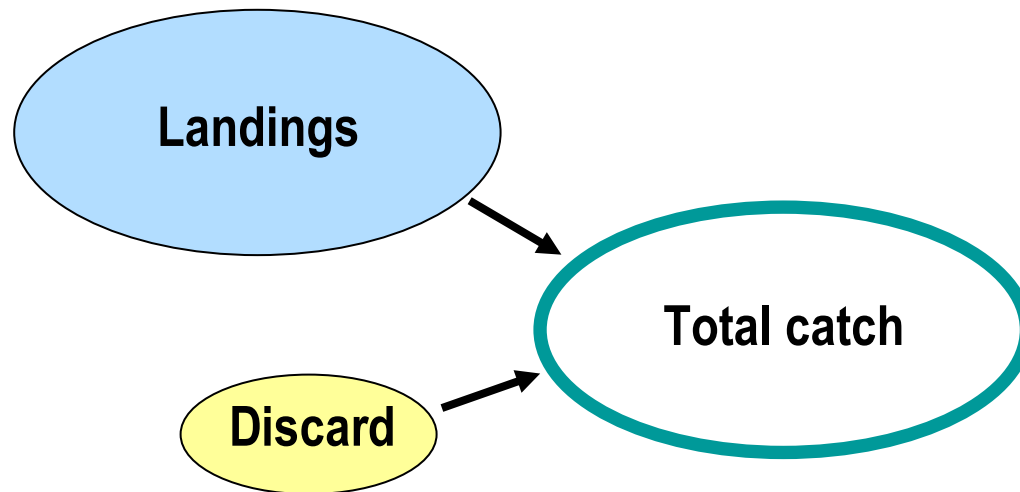
FISH 576, Week 4

Love et al. (2001)

- Concise overview of different aspects of rockfish biology
- Excellent (and concise) overview of rockfish fisheries on the U.S. West Coast
- Information of individual rockfish species, that is useful for stock assessments
- Very well written and entertaining



Categories of catch



Reasons for discarding

From Rogers (1994)

Table V3. Reasons for discarding stated by fishermen for selected species, which were targeted and discarded (TD) or not-targeted and discarded (ND). Codes for the reasons are: 1= size, 2=market problems, 3=high-grading, 4=regulations, and 5=other. A * means that the reason is responsible for discards of greater than 50% of the catch in an average haul.

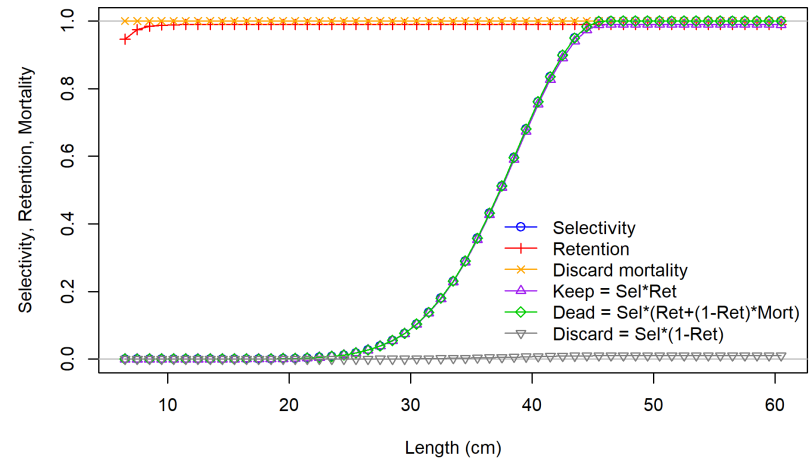
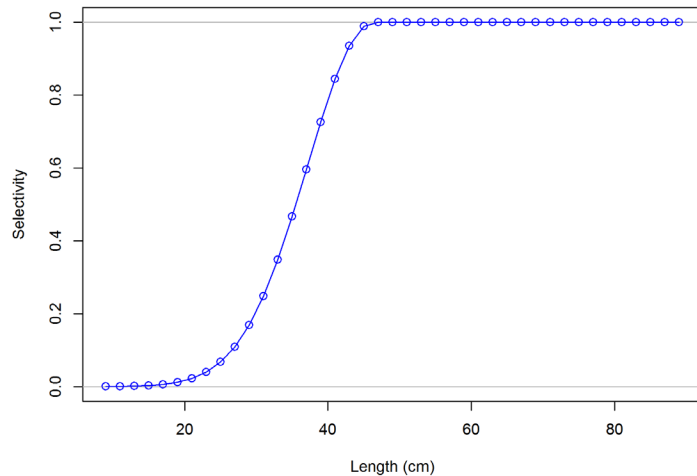
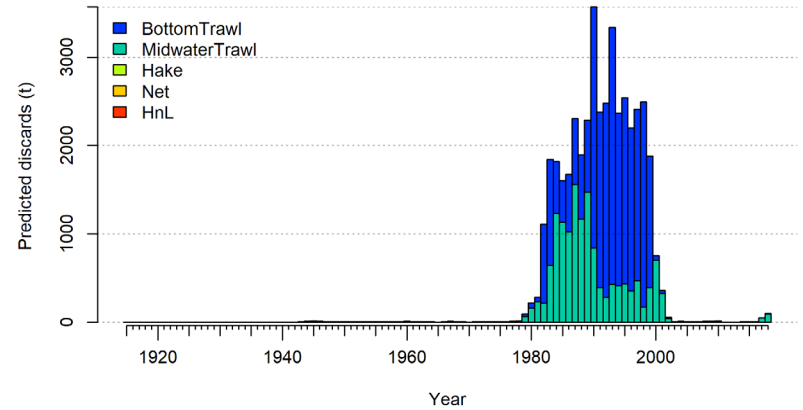
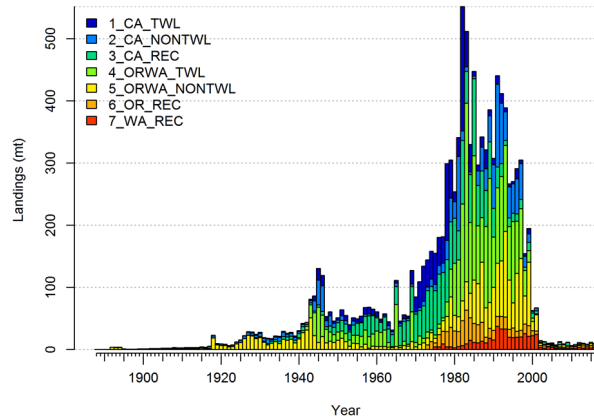
Species	Assemblage											
	BRF		DWD		NSM		DWR		SHR		WID	
	TD	ND	TD	ND	TD	ND	TD	ND	TD	ND	TD	ND
Dogfish	0	2*	0	1,2*	0		2*	0	2*	0	2*	0
LN Skate	0	2*	0	1,2*	0		2*	0	2*	0	2*	0
Sanddab	0	2*,5	0	1,2	1,2		1,2*	0	0	0	1,2*	0
Arrow. Fl.	0	2*	1	1,2*,5	0		1,2*	0	1,2*	0	1,2*	0
Petrale S.	0	1,5	1	1	1		1	0	0	0	5*	0
English S.	0	1,5	1	1	1		1	0	0	0	1	0
Dover S.	0	1,5	1	1	1		1	0	0	0	1*,5	0
Rex Sole	0	1*,5	1	1	1		1	0	1	0	1*,2,5	0
Starry Fl.	0	0	0	0	1		1	0	0	0	0	0
Sand S.	0	0	0	2	1		1	0	0	0	0	0
Sablefish	0	1*	1,3,4	1,3,4,5	0		1*,2	0	1,3	0	1*,2,5	0
Pac. Cod	0	0	1	5	0		1,5	0	0	0	2,5	0
Lingcod	0	1	0	0	0		1	0	0	0	1	0
Pac. Whiting	0	2*	0	1,2*	0		2*	0	2*	0	2*	0
S.S.Thorny.	0	1*	1	1,2	0		0	0	1*	0	1*,2	0
P.O.P.	0	1	1	1	0		0	1	0	0	1*	0
Darkbl. R.	0	1*	0	1	0		0	0	0	0	1*	0
Splitn. R.	0	0	0	1	0		0	0	1*	0	1*,2	0
Widow R.	0	1,3	0	0	0		0	0	0	0	0	3
Y.tail R.	5	3,5	0	0	0		0	0	0	0	0	0
Bocaccio	0	0	0	0	0		0	0	0	0	0	0
Canary R.	0	0	0	0	0		1	0	0	0	0	0
Yelloweye R.	0	0	0	0	0		0	0	0	0	0	0
Sharpchin R.	0	1*	0	1	0		0	0	1	0	1*	0
Yellowmth. R.	0	1*	0	0	0		0	0	1	0	0	0
P. Shrimp	0	0	0	0	0		0	0	0	0	0	0

Ways to incorporate discard data in the assessment model

Primary reason for discarding	What to do if discards are high or length comps differ	What to do if discards are low or length comps very similar
Catch limits or lack of market for all sizes (e.g. dogfish)	Model separate discard fleet (challenge is extrapolation to period without discard data)	Combine discard and retained catch and ignore discard comps or combine retained + discard comps
Size limits or lack of market for small fish (e.g. lingcod)	Model retention within the assessment (probably needs to be time-varying)	Combine discard and retained catch and ignore discard comps or combine retained + discard comps



Ways to incorporate discard data



Sources of discard information

- **Pikitch study**
 - Between 1985 and 1987.
 - Between 42°60' and 48°42' North latitude (primarily Columbia INPFC area)
 - Estimates by species
- **EDCP**
 - From late 1995 to early 1999
 - Oregon waters only
 - Focus on deeper waters
- **WCGOP**
 - 2002 forward
 - Coastwide
 - Discard estimates by species

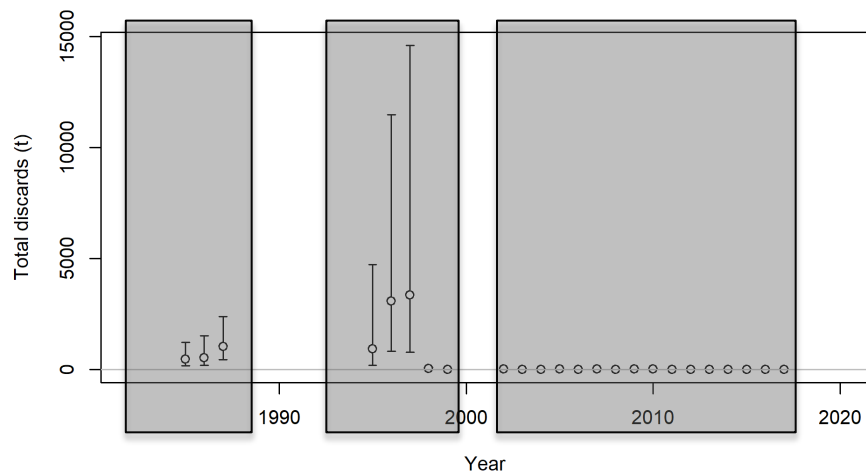


Discard data types

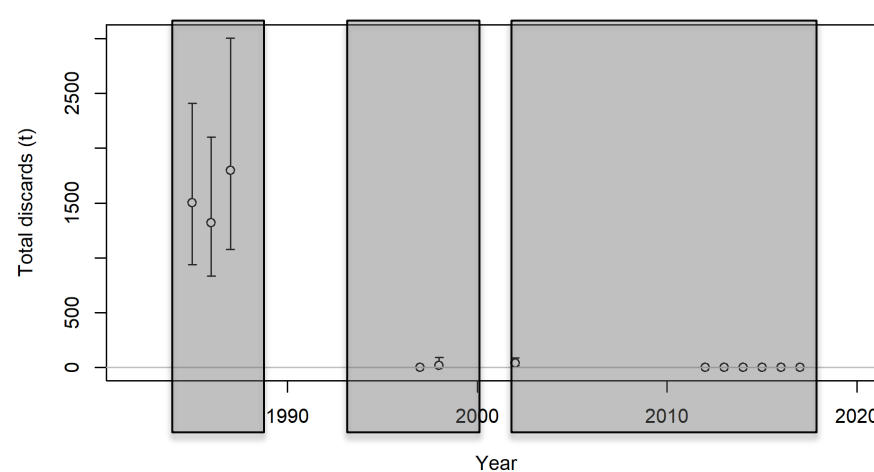
- Fraction/amount discarded
 - Pikitch study
 - EDCP
 - WCGOP
- Length frequencies
 - Pikitch
 - WCGOP

Widow rockfish discard from 2013 model

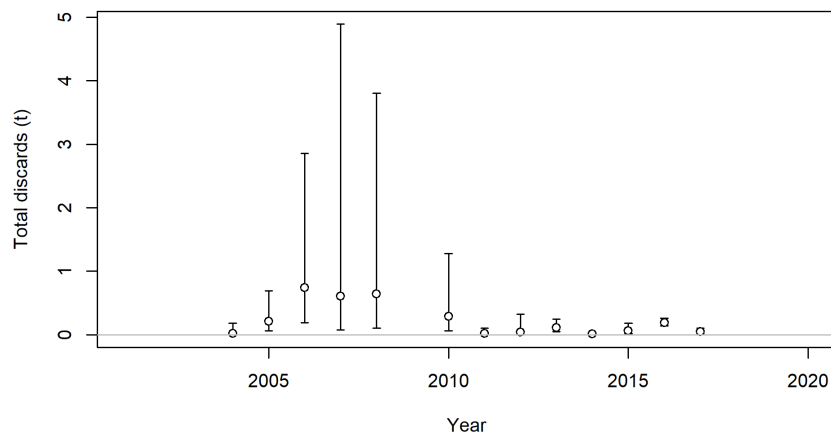
Total discard for BottomTrawl



Total discard for MidwaterTrawl



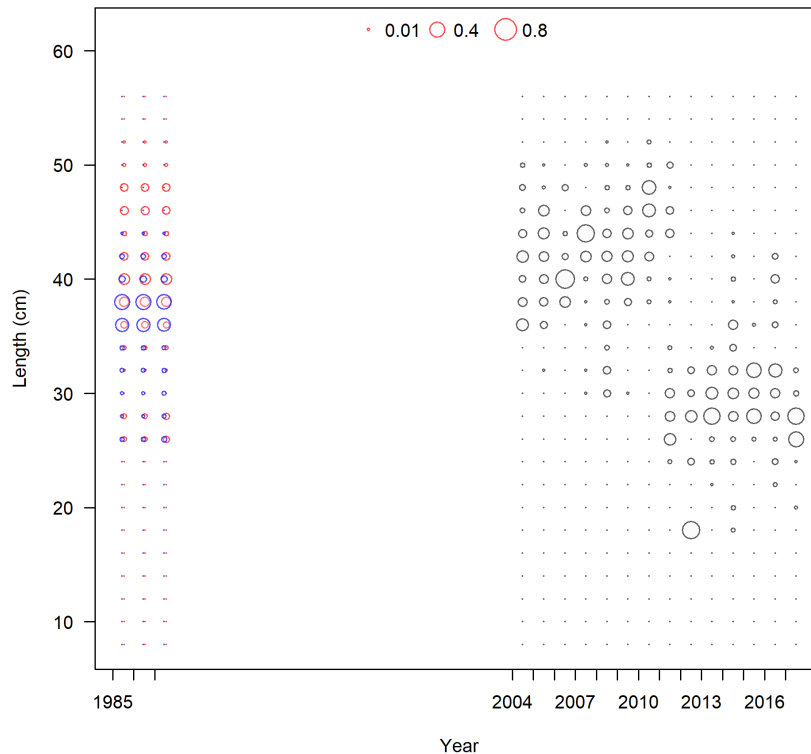
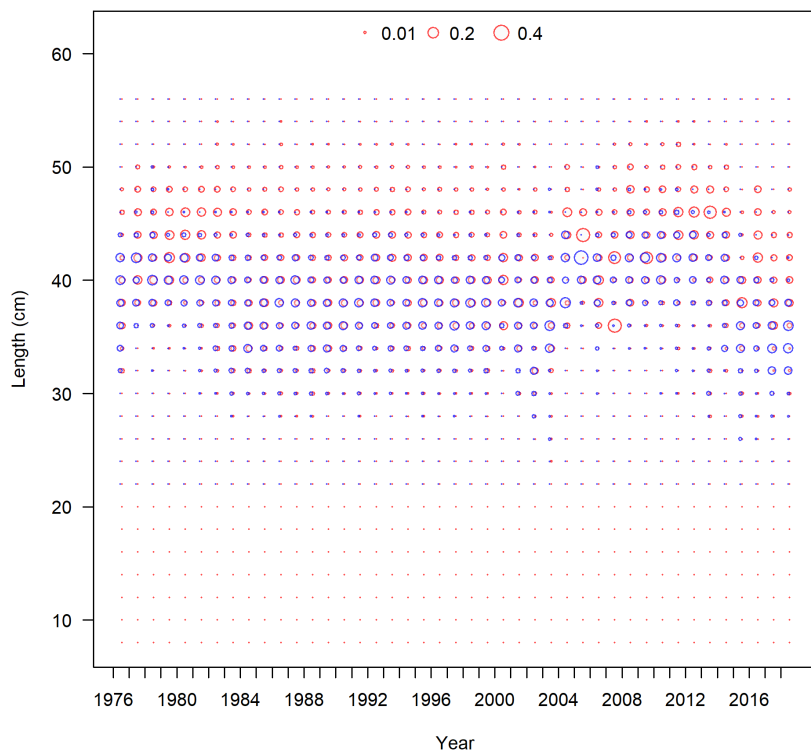
Total discard for HnL



Individual Fishing Quota (IFQ)

- Implemented in 2011 for limited entry trawl fishery.
- Prior 2011, fishery was managed on using trip limits (with discard not being counted toward catch limits)
- Since 2011, the fishery is managed with quotas, which includes both retained and discarded catch.
- IFQ fishery is fully observed (onboard observes or electronic monitoring system)

Widow rockfish discard from 2019 model



- Bottom trawl fleet
- Discard length are usually smaller than retained.
- WGCOP lengths are not separated by sex.

Groundfish Expanded Mortality Multiyear product (GEMM)

- Total removals for individual species.
- Landings separated from discards.
- Discard estimates with (and without) discard mortality applied.
- Excellent way to explore removals, by state, gear, evaluate how much is discarded (2002-forward).
- Publicly available via warehouse.

How to access GEMM

- Can be pulled from the warehouse.
- GEMM data can be viewed in R with `nwfscSurvey::pull_gemm()`.
- Full report online at <https://www.nwfsc.noaa.gov/data> (under "Observer Program" within the Layers menu).
- Already downloaded for you and placed on the class GitHub

How to interpret GEMM

B	C	D	E	F	G	H	I	J	K	L
grouping	sector	species	total_disc	total_disc	total_disc	total_disc	total_land	type	year	
Yellowtail	At-Sea Hake CP	Yellowtail	237.1485	70.10963	237.1485	70.10963	167.0388	groundfist	2023	
Pacific oce	At-Sea Hake CP	Pacific Oce	75.53924	12.71715	75.53924	12.71715	62.82209	groundfist	2023	
Shortspine	At-Sea Hake CP	Shortspine	74.28022	3.53944	74.28022	3.53944	70.74078	groundfist	2023	
Arrowtoot	At-Sea Hake CP	Arrowtoot	40.36313	2.074869	40.36313	2.074869	38.28826	groundfist	2023	
Longspine	At-Sea Hake CP	Longspine	0.006559	0.000806	0.006559	0.000806	0.005753	groundfist	2023	
Big skate	At-Sea Hake CP	Big Skate	0.289171	0.127902	0.289171	0.127902	0.16127	groundfist	2023	
Canary ro	At-Sea Hake CP	Canary Ro	19.75028	8.690047	19.75028	8.690047	11.06023	groundfist	2023	
Darkblotcl	At-Sea Hake CP	Darkblotcl	89.80015	9.223526	89.80015	9.223526	80.57662	groundfist	2023	
Dover sole	At-Sea Hake CP	Dover Sole	1.049579	0.072459	1.049579	0.072459	0.97712	groundfist	2023	
Ecosystem	At-Sea Hake CP	Grenadier	4.227038	1.199897	4.227038	1.199897	3.027141	groundfist	2023	
Ecosystem	At-Sea Hake CP	Sandpape	0.016664	0.000584	0.016664	0.000584	0.01608	groundfist	2023	
Ecosystem	At-Sea Hake CP	Shortbelly	4.420225	0.654968	4.420225	0.654968	3.765257	groundfist	2023	
Ecosystem	At-Sea Hake CP	Soupfin Sh	0.204915	0.204915	0.204915	0.204915	0	groundfist	2023	
Ecosystem	At-Sea Hake CP	Spotted R	0.008876	0.003778	0.008876	0.003778	0.005098	groundfist	2023	

A	B	C	D	E	F	G	H
		Gear					
		Bottom Trawl	Fixed Gears	Hook & Line	Midwater Trawl	Pot	Shrimp Trawl
	Catch Shares	2013674	0	27911	2088	43149	0
	Catch Shares EM	24822	0	1	0	6469	0
	Directed Pacific Halibut	0	0	2586	0	0	0
	LE CA Halibut	28260	0	0	0	0	0
	LE Fixed Gear DTL		0	0	34233	0	0
	Limited Entry Sablefish	0	0	131513	0	36020	0
	Limited Entry Trawl	728584	0	0	253	0	0
0	Midwater Hake	0	0	0	16287	0	0
1	Midwater Rockfish	0	0	0	13508	0	0
2	Nearshore	67222	0	0	0	0	
3	OA CA Halibut	61809	0	0	0	0	0
4	OA Fixed Gear	0	0	9502	0	4997	0
5	Pink Shrimp	0	0	0	0	0	350203
6	Ridgeback Prawn	0	0	0	0	0	15098
7	Sea Cucumber	4185	0	0	0	0	0
8	Shoreside Hake	0	0	0	76419	0	0

What discard data should be requested



- GEMM



- WCGOP discard amounts and bio
- Data is on the Drive in non-confidential form

GEMM widow rockfish

