

INFLUENCE OF SELECTIVE FLATFISH TRAWL GEAR ON CHINOOK BYCATCH PROJECTIONS IN THE BOTTOM TRAWL SECTOR

Summary of Agenda Item F.3; Supplemental NMFS Report; April 2017

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Background:

NMFS provided non-whiting Chinook projections to inform upcoming Biological Opinion:

Scenario 2A: Assumes conditions similar to last three years

Scenario 2B: Assumes historical activity (higher landings, no RCA, etc.)

Two approaches taken for Scenario 2B

- Both based on higher historical landings from 1990's
- 2B-2 uses 1995-1999 bycatch rates from bottom trawl
- 2B-1 uses recent (2012-2014) bycatch rates from bottom trawl

2B-2 PROJECTIONS MUCH HIGHER DUE TO GREATER HISTORICAL BYCATCH RATES

a. Bottom trawl, summer.

		BC rates (x)		
		0.088	0.207	0.325
GF landings (y)		-1 S.D.	Mean	+1 S.D.
20,482	-1 S.D.	1,812	4,238	6,665
24,470	Mean	2,164	5,063	7,962
28,522	+1 S.D.	2,523	5,902	9,281

b. Bottom trawl, winter.

		BC rates (x)		
		0.093	0.910	1.728
GF landings (y)		-1 S.D.	Mean	+1 S.D.
12,669	-1 S.D.	1,178	11,533	21,889
17,233	Mean	1,602	15,688	29,774
21,091	+1 S.D.	1,961	19,200	36,440

c. Sum seasons, bottom trawl.

GF landings (y)		Bycatch rates (x)		
		-1 S.D.	Mean	+1 S.D.
33,151	-1 S.D.	2,989	15,771	28,553
41,703	Mean	3,766	20,751	37,737
49,613	+1 S.D.	4,483	25,102	45,720

d. Sum seasons, non-whiting midwater.

		BC rates (x)		
		0	0.26375	0.5382473
GF landings (y)		-1 S.D.	Mean	+1 S.D.
-1 S.D.	Min	0	3,341	6,819
Mean	Mean	0	4,545	9,276
+1 S.D.	Max	0	5,563	11,352

e. Sum seasons and components.

GF landings (y)		Bycatch rates (x)		
		-1 S.D.	Mean	+1 S.D.
33,748	-1 S.D.	2,989	19,113	35,372
43,257	Mean	3,766	25,297	47,012
51,991	+1 S.D.	4,483	30,665	57,073

Scenario 2B-2:

- Projections very high (pink box)
(2,989 – 57,073 Chinook)
- Since based on high bycatch rates from 1990's bottom trawl (blue)

a. Bottom trawl, summer.

		Bycatch rates (x)		
		0.002	0.015	0.028
GF landings (y)		Min	Mean	Max
20,482	Min	51	315	569
24,470	Mean	61	376	679
28,522	Max	71	438	792

b. Midwater non-whiting trawl, summer.

		Bycatch rates (x)		
		0.230	0.762	1.294
GF landings (y)		Min	Mean	Max
329	Min	76	251	426
750	Mean	173	572	971
1,060	Max	244	807	1,371

c. Sum components, summer.

GF landings (y)		Bycatch rates (x)		
		Min	Mean	Max
20,811	Min	127	566	995
25,221	Mean	234	948	1,650
29,581	Max	315	1,246	2,163

d. Bottom trawl, winter.

		Bycatch rates (x)		
		0.018	0.045	0.085
GF landings (y)		Min	Mean	Max
12,669	Min	232	576	1,071
17,233	Mean	315	783	1,456
21,091	Max	386	959	1,782

e. Midwater non-whiting trawl, winter

		Bycatch rates (x)		
		0.106	0.263	0.420
GF landings (y)		Min	Mean	Max
267	Min	28	70	112
803	Mean	85	211	337
1,319	Max	140	347	554

f. Sum components, winter

GF landings (y)		Bycatch rates (x)		
		Min	Mean	Max
12,936	Min	260	646	1,183
18,036	Mean	401	994	1,793
22,410	Max	526	1,305	2,336

g. Sum seasons, bottom trawl.

GF landings (y)		Bycatch rates (x)		
		Min	Mean	Max
33,151	Min	283	890	1,639
41,703	Mean	376	1,159	2,136
49,613	Max	457	1,397	2,574

h. Sum seasons, non-whiting midwater.

GF landings (y)		Bycatch rates (x)		
		Min	Mean	Max
597	Min	104	321	538
1,553	Mean	258	783	1,308
2,379	Max	384	1,154	1,924

i. Sum seasons and components.

GF landings (y)		Bycatch rates (x)		
		Min	Mean	Max
33,748	Min	387	1,212	2,178
43,257	Mean	634	1,942	3,444
51,991	Max	841	2,551	4,499

Scenario 2B-1:

- Projections much lower (yellow)
(less than 4,449 Chinook)
- Since uses lower recent (2012-2014)
b. trawl bycatch rates (green)

Comparison of bycatch rates:
Mean summer (recent)= 13.8x lower ('90's)
Mean winter (recent) = 20.2x lower ('90's)

2B-1 (RECENT RATES) PROJECTIONS DEEMED MORE REASONABLE

(by NMFS and GMT)

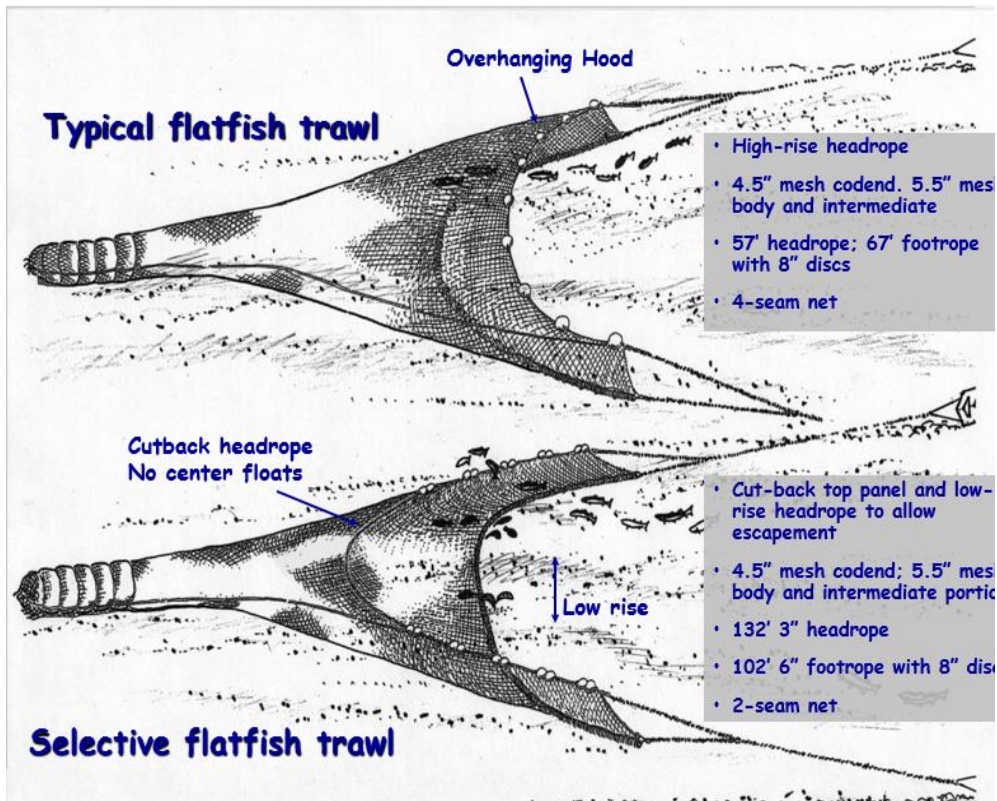
“Due to fleet consolidation, recent impetus on bycatch reduction, etc.”

-- However --

Council requested that 2B-1 projections evaluate removal of
Selective Flatfish Trawl (SFFT) requirement

Why evaluate removal of SFFT requirement?

- 2B-1 projections based on recent bycatch rates that include SFFT
- Council approved removal of SFFT requirement (Gear Regs. Package)
- Bycatch rates theorized to be lower for SFFTs than “hooded” nets
- Better able to evade capture due to low-rise and cut-back headrope of SFFT?
- If lower, then would expect greater bycatches in future once SFFT rule removed



Step 1:

Compare bycatch rates between “hooded” trawls and SSFTs

**If higher for “hooded” nets,
then replace SSFT bycatch rates with those of “hooded nets**

Bycatch rates were 63.8 times higher for “hooded” nets

(When compared in the SFFT regulatory area: North of 40.10 and shoreward of the RCA)

Bottom trawl type	Era	Haul count	Chinook count	Groundfish mt	Chinook per MT	X higher
Hooded, high-rise small footrope	2002-2004	3,214	2,517	1,287	1.955	63.8
Cut-back, low-rise selective flatfish	2005-2014	10,103	259	8,446	0.031	---

Notes:

- (1) SFFT requirement adopted in 2005 (hence pre- and post- 2005 comparison)
- (2) Based on WCGOP observed hauls
- (3) Filtered for SFFT regulatory area (N of 40.10 and shoreward of RCA)
- (4) Excludes SFFT EFP trips before 2005
- (5) From Table 1 of Supplemental NMFS report

Difference not due to shift to IFQ (SFFT rates lower prior to IFQ than after)

Bottom trawl type	Era	Haul count	Chinook count	Groundfish mt	Chinook per MT	X higher
Hooded, high-rise, small footrope	2002-2004	3,214	2,517	1,287	1.9551	294.76
Cut-back, low-rise selective flatfish	2005-2010	4,558	18	2,714	0.0066	---
Cut-back selective flatfish	2011- 2014	5,545	241	5,733	0.0420	6.34

Step 2:

New projections based on removal of SFFT requirement

General Approach:

- Had to replace lesser SFFT bycatch rates with the greater rates of “hooded nets”
- ONLY PERTAINS TO THE PORTION OF THE LANDINGS FROM SFFT AREA
(shoreward of RCA and North of 40.10)
- Because bycatch rates outside SFFT area expected to remain similar (same gear regs)
- Kept same depth, area, and seasonal strata as before

Two approaches used to partition historical landings inside and outside of SFFT area (“shelf”)

Historical distribution

- Based on 1995-1999 logbooks hauls
- Reflects less constrained shelf access (pre overfished rockfish era)
- Greater % shelf during winter
- Better meet Scenario 2B definition?

Recent distribution

- Based on 2011-2014 WCGOP observed hauls
- Reflects constrained shelf access (due to canary and yelloweye being overfished)
- Lesser % shelf during winter
- Chosen since yelloweye may still constrain access

Comparisons of shelf activity from the two approaches (winter is main difference)

Source	Logbook data, 1995-1999		Observer data 2011-2014	
Season	Summer	Winter	Summer	Winter
Min	0.3805	0.1907	0.2829	0.0299
Mean	0.4259	0.2553	0.4121	0.0387
Max	0.4608	0.2992	0.5297	0.0472

NEW SCENARIO 2B B. TRAWL PROJECTIONS BASED ON REMOVAL OF SFFT REQUIREMENT

RECENT WCGOP APPROACH

a. Bottom trawl, assuming min shelf effort, 2011-2014.

		Combined stratified BC rates (x)		
GF landings (y)		Min	Mean	Max
33,151	Min	1,613	6,803	15,290
41,703	Mean	1,951	7,896	17,648
49,613	Max	2,281	9,124	20,367

c. Bottom trawl, assuming mean shelf effort, 2011-2014.

		Combined stratified BC rates (x)		
GF landings (y)		Min	Mean	Max
33,151	Min	2,191	9,540	21,513
41,703	Mean	2,629	10,994	24,648
49,613	Max	3,066	12,675	28,376

e. Bottom trawl, assuming mean shelf effort, 2011-2014.

		Combined stratified BC rates (x)		
GF landings (y)		Min	Mean	Max
33,151	Min	2,724	12,044	27,199
41,703	Mean	3,256	13,833	31,051
49,613	Max	3,793	15,931	35,704

HISTORICAL LOGBOOK APPROACH

b. Bottom trawl, assuming min shelf effort, 1995-1999.

		Combined stratified BC rates (x)		
GF landings (y)		Min	Mean	Max
33,151	Min	4,989	14,750	30,167
41,703	Mean	6,419	18,149	36,631
49,613	Max	7,629	21,317	42,878

d. Bottom trawl, assuming mean shelf effort, 1995-1999.

		Combined stratified BC rates (x)		
GF landings (y)		Min	Mean	Max
33,151	Min	6,365	18,059	36,416
41,703	Mean	8,237	22,397	44,558
49,613	Max	9,803	26,362	52,263

f. Bottom trawl, assuming max shelf effort, 1995-1999.

		Combined stratified BC rates (x)		
GF landings (y)		Min	Mean	Max
33,151	Min	7,313	20,381	40,836
41,703	Mean	9,485	25,364	50,135
49,613	Max	11,295	29,882	58,857

**Considerably higher than
2B-1 B. trawl projections**

g. Sum seasons, bottom trawl.

GF landings (y)		Bycatch rates (x)		
		Min	Mean	Max
33,151	Min	283	890	1,639
41,703	Mean	376	1,159	2,136
49,613	Max	457	1,397	2,574

Table 1.b. from NMFS supplemental
Copy for Table 14 from NMFS Report 1

**Need to add mid-water for total
non-whiting projection
(+ 104-1,924 Chinook)**

h. Sum seasons, non-whiting midwater.

GF landings (y)		Bycatch rates (x)		
		Min	Mean	Max
597	Min	104	321	538
1,553	Mean	258	783	1,308
2,379	Max	384	1,154	1,924

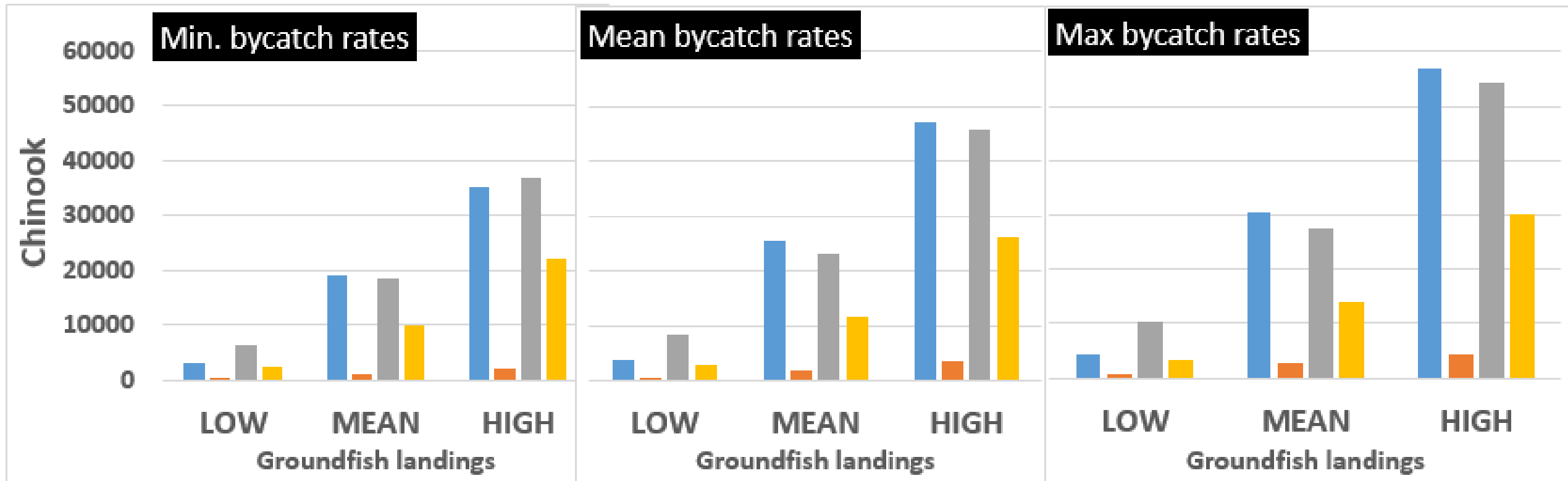
TABLE 3A – 3F FROM NMFS SUPPLEMENTAL REPORT

COMPARISON OF ALL 2B PROJECTIONS BASED ON MEAN HISTORICAL LANDINGS

(Including mid-water)

Scenario	Source	Bottom trawl bycatch rate description	Approach for replacing low bycatch rate <u>SFFT</u> s w/ higher rates of hooded nets	Min	Med	Max
2B-1	NMFS report 1; Table 14-i	Recent WCGOP observed hauls. Includes low bycatch rate <u>SFFT</u> s for shelf	---	634	1,942	3,444
2B-No SFFT: "recent shelf activity"	NMFS Supp. April 2017; Table 3-c B. trawl + Table 1-h mid-water	SFFT replaced w/ higher bycatch rate hooded nets (2002-2004 WCGOP) in shelf.	<u>Recent</u> : higher hooded rate applied to portion of shelf GF landings during IFQ for WCGOP observed hauls.	2,887	11,777	25,956
2B-No SFFT: "historical shelf activity"	NMFS supp. April 2017; Table 3-d b. trawl + Table 1-h mid-water	SFFT replaced w/ higher bycatch rate hooded nets (2002-2004 WCGOP) in shelf.	<u>Historical</u> : higher hooded rate applied to portion of GF landings in shelf during 1990's from logbooks.	8,495	23,180	45,866
2B-2	NMFS report 1; Table 18-e	1990's EDCP observed hauls for bottom trawl that were assumed to be 100% hooded.	---	3,766	25,297	47,012

COMPARISON OF ALL 2B PROJECTIONS



LEGEND:

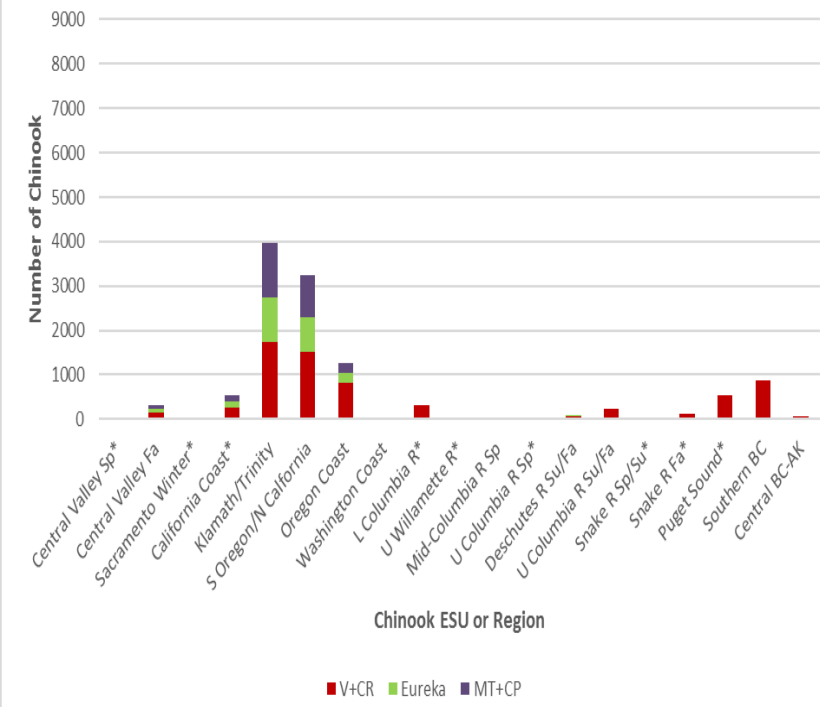
- Blue:** 2B-2 (historical b. trawl rates from EDCP)
- Orange:** 2B-1 (recent b. trawl rates from WCGOP)
- Grey:** NO SFFT – HISTORICAL (mean shelf effort)
- Tan:** NO SFFT – RECENT (mean shelf effort)

TAKE-HOMES FOR REMOVAL OF SFFT:

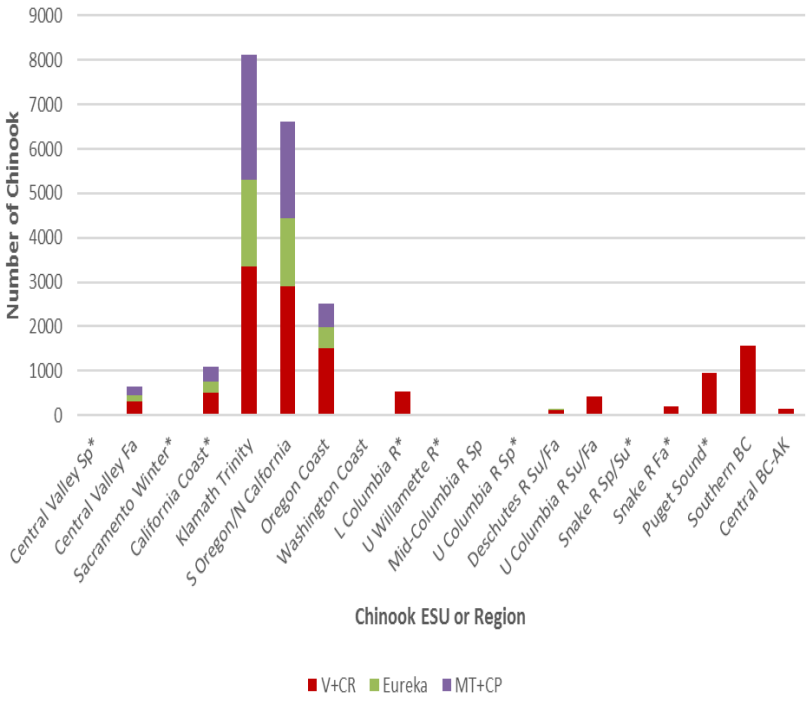
- (1) GREATLY INCREASES PROJECTIONS COMPARED TO 2B-2**
(orange vs grey and tan)
- (2) ASSUMPTION OF SHELF ACTIVITY INFLUENTIAL**
(~2X greater if use higher historical shelf activity)
- (3) NON-WHITING PROJECTIONS VERY UNCERTAIN**

COMPARISON OF ALL 2B PROJECTIONS: Stock Composition

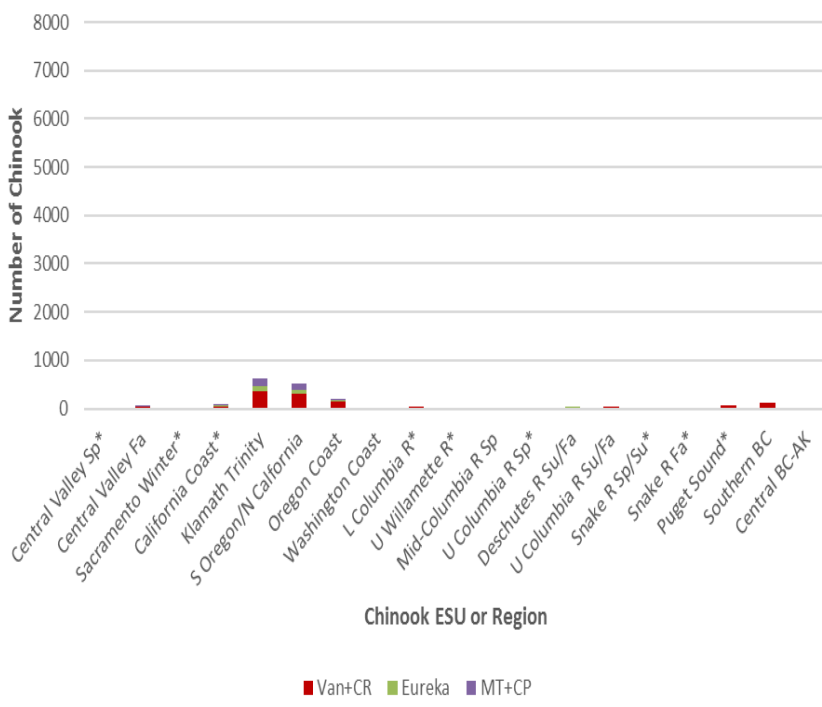
2B1: Hooded Trawl Net BCR - Recent Mean Depth
Mean Chinook Bycatch by ESU and Management Area



2B1: Hooded Trawl Net BCR - 1990 Mean Depth
Mean Chinook Bycatch by ESU and Management Area



2B1: Pre-RCA, Robust Rockfish Access, Recent Bycatch Rates
Mean Chinook Bycatch by ESU and Management Area



TAKE-HOMES FOR REMOVAL OF SFFT:

- (1) GREATLY INCREASES PROJECTIONS BY ESU COMPARED TO Scenario 2B1 as presented in March
- (2) DISTRIBUTION AMONG AREAS UNCHANGED FROM MARCH
- (3) NON-WHITING PROJECTIONS VERY UNCERTAIN

Conclusions:

- (1) Non-whiting projections higher for Scenario 2B when considering removal of SFFT requirement**
- (2) Greater credence that high bycatches from 2B-2 projections were plausible (essentially a hindcast of 1990's bycatch prior to SFFT rule, higher landings, no RCA, etc.)**
- (3) And same for the high 2002-2003 WCGOP estimates (new "No SFFT" projections using recent distributions similar to hindcast of 2002-2003)**
- (4) FUTURE NON-WHITING BYCATCH HIGHLY UNCERTAIN**
 - (a) Based on sparse bycatch rate data (due to minor shelf activity during observer era)**
 - (b) Highly influenced by gear assumptions and assumed behavior**
 - (c) Also contingent on if landings will return to historical levels**