

Pacific ocean perch

Changes in projected biomass and catch for 2016

	Actual or estimated		Percent change
	Estimated in 2014 (t)	in 2015 (t)	
2014 catch	31,162	32,383	3.9
2015 catch	30,029	32,029	6.7
2016 Biomass	561,090	557,886	-0.6
2016 ABC	33,550	33,320	-0.7
2016 OFL	40,809	40,529	-0.7

Change between 2015 and 2016

	Percent	
	2015	2016 change
ABC	34,988	33,320 -4.8
OFL	42,588	40,529 -4.8
Biomass (t)	577,967	557,886 -3.5

Methodology for estimating 2015 catch

$$\begin{array}{l} \text{2015 catch} \\ \text{through end of} \\ \text{September} \end{array} + \left[\begin{array}{l} \text{Remaining ABC} \\ \text{after end of} \\ \text{September} \end{array} \times \begin{array}{l} \text{Proportion of} \\ \text{remaining Oct -Dec} \\ \text{ABC captured in} \\ \text{recent 2 years} \end{array} \right]$$

$$24,338 \text{ t} + \left[10,650 \text{ t} \times 0.72 \right] = 32,029 \text{ t}$$

Estimated 2016 catch (30,579 t) was assumed to be obtained from fishing at the same rate as estimated for 2015 (0.082).

POP summary table

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2015	2016	2016	2017
<i>M</i> (natural mortality rate)	0.062	0.062	0.062	0.062
Tier	3a	3a	3a	3a
Projected total (age 3+) biomass	577,967	561,090	557,886	542,162
Female spawning biomass (t)				
Projected	234,426	223,744	222,369	211,339
<i>B</i> _{100%}	423,008	423,008	423,008	423,008
<i>B</i> _{40%}	169,203	169,203	169,203	169,203
<i>B</i> _{35%}	148,053	148,053	148,053	148,053
<i>F</i> _{OFL}	0.109	0.109	0.109	0.109
<i>maxF</i> _{ABC}	0.089	0.089	0.089	0.089
<i>F</i> _{ABC}	0.089	0.089	0.089	0.089
OFL (t)	42,558	40,809	40,529	38,589
maxABC (t)	34,988	33,550	33,320	31,724
ABC (t)	34,988	33,550	33,320	31,724
Status	As determined last year for:		As determined this year for:	
	2013	2014	2014	2015
Overfishing	No	n/a	No	n/a
Overfished	n/a		n/a	No
Approaching overfished	n/a		n/a	No

Area apportionment

	WAI	CAI	EAI	EBS
Estimated 2014 biomass (from random effects model)	311,678	236,416	254,448	268,506
Proportion of biomass	29.1%	22.1%	23.8%	25.1%

Recommended apportionment based on random effects model

Northern rockfish

Changes in projected biomass and catch for 2016

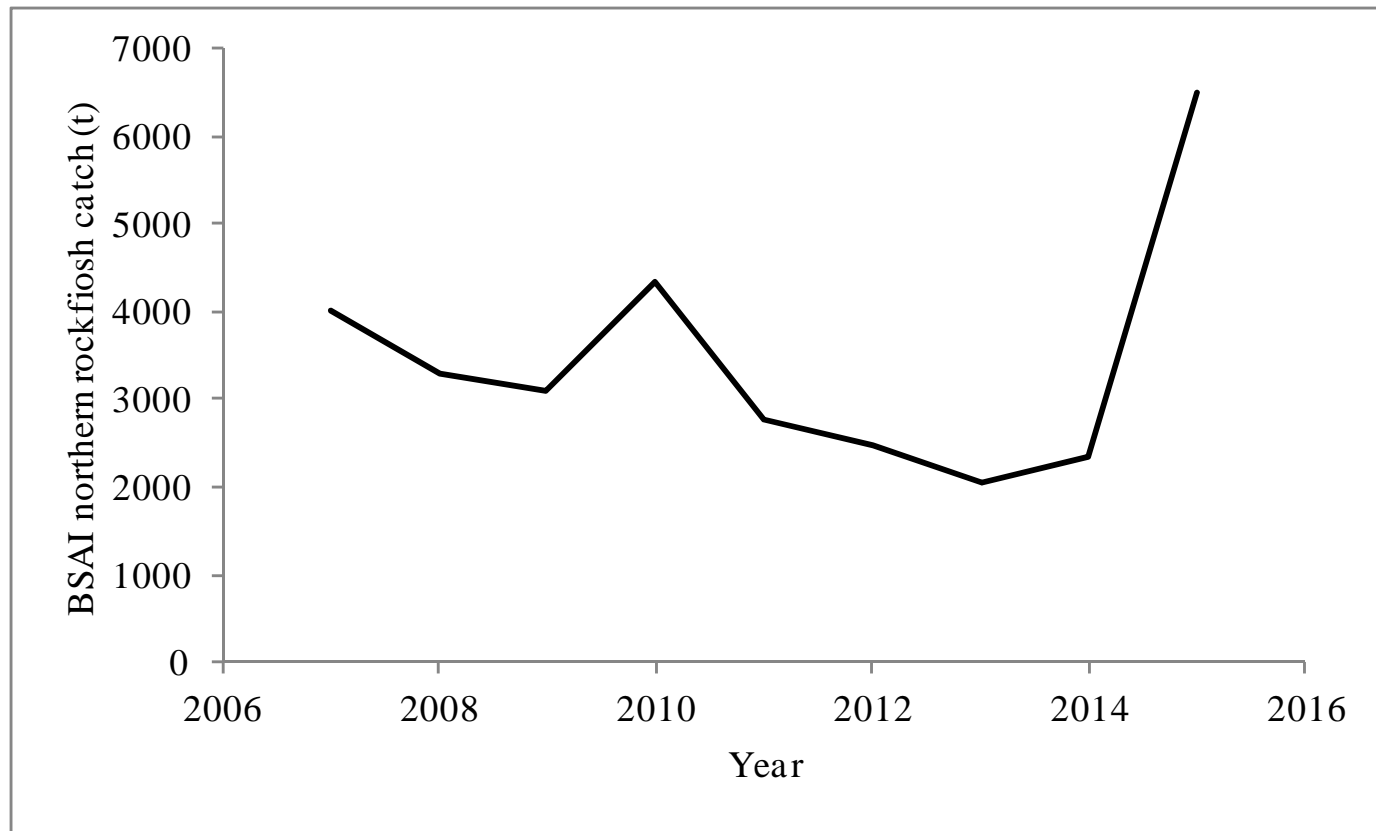
	Estimated in 2014 (t)	Actual or estimated	
		in 2015 (t)	Percent change
2014 catch	2,468	2,342	-5.1
2015 catch	2,201	7,589	244.8
2016 Biomass	218,898	213,674	-2.4
2016 ABC	12,295	11,960	-2.7
2016 OFL	15,100	14,689	-2.7

Change between 2015 and 2016

	Percent		
	2015	2016	change
ABC	12,488	11,960	-4.2
OFL	15,337	14,689	-4.2
Biomass (t)	218,901	213,674	-2.4

Recent catch of BSAI northern rockfish

(2015 is through Sept 30)



Methodology for estimating 2015 catch

$$\begin{array}{l} \text{2015 catch} \\ \text{through end of} \\ \text{September} \end{array} + \left[\begin{array}{l} \text{Catch from Oct} \\ \text{1-17} \end{array} \times \begin{array}{l} \text{Estimate of length} \\ \text{of time catch will} \\ \text{continue (relative to} \\ \text{the period from Oct} \\ \text{1-17)} \end{array} \right]$$

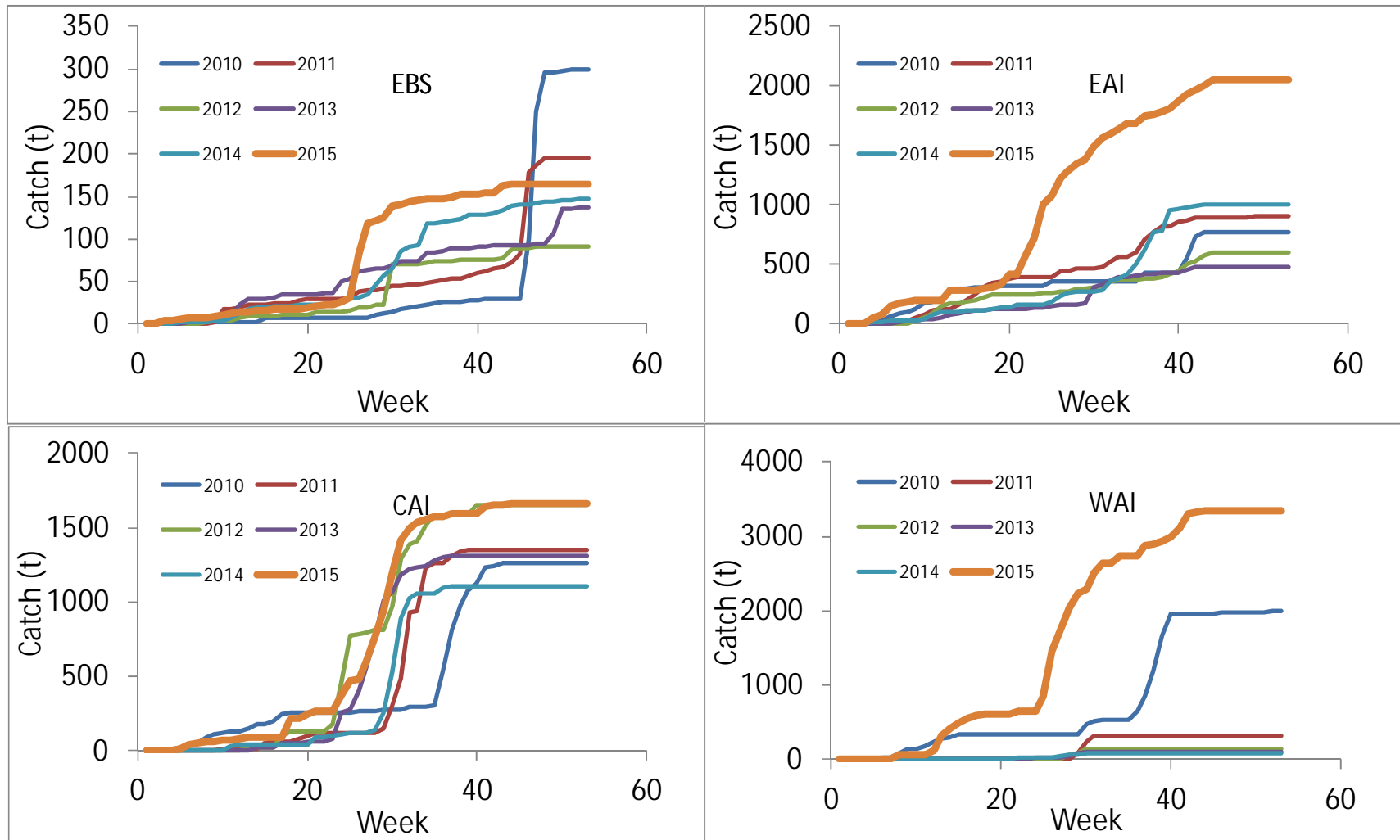
$$6,491 \text{ t} + \left[549 \text{ t} \times 2 \right] = 7,589 \text{ t}$$

Estimated 2016 catch (7,263 t) was assumed to be obtained from fishing at the same rate as estimated for 2015 (0.042).

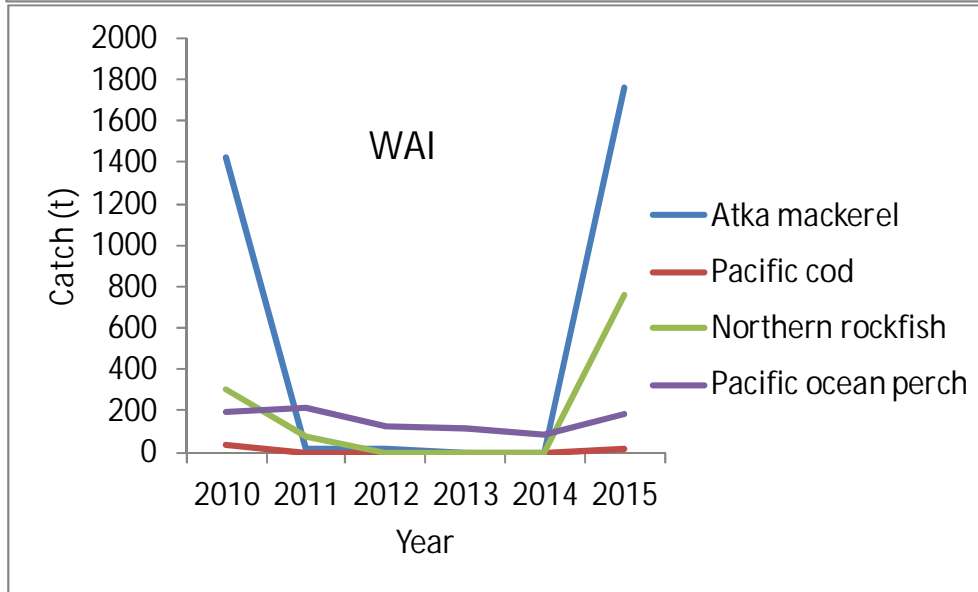
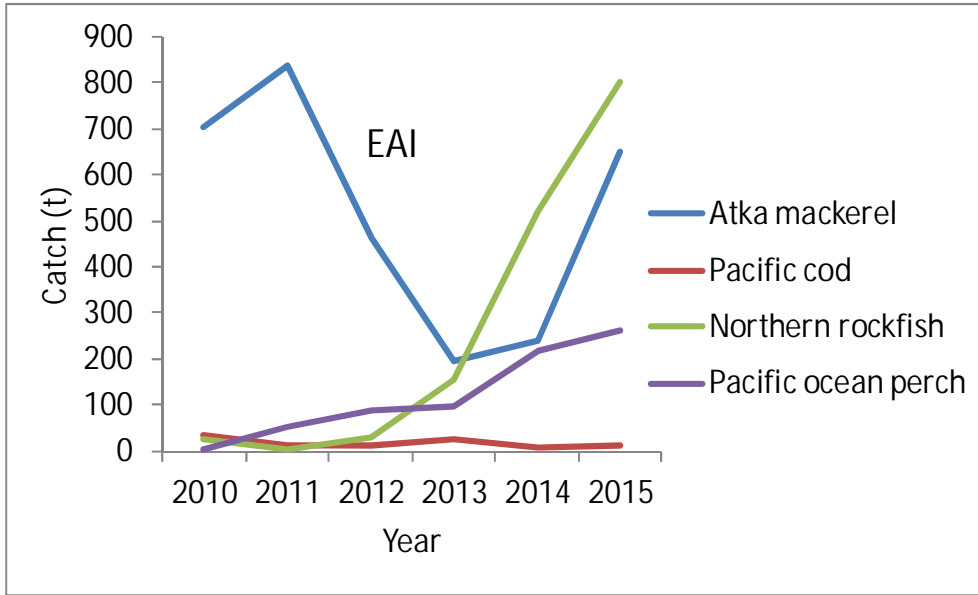
Northern rockfish summary table

Quantity	As estimated or specified last year for:		As estimated or recommended this year for:	
	2015	2016	2016	2017
<i>M</i> (natural mortality rate)	0.049	0.049	0.049	0.049
Tier	3a	3a	3a	3a
Projected total (age 3+) biomass	218,901	218,898	213,674	209,369
Female spawning biomass (t)				
Projected	94,873	93,540	91,648	88,326
<i>B</i> _{100%}	144,420	144,420	144,420	144,420
<i>B</i> _{40%}	57,768	57,768	57,768	57,768
<i>B</i> _{35%}	50,547	50,547	50,547	50,547
<i>F</i> _{OFL}	0.087	0.088	0.087	0.087
<i>maxF</i> _{ABC}	0.070	0.070	0.070	0.070
<i>F</i> _{ABC}	0.070	0.070	0.070	0.070
OFL (t)	15,337	15,100	14,689	14,085
maxABC (t)	12,488	12,295	11,960	11,468
ABC (t)	12,488	12,295	11,960	11,468
Status	As determined last year for:		As determined this year for:	
	2013	2014	2014	2015
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

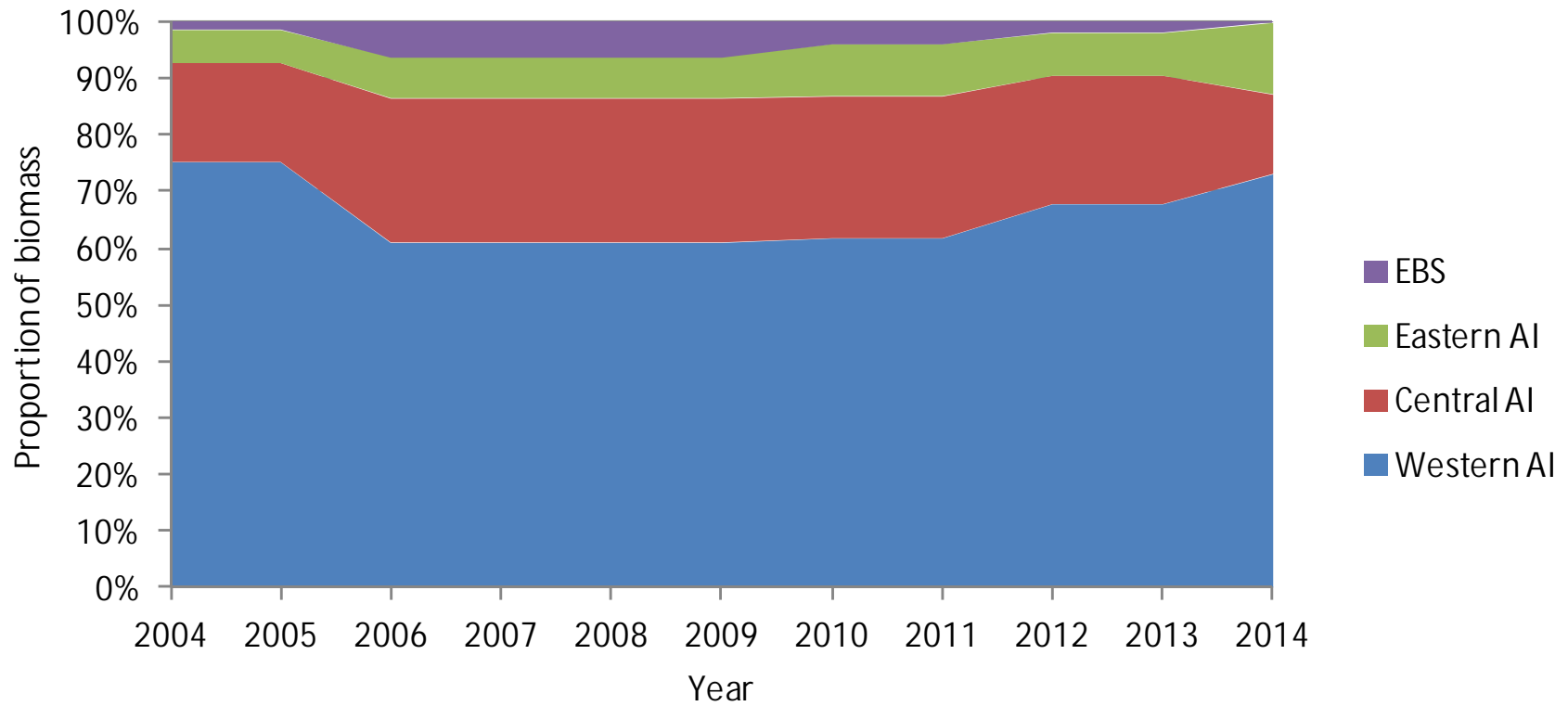
I ncreased 2015 catch has occurred in the east AI , and west AI



Northern rockfish catch by target fishery (from observer tows)



Spatial distribution of northern survey rockfish biomass



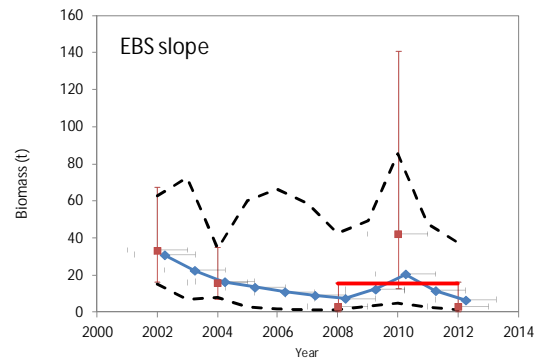
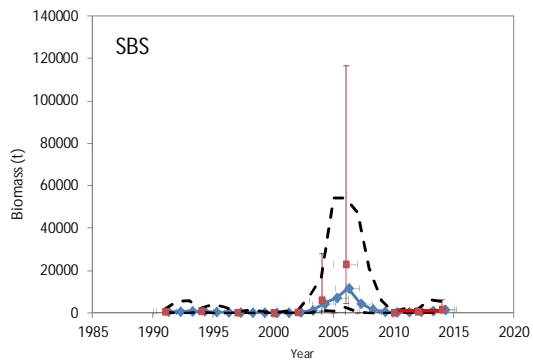
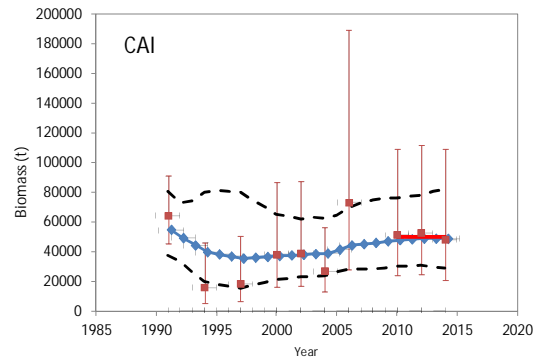
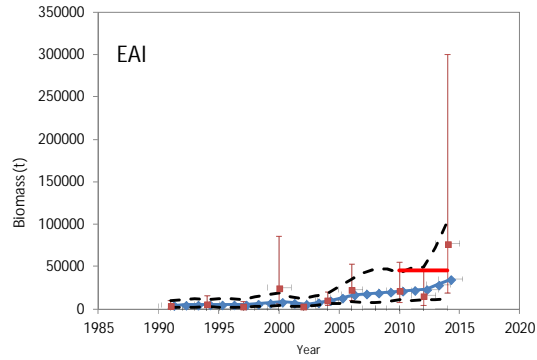
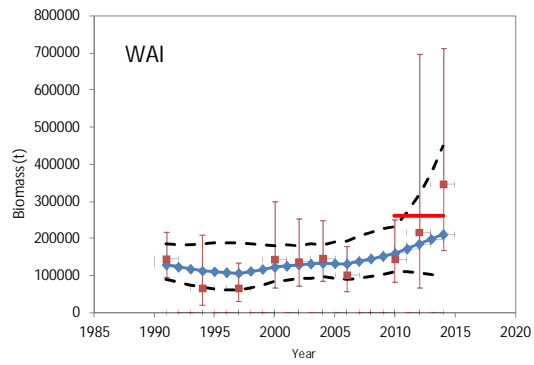
This story should sound familiar . . .



"It's like deja-vu, all over again"

Yogi Berra,
1925-2015

Fits of random effects model to survey biomass estimates



Comparison of subarea biomass from random effects model and weighted average

Smoothed survey biomass estimates

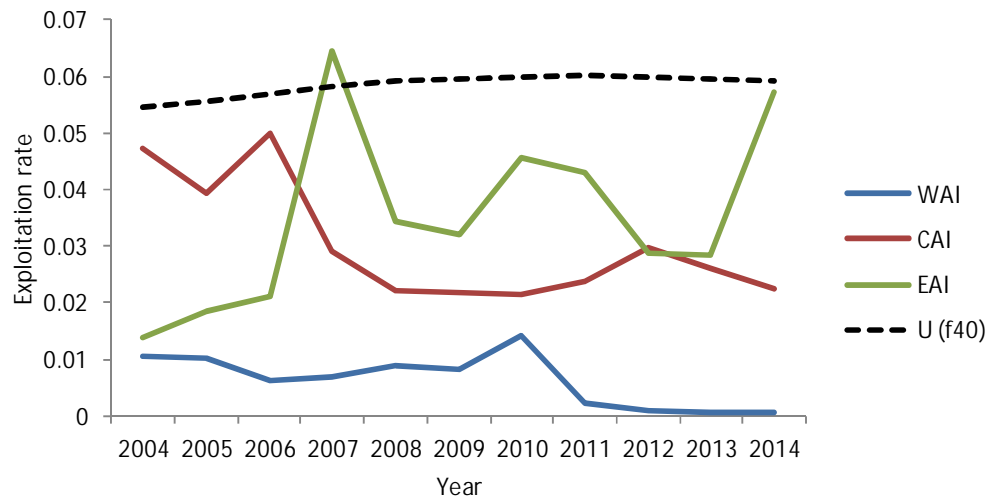
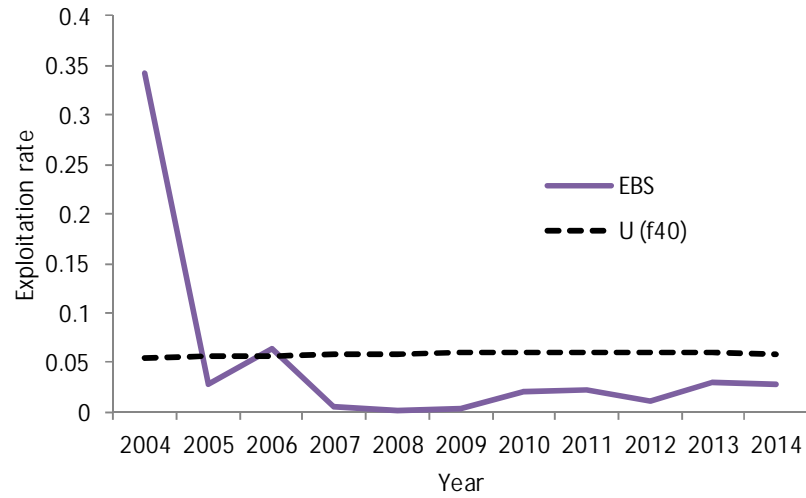
	WAI	CAI	EAI	SBS	EBS slope
weighted average	262699	50200	45903	1004	16
Re model	211018	48650	35151	1428	7

Proportion of smoothed biomass

weighted average	0.73	0.14	0.13	0.0028	0.0000
Re model	0.71	0.16	0.12	0.0048	0.0000

Area specific exploitation rates for BSAI Northern rockfish

~~Looks like it is not so much of a problem~~ maybe we should revisit this



From 2012 BSAI Plan Team minutes

“The Team discussed whether setting area ABCs would be likely to change the amount actually caught. Mary Furuness said that it would not, but it would complicate management. She also suggested that there might be other ways to make area exploitation rates less disproportionate (e.g., getting industry to agree on voluntary measures).

We would like to incorporate management considerations more explicitly in the process, to be able to weigh more effectively the costs and benefits of management outcomes. ”

Comparison of subarea biomass from random effects model and weighted average, with potential ABCs

Smoothed survey biomass estimates

	WAI	CAI	EAI	SBS	EBS slope
weighted average	262699	50200	45903	1004	16
Re model	211018	48650	35151	1428	7

Proportion of smoothed biomass

weighted average	0.73	0.14	0.13	0.0028	0.0000
Re model	0.71	0.16	0.12	0.0048	0.0000

Potential 2016 ABCs (from RE model)

WAI	CAI	EAI	EBS	Total
8519	1964	1419	58	11960

BSAI Blackspotted/rougheye update

AI portion assessed with age-structured model

EBS portion assessed with Tier 5 methods

Changes in projected biomass and catch for 2016 for AI portion

	Actual or estimated		
	Estimated in 2014 (t)	in 2015 (t)	Percent change
2014 catch	192	173	-9.9
2015 catch	282	146	-48.2
2016 Biomass	42,445	42,605	0.4
2016 ABC	522	528	1.1
2016 OFL	642	649	1.1

Change between 2015 and 2016 for AI portion

	Percent		
	2015	2016	change
ABC	420	528	25.7
OFL	516	649	25.8
Biomass (t)	40,391	42,605	5.5
Fabc	0.032	0.037	15.6

Methodology for estimating 2015 AI catch

$$\begin{array}{l}
 \text{2015 AI catch} \\
 \text{through end of} \\
 \text{September}
 \end{array}
 + \left[\begin{array}{l}
 \text{Remaining} \\
 \text{BSAI ABC} \\
 \text{after end of} \\
 \text{September}
 \end{array} \times \begin{array}{l}
 \text{Proportion of} \\
 \text{remaining} \\
 \text{Oct -Dec BSAI} \\
 \text{ABC captured in} \\
 \text{recent years}
 \end{array} \times \begin{array}{l}
 \text{Recent} \\
 \text{proportion of} \\
 \text{Oct BSAI} \\
 \text{catch in AI}
 \end{array} \right]$$

$$139 \text{ t} + \left[285 \text{ t} \times 0.055 \times 0.44 \right] = 146 \text{ t}$$

Estimated 2016 catch (183 t) was assumed to be obtained from fishing at the average of the F estimated for 2014 and 2015 (0.0126).

Summary table for AI portion of BSAI blackspotted/rougheye

Quantity	As estimated or <i>specified</i> last year for:		As estimated or <i>recommended</i> this year for:	
	2015	2016	2016	2017
M (natural mortality rate)	0.033	0.033	0.033	0.033
Tier	3b	3b	3b	3b
Projected total (age 3+) biomass	40,391	42,445	42,605	44,682
Female spawning biomass (t)				
Projected	7,932	9,002	9,076	10,307
$B_{100\%}$	28,507	28,507	28,507	28,507
$B_{40\%}$	11,403	11,403	11,403	11,403
$B_{35\%}$	9,977	9,977	9,977	9,977
F_{OFL}	0.039	0.045	0.045	0.051
$maxF_{ABC}$	0.032	0.036	0.037	0.042
F_{ABC}	0.032	0.036	0.037	0.042
OFL (t)	516	642	649	811
maxABC (t)	420	522	528	661
ABC (t)	420	522	528	661
Status	As determined last year for:		As determined this year for:	
	2014	2015	2015	2016
Overfishing	No	n/a	No	n/a
Overfished	n/a	No	n/a	No
Approaching overfished	n/a	No	n/a	No

Summary table for BS portion of BSAI blackspotted/rougheye

Quantity	As estimated or <i>specified last year for:</i>		As estimated or <i>recommended this year for:</i>	
	2015	2016	2016	2017
M (natural mortality rate)	0.033	0.033	0.033	0.033
Tier	5	5	5	5
Biomass (t)	1,339	1,339	1,339	1,339
F_{OFL}	0.033	0.033	0.033	0.033
$maxF_{ABC}$	0.0248	0.0248	0.0248	0.0248
F_{ABC}	0.0248	0.0248	0.0248	0.0248
OFL (t)	44	44	44	44
maxABC (t)	33	33	33	33
ABC (t)	33	33	33	33
Status	As determined <i>last year for:</i>		As determined <i>this year for:</i>	
	2013	2014	2014	2015
Overfishing	No	n/a	No	n/a

Area apportionments

Estimated biomass from random effects model

	Area					
	WAI	CAI	EAI	AI	SBS	EBS slope
	subarea					
Estimated biomass (from RE model)	566	3,152	1,425	5,143	321	1,018
Proportion of AI biomass	11.0%	61.3%	27.7%			

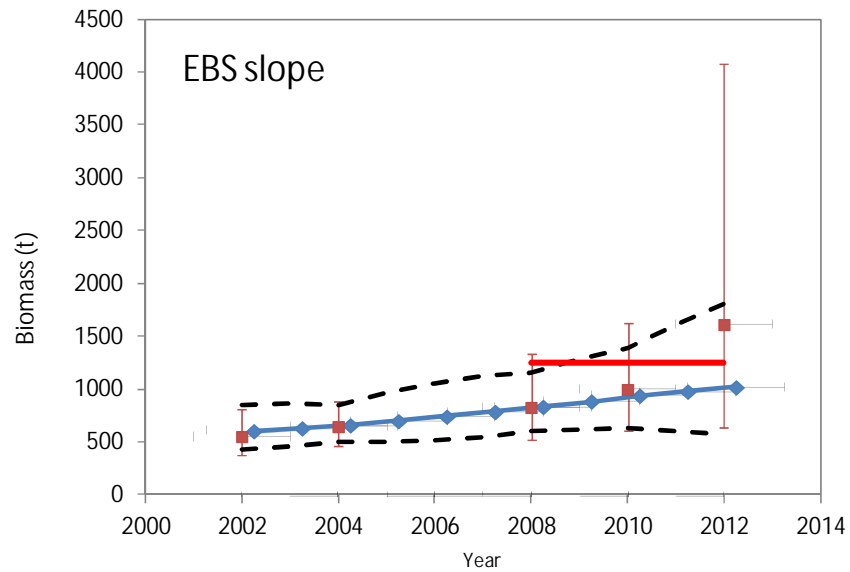
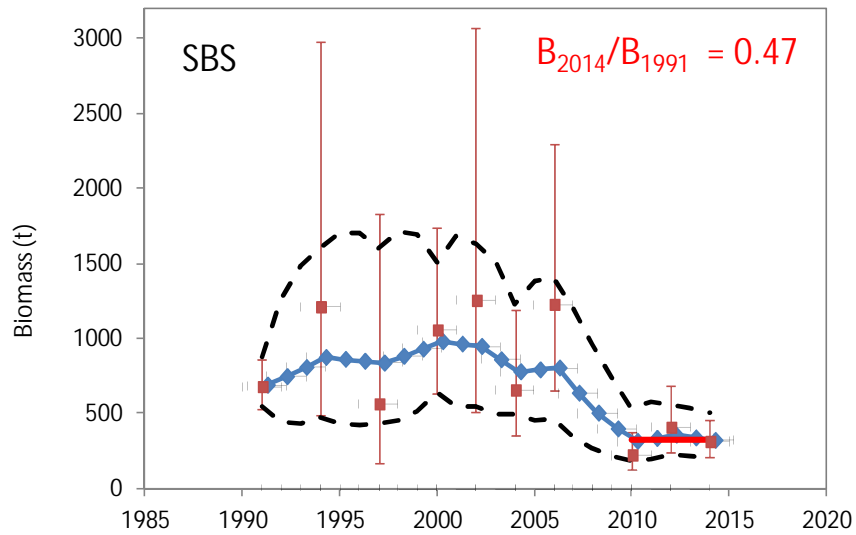
Potential ABCs for BSAI subareas

	WAI	CAI	EAI	EBS
ABC (2016)	58	324	146	33
ABC (2017)	73	405	183	33

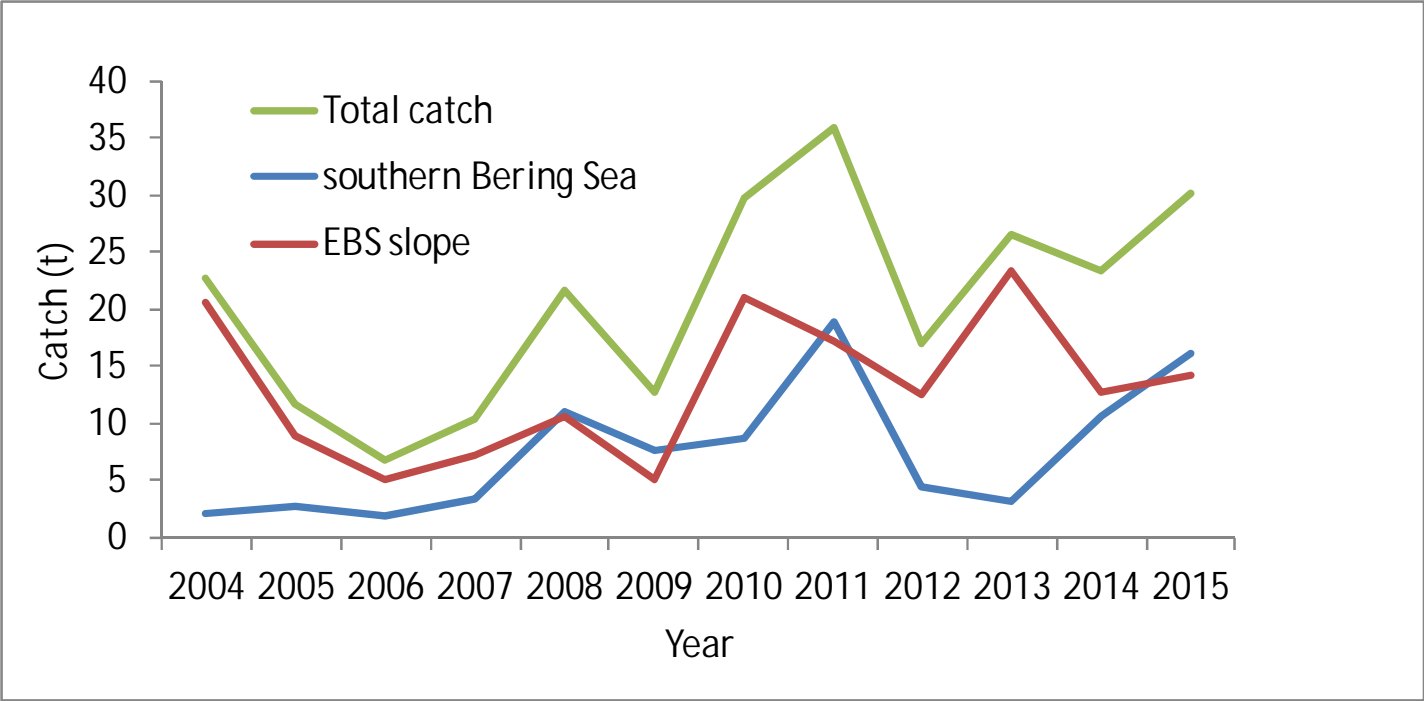
Overall summary table for BSAI blackspotted/rougheye

Area/subarea	Year	Total				
		Biomass (t) ¹	OFL	ABC	TAC	Catch ²
BSAI	2014	30,476	505	475	475	197
	2015	41,780	560	453	349	173
	2016	43,944	693	561	n/a	n/a
	2017	46,201	855	694	n/a	n/a
Western/Central Aleutian Islands	2014			239	239	99
	2015			304	200	112
	2016			382	n/a	n/a
	2017			478	n/a	n/a
Eastern AI/Eastern Bering Sea	2014			177	177	98
	2015			149	149	61
	2016			179	n/a	n/a
	2017			216	n/a	n/a

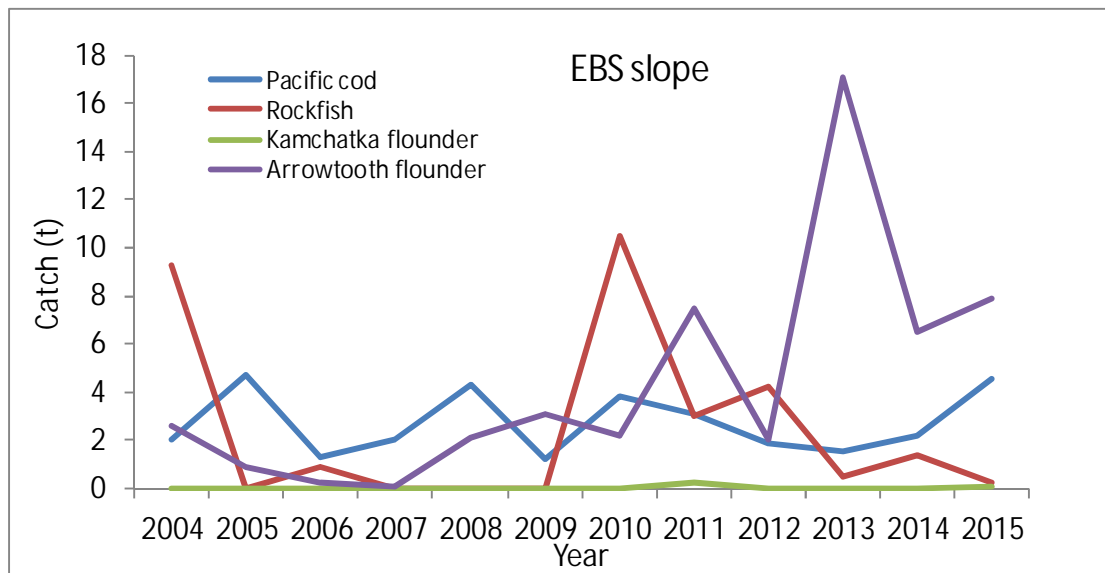
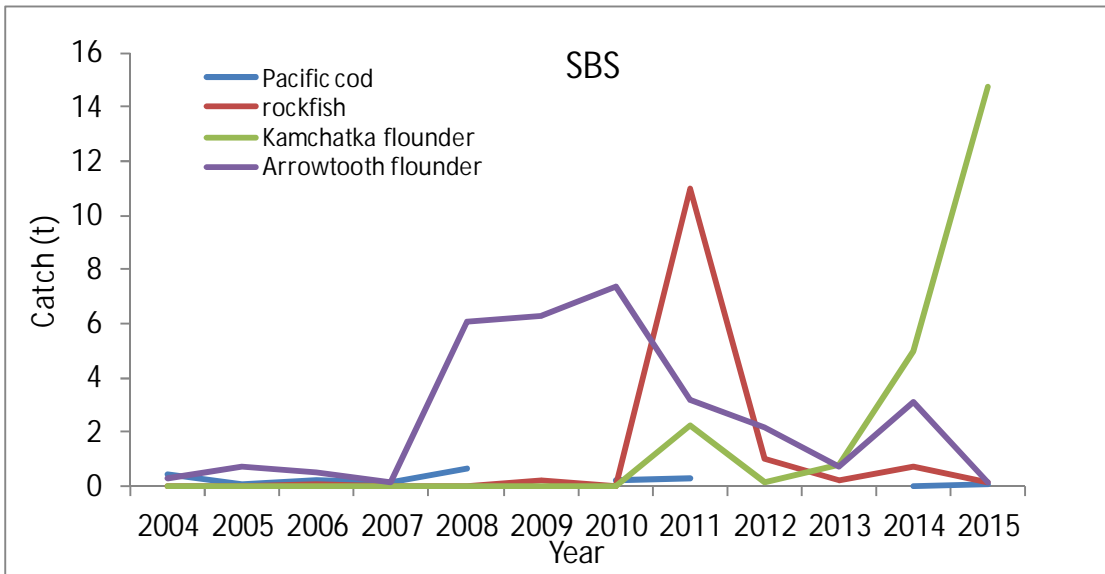
Survey biomass estimates of BS/RE in the EBS



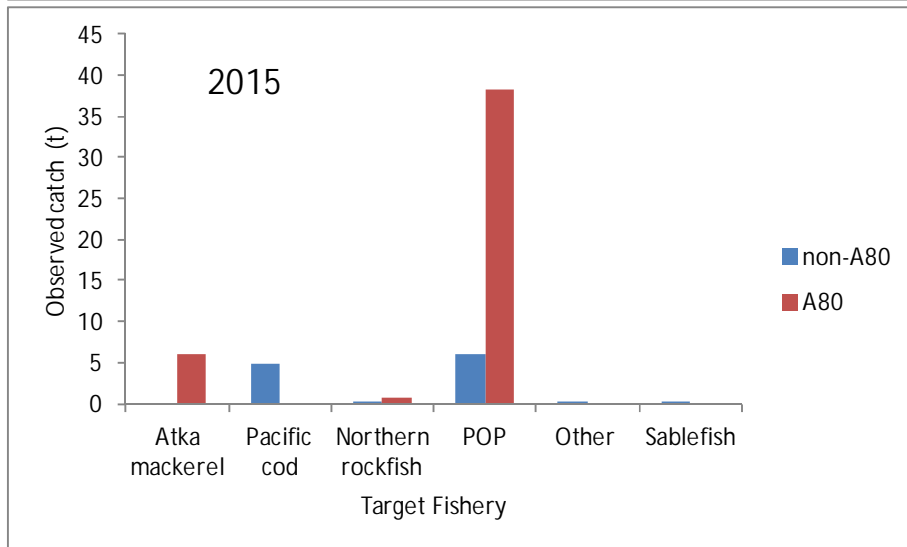
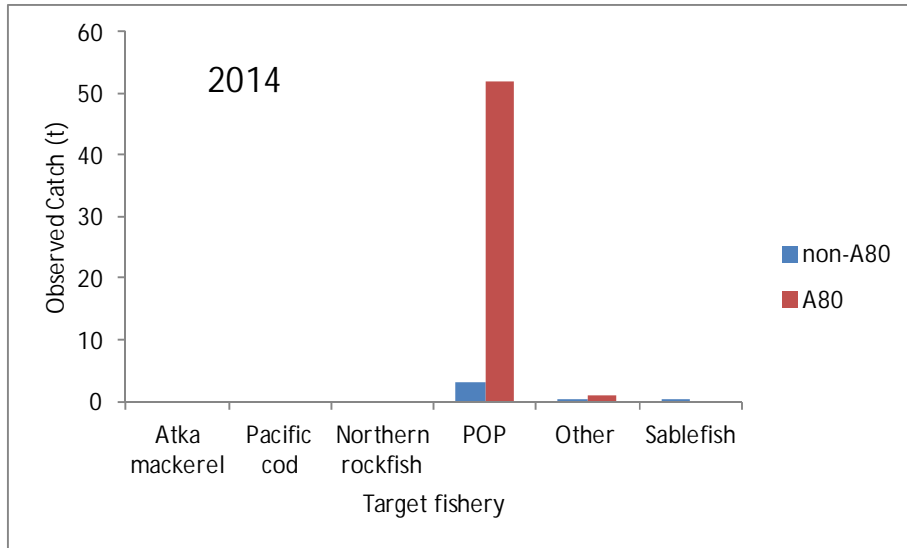
Catch of blackspotted/rougheye rockfish in the EBS



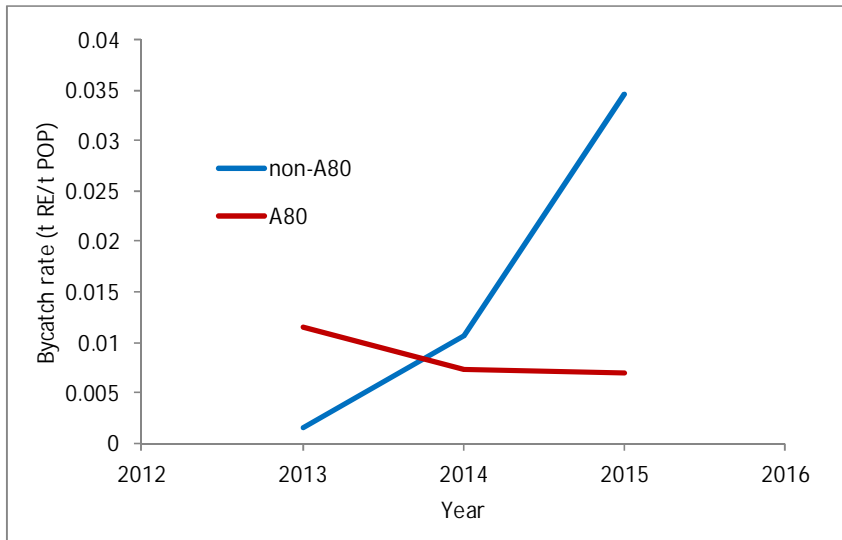
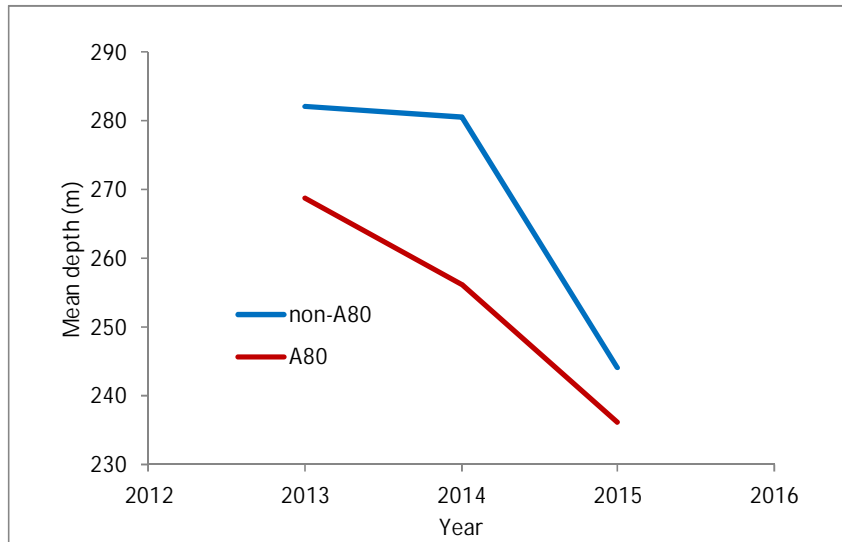
Catch of blackspotted/rougheye rockfish in EBS by fishery



Observed WAI catch of blackspotted/rougheye rockfish by 'target' fishery and A80 status,



Mean depths and blackspotted/rougheye bycatch rates in observed POP tows in the WAI



Bycatch rate, WAI tows, POP target fishery

