

## Amendment 16-4 Groundfish Rebuilding Plans

### Rebuilding Plan Alternatives and Analysis of Effects

## Magnuson-Stevens Act Guidance on Rebuilding Depleted Species

- Rebuild depleted stocks in as short a time as possible
- Consider the stock's status and biology
- Consider the socioeconomic needs of fishing communities
- Consider the interaction of depleted stocks in the marine ecosystem



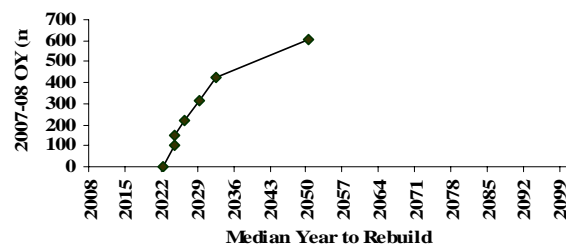
## Optimum Yield Alternatives for Depleted Species

2007-2008 OYs (mt)

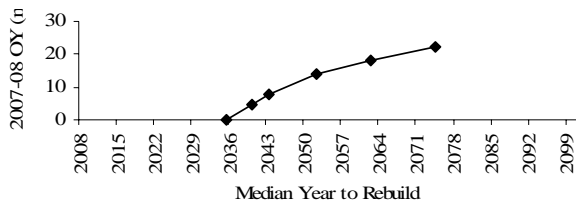
Stock	Association	OY Alt. 1	OY Alt. 2	OY Alt. 3	OY Alt. 4	OY Alt. 5	OY Alt. 6
Yelloweye	Northern Shelf	0	12	17	21	24	27
Canary		0	24	44	68		
Cowcod a/	Southern Shelf	0	8	14	18	22	
Bocaccio		0	149	218	315	424	
Darkblotched	Northern Slope	0	130	229	330	472	
POP		0	87	405	514	749	
Widow	Midwater	0	329	456	917	1,369	

a/ OY alternatives for Conception and Monterey areas combined.

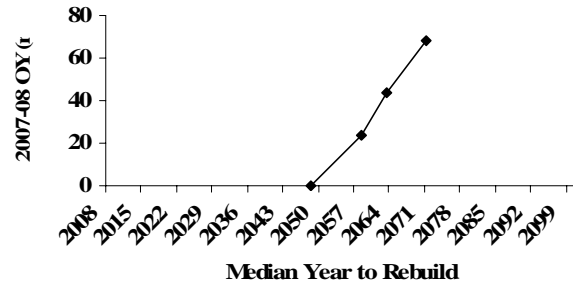
## Alternative Bocaccio OYs vs. Rebuilding Times



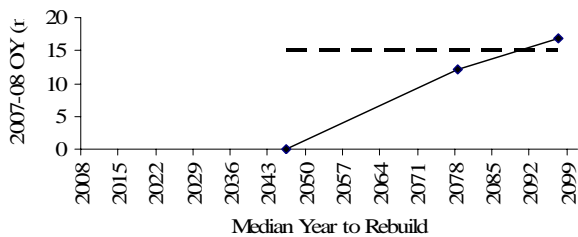
### Alternative Cowcod OYs vs. Rebuilding Times



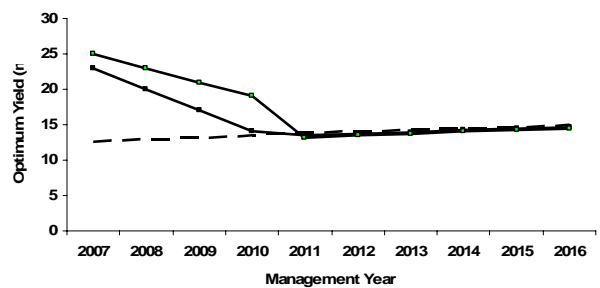
### Alternative Canary Rockfish OYs vs. Rebuilding Times



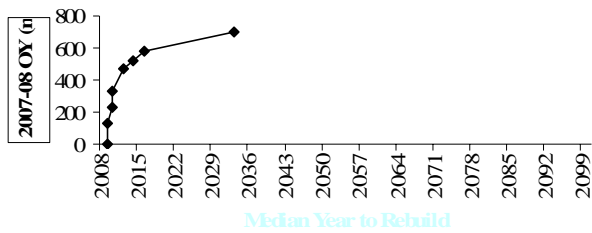
### Alternative Yelloweye Rockfish OYs vs. Rebuilding Times



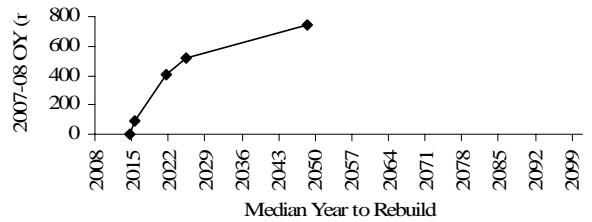
### Alternative Yelloweye Rockfish Rebuilding Strategies Ramping Down the Harvest Rate



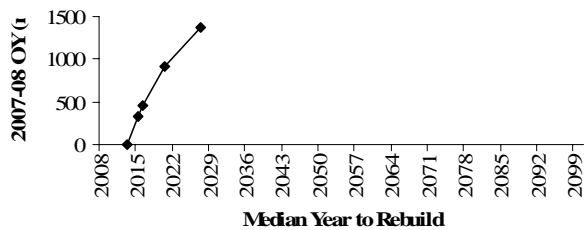
### Alternative Darkblotched Rockfish OYs vs. Rebuilding Times



### Alternative Pacific Ocean Perch OYs vs. Rebuilding Times



### Alternative Widow Rockfish OYs vs. Rebuilding Times



### Limited Entry Trawl Constraints in OR and WA

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Shelf Strategy	Nearshore P. cod	Red	Grey	Green	Green	Green	Green
		Nearshore flatfish	Red	Grey	Green	Green	Green	Green
		Arrowtooth flounder	Orange	Grey	Green	Green	Green	Green
		Spiny dogfish	Red	Grey	Green	Green	Green	Green
		Shelf Dover	Red	Grey	Green	Green	Green	Green
		Shelf Petrale	Red	Grey	Green	Green	Green	Green
	Deep Shelf/Slope	Winter Petrale	Green	Yellow	Grey	Red	Red	Green
		DTS	Green	Yellow	Grey	Red	Red	Green
	Midwater	Hake	Green	Yellow	Grey	Yellow	Red	Green
	OR	Shelf Strategy	Nearshore flatfish	Red	Grey	Green	Green	Green
Arrowtooth flounder			Red	Grey	Green	Green	Green	Green
Shelf Dover			Red	Grey	Green	Green	Green	Green
Shelf Petrale			Red	Grey	Green	Green	Green	Green
Deep Shelf/Slope		DTS	Green	Yellow	Grey	Red	Red	Green
		Winter Petrale	Green	Yellow	Grey	Red	Red	Green
Midwater	Hake	Green	Yellow	Grey	Yellow	Red	Green	

### Limited Entry Trawl Constraints in CA

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
CA	Shelf Strategy	Nearshore flatfish	Red	Orange	Orange	Green	Green	Green
		Shelf Petrale	Red	Orange	Orange	Green	Green	Green
		Shelf Dover	Red	Orange	Orange	Green	Green	Green
	Deep Shelf/Slope	Winter Petrale	Yellow	Yellow	Green	Orange	Yellow	Green
DTS		Yellow	Green	Green	Red	Yellow	Green	
Slope rockfish		Yellow	Green	Green	Orange	Yellow	Green	
Midwater	Hake	Grey	Orange	Grey	Yellow	Green	Red	
	Chilipepper	Red	Yellow	Green	Green	Yellow	Green	

### Limited Entry Fixed Gear Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Spiny dogfish	Grey	Yellow	Grey	Green	Green	Green	Orange
	Sablefish (primary)	Grey	Yellow	Grey	Green	Green	Green	Orange
OR	Sablefish (primary)	Grey	Yellow	Grey	Green	Green	Green	Orange
	Nearshore rockfish	Grey	Yellow	Grey	Green	Green	Green	Orange
CA	Nearshore rockfish	Orange	Yellow	Green	Green	Green	Green	Yellow
	Nearshore flatfish	Orange	Yellow	Green	Green	Green	Green	Green
	Slope rockfish	Green	Green	Green	Yellow	Green	Green	Green
	Chilipepper	Red	Green	Green	Green	Green	Green	Green

### Open Access Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Spiny dogfish	Grey	Yellow	Grey	Green	Green	Green	Orange
	Sablefish DTL	Grey	Yellow	Grey	Green	Green	Green	Orange
OR	Sablefish DTL	Grey	Orange	Grey	Green	Green	Green	Orange
	Nearshore rockfish	Orange	Orange	Grey	Green	Green	Green	Orange
CA	Nearshore rockfish	Orange	Yellow	Yellow	Green	Green	Green	Yellow
	Nearshore flatfish	Orange	Yellow	Yellow	Green	Green	Green	Green
	Sablefish DTL	Yellow	Yellow	Yellow	Green	Green	Green	Orange
	Slope rockfish	Green	Yellow	Green	Yellow	Green	Green	Green
	Chilipepper	Orange	Yellow	Green	Green	Green	Green	Green

### Potential Tribal Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
Trawl	Nearshore P. cod	Grey	Orange	Grey	Green	Green	Green	Green
	Nearshore/shelf flatfish	Grey	Orange	Grey	Green	Green	Green	Green
	Midwater yellowtail	Grey	Red	Grey	Green	Green	Red	Green
	DTS/deepwater	Grey	Yellow	Grey	Orange	Orange	Green	Green
	Whiting	Grey	Red	Grey	Green	Green	Red	Green
FG	Pacific halibut	Grey	Yellow	Grey	Green	Green	Green	Orange
	Sablefish	Grey	Yellow	Grey	Green	Green	Green	Orange

## Recreational Groundfish Constraints

		Bocaccio	Canary	Cowcod	Dkbl	POP	Widow	Yeye
WA	Groundfish	Grey	Red	Grey	Grey	Grey	Green	Red
	Pacific halibut	Grey	Red	Grey	Grey	Grey	Green	Red
OR	Groundfish	Grey	Red	Grey	Grey	Grey	Green	Red
	Pacific halibut	Grey	Red	Grey	Grey	Grey	Green	Red
CA	Groundfish	Red	Red	Orange	Grey	Grey	Green	Red

## Rebuilding Alternatives

Stock	Association	"Status Quo"					
		Reb. Alt.	Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5
Yelloweye	Northern	27	21	17	21	12	12
Canary	Shelf	44	24	44	68	24	24
Cowcod	Southern	5	8	18	22	14	3
Bocaccio	Shelf	149	149	218	424	315	40
Darkblotched	Northern	229	330	229	472	472	130
POP	Slope	87	405	87	749	405	44
Widow	Midwater	329	456	329	917	329	120

## Status Quo Rebuilding Alternative

Yelloweye	Northern Shelf	27
Canary	Northern Shelf	44
Cowcod	Southern Shelf	5
Bocaccio	Southern Shelf	149
Darkblotched	Northern Slope	229
POP	Northern Slope	87
Widow	Midwater	329

- Best prediction of impacts with status quo management measures
- Potentially each stock equally constraining
- No management flexibility to react to changes in fleet behavior or recruitment variability

## Rebuilding Alternative 1

Yelloweye	Northern Shelf	21
Canary	Northern Shelf	24
Cowcod	Southern Shelf	8
Bocaccio	Southern Shelf	149
Darkblotched	Northern Slope	330
POP	Northern Slope	405
Widow	Midwater	456

- Increased slope and midwater trawl opportunities
- Decrease in coastwide shelf fishing opportunities

## Rebuilding Alternative 2

Yelloweye	Northern Shelf	17
Canary		44
Cowcod	Southern Shelf	18
Bocaccio		218
Darkblotched	Northern Slope	229
POP		87
Widow	Midwater	329

- Close to status quo slope and midwater trawl opportunities
- Increased southern shelf fishing opportunities
- Decreased northern shelf fishing opportunities for recreational and fixed gears

## Rebuilding Alternative 3

Yelloweye	Northern Shelf	21
Canary		68
Cowcod	Southern Shelf	22
Bocaccio		424
Darkblotched	Northern Slope	472
POP		749
Widow	Midwater	917

- Increased slope and midwater trawl opportunities
- Increased coastwide shelf fishing opportunities

## Rebuilding Alternative 4

Yelloweye	Northern Shelf	12
Canary		24
Cowcod	Southern Shelf	14
Bocaccio		315
Darkblotched	Northern Slope	472
POP		405
Widow	Midwater	329

- Increased slope and midwater trawl opportunities
- Dramatically decreased northern shelf fishing opportunities
- Decreased southern shelf fishing opportunities north of Pt. Conception
- Increased shelf fishing opportunities south of Pt. Conception

## Rebuilding Alternative 5

Yelloweye	Northern Shelf	12
Canary		24
Cowcod	Southern Shelf	3
Bocaccio		40
Darkblotched	Northern Slope	130
POP		44
Widow	Midwater	120

- Dramatically decreased slope and midwater trawl opportunities
- Dramatically decreased coastwide shelf fishing opportunities

## Rebuilding OY Implications

- Under a constant harvest rate strategy, an OY decision for 2007-2008 sets the harvest rate and the target year to rebuild (defined as median year to rebuild under that harvest rate)
- If a different strategy is decided (i.e., a harvest rate ramp-down strategy for yelloweye), the Council should clearly state the rationale for this decision and the target rebuilding year



## Rebuilding OY Considerations

- **Key Considerations**
  - Recruitment variability
  - Uncertainty in catch monitoring systems
  - Stock status uncertainty
- **Possible Remedies**
  - Strategy where OYs are managed in a longer term than annually?
  - Establish an OY buffer?



## Needs of Communities Project Context

- “These actions must also conform to a recent court ruling in the Ninth Circuit Court of Appeals, which interpreted the rebuilding requirements of the MSA as: 1) the rebuilding periods must be as short as possible; 2) **short-term needs of fishing communities** may be taken into account in setting rebuilding periods; 3) **to avoid disastrous short-term consequences**, NMFS may set limited quotas that allow for some fishing of plentiful species, despite the inevitability of bycatch.”

## What is a Fishing Community?

- Although from a distance the “fishing community” may seem like a single group of like-minded people, it actually consists of many communities based on gear type, fishery, geography, and values. Social scientists spend a lot of time trying to define “community” so that communities can be studied and compared. The Magnuson-Stevens Act (MSA) defines a fishing community as:
- “a community which is substantially dependent on or substantially engaged in the harvest or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew and United States fish processors that are based in such community.”
- In interpreting this definition, the National Marine Fisheries Service has stated that “A fishing community is a social or economic group whose members reside in a specific location...”. This “official” interpretation means that a fishing community exists in a specific place like Astoria, San Pedro, or Seattle. However, other types of communities exist. For example, an “occupational community” is a group of people involved in the same occupation, like the coastwide community of trawlers who engage in similar activities. A “community of interest” is made up of people who share similar interests - for example, people who are concerned about making the fishing industry safer. One town or city might include many different occupational communities and communities of interest.

## Overall FMP Goals and Objectives

- The Council is committed to developing long-range plans for managing the Washington, Oregon, and California groundfish fisheries that will promote a stable planning environment for the seafood industry, including marine recreation interests, and will maintain the health of the resource and environment. In developing allocation and harvesting systems, the Council will give consideration to maximizing economic benefits to the United States, consistent with resource stewardship responsibilities for the continuing welfare of the living marine resources. Thus, management must be flexible enough to meet changing social and economic needs of the fishery as well as to address fluctuations in the marine resources supporting the fishery.

## Economic Objectives

- Objective 6. Attempt to achieve the greatest possible net economic benefit to the nation from the managed fisheries.
- Objective 7. Identify those sectors of the groundfish fishery for which it is beneficial to promote year-round marketing opportunities and establish management policies that extend those sectors fishing and marketing opportunities as long as practicable during the fishing year.
- Objective 8. Gear restrictions to minimize the necessity for other management measures will be used whenever practicable.



## Social Objectives

Objective 13. When conservation actions are necessary to protect a stock or stock assemblage, attempt to develop management measures that will affect users equitably.

Objective 14. Minimize gear conflicts among resource users.

Objective 15. When considering alternative management measures to resolve an issue, choose the measure that best accomplishes the change with the least disruption of current domestic fishing practices, marketing procedures, and the environment.

Objective 16. Avoid unnecessary adverse impacts on small entities.

Objective 17. Consider the importance of groundfish resources to fishing communities, provide for the sustained participation of fishing communities, and minimize adverse economic impacts on **fishing communities** to the extent practicable

## Rebuilding Objectives-General

- 1) achieve the population size and structure that will support the maximum sustainable yield within the specified time period;
- 2) minimize, to the extent practicable, the adverse social and economic impacts associated with rebuilding, including adverse impacts on **fishing communities**;
- 3) fairly and equitably distribute both the conservation burdens (overfishing restrictions) and recovery benefits among commercial, recreational, and charter fishing sectors;
- 4) protect the quantity and quality of habitat necessary to support the stock at healthy levels in the future; and
- 5) promote widespread public awareness, understanding and support for the rebuilding program. More specific goals and objectives may be developed in the rebuilding plan for each overfished species.

## Rebuilding Objectives-Specific

The Council may consider a number of factors in determining the time period for rebuilding, including:

1. The status and biology of the stock or stock complex.
2. Interactions between the stock or stock complex and other components of the marine ecosystem or environmental conditions.
3. The **needs of fishing communities**.
4. Recommendations by international organizations in which the United States participates.
5. Management measures under an international agreement in which the United States participates.

## Neither MSA or FMP Defines “Needs”

- FMP Indirect inferences—“importance” “avoid adverse impacts” “equitable allocation among sectors” “year round fishery” “sustained participation” “Net economic benefit” “fair and equitable distribution of burden and benefit among sectors” “stable fishery”
- UK Fisheries
  - Fishing Communities need a sustainable fishery that is safe, well managed, and profitable, that provides jobs and incomes, that contributes to the local social fabric, culture, and image of the community, and helps market the community and its services and products.



## Avoid “Disastrous” Consequences

- In determining “fishery resource disasters” and “commercial fishery failures” MSA nor the Interjurisdictional Fishery Act provides quantitative measures. NOAA has no specific guidelines but like many agencies has processes and every determination is done on a case-by-case basis.

## EDA Disaster Criteria

Plant Closings or Industry restructuring: For areas over 100,000 population, the actual or threatened dislocation is 500 jobs, or **1 percent of the civilian labor force (CLF), whichever is less**. For areas up to 100,000 population, the actual or threatened dislocation is 200 jobs, or 1 percent of the CLF, whichever is less

Natural or other major disasters or emergencies, including terrorists attacks. If an area that has received one of the following disaster declarations is eligible to apply for EDA assistance for a period of 18 months after the date of declaration. (See Previous Slide)

Extraordinary depletion of natural resources. EDA presently recognizes the following conditions of extraordinary natural resource depletion:  
1. Fisheries. 2. Coal. 3. Timber.

## SBA Disaster Declaration

- SBA will make a physical disaster declaration when: At least 25 homes (primary residences) and/or businesses in a county have **uninsured losses of 40%** or more of their estimated fair replacement value (Secondary homes, condominium units, cabins, camps, lake homes, etc., used for recreational purposes are not included in the count.)  
**or** At least three (3) businesses have **uninsured loss of 40%** or more of their estimated fair replacement value and, as a direct result of the damages, **25% of the work force** in the community would be unemployed for at least 90 days. • SBA will make an economic injury disaster declaration when: A Governor certifies that at least 5 small businesses in a disaster area **have suffered substantial economic injury** as a result of the disaster and are in need of financial assistance not otherwise available on reasonable terms.  
**or** The Secretary of Agriculture designates an area as an agricultural disaster area. SBA may make Economic Injury Disaster Loans to small business concerns and small agricultural cooperatives in the designated counties without credit available elsewhere.  
**or** The Secretary of Commerce makes a commercial fishery failure or fishery resource disaster under Section 308(b) of the Interjurisdictional Fisheries Act of 1986.

## USDA

- Severe production losses within a county are those in which
  - A reduction countywide of **at least 30 percent** of the normal year's dollar value of all crops and crops could not be replanted or replaced with a substitute crop
  - Examples of Assistance Assistance Eligibility Requirements: Crop Disaster Assistance-farmers with crop losses of greater than **35% of historical average** yield for county; Livestock Assistance-farmers with grazing losses of **40% or greater than normal** during 3 consecutive months during disaster

## A Groundfish Disaster was Declared in January 2000

- Fishery resource failure: poor rockfish recruitment due to unknown but probably natural causes based on review of possible factors such as Ocean Regime Shift, changes in the California current, El Nino's, the Councils harvest policies, and lack of positive response despite increasing severity in harvest restrictions.

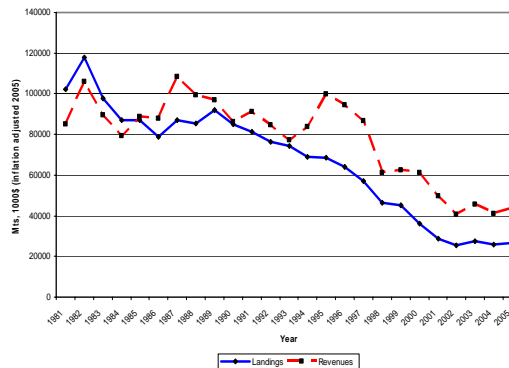
## Groundfish Disaster a Multi-Year Concept

- Based on review of the trends in commercial non-whiting groundfish harvests—there was uncertainty about the beginning of the disaster—1998?1999? Earlier?
- Because current and future species rebuilding plans involve long-lived rockfish that take decades to recover-it was recognized that disaster would continue for a number of years

## Commercial Fishery Failure

- Used 1999 as benchmark to forecast 2000 impacts
- Forecasted 25% reduction in landings and Revenues

Non-Whiting Groundfish Commercial Trends



## Economic Revenue and Distributional Impacts Associated with Overfished Species Management in West Coast Commercial Groundfish Fisheries

## Overview of presentation

1. Examples of potential fishing communities
2. Tradeoffs between exvessel revenue and overfished species mortality by commercial groundfish sector
3. Sectors and ports likely to be affected if the Council wishes to lower the catch of overfished species
  - Port and sector listed by likelihood of being affected relative to each overfished species
  - Likelihood of ports and sectors being affected is categorized by latitudinal management area
4. Summary

## What is a "fishing community"?

Social scientists and economists have discussed several potential examples including:

1. A collective fishing sector such as the "west coast bottom trawl community"
2. A geographic port such as "the community of Astoria, Oregon"
3. A neighborhood within a large city such as the "Ballard fishing community" of Seattle, Washington
4. A combination of the above examples

This presentation provides information on fishing sectors and ports with the intention that it can be used to "take into account...the needs of fishing communities" and the "fair and equitable distribution of overfishing restrictions and recovery benefits"

## Background

Due to the mixed-stock nature of groundfish fisheries, overfished species operate as a constraint upon the catch of target species

- Available OYs of many target species are often not realized (yellowtail, chilipepper, shelf rockfish, etc)

Certain overfished species affect some sectors and regions more than others

- Yelloweye largely constrains hook and line sectors, Darkblotched largely constrains bottom trawl sectors
- Pacific Ocean Perch constrains northern fisheries, Bocaccio constrains southern fisheries

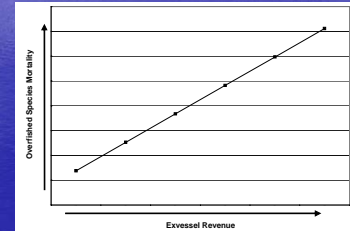
## Concepts shown in these analyses

1. As the mortality of overfished species is reduced, revenues are also reduced
  - A. In single target fisheries, changes in revenue and mortality of overfished species are proportional
  - B. In multiple target fisheries, changes in revenue and mortality are not constantly proportional, and decreases in overfished species mortality become increasingly more costly
2. Different overfished species have different levels of implied value (value of catch associated with overfished species A is different from that of overfished species B)
3. Different overfished species affect different entities
  - A. Different overfished species may affect different sectors, ports, and regions
  - B. Some overfished species may affect relatively more (or fewer) sectors ports or regions

## Revenue tradeoffs in a single target sector

As exvessel revenue and target catch are increased, the mortality of overfished species increases in proportion

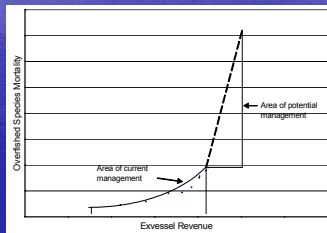
Through the use of RCA's and sector caps, the FG sablefish and whiting sectors have been able to attain their OYS



## Revenue tradeoffs in a multiple target sector

Decreases in overfished species mortality become increasingly more costly.

Revenues in multiple target sectors are potentially higher, but we've eliminated targeting on species with high overfished species co-occurrence.

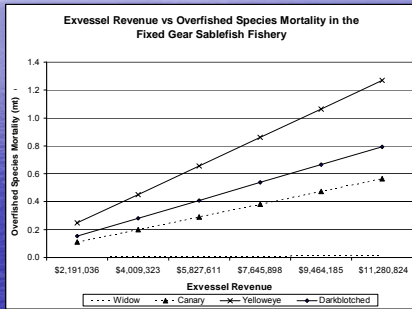


## Example Revenue/Overfished Species tradeoff analyses

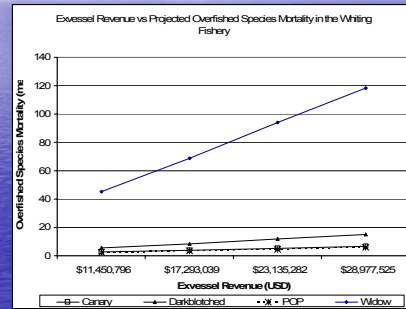
Analyses are presented showing the tradeoffs of revenue and overfished species impacts for the following sectors:

- Fixed Gear Sablefish
- LE whiting trawl
- Nearshore open access
- LE bottom trawl

### Revenue – Overfished Species Tradeoffs in FG Sablefish Fishery



### Revenue – Overfished Species Tradeoffs in the Whiting Fishery

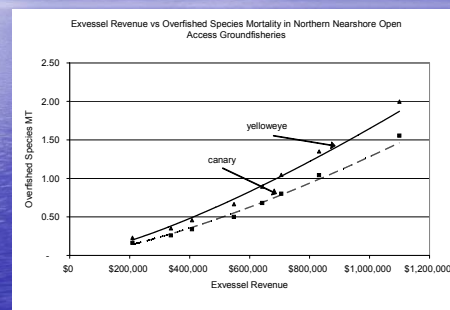


### Revenue – Overfished species tradeoffs in the LE bottom trawl and nearshore open access fisheries

Multiple target sectors have more dynamic tradeoffs than single target sectors.

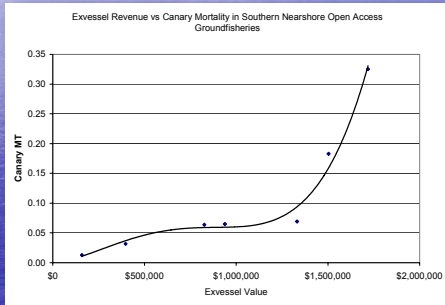
- Analyses shown here strategize toward maintaining highest possible coastwide revenue
  - Decrease catch of least valuable species first

### Revenue – Overfished Species Tradeoffs in northern nearshore open access fisheries

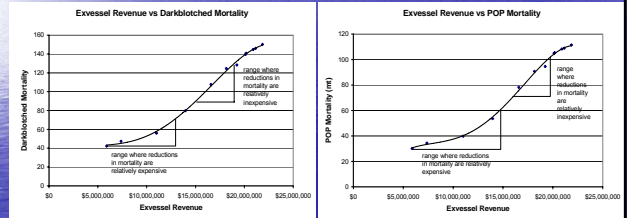




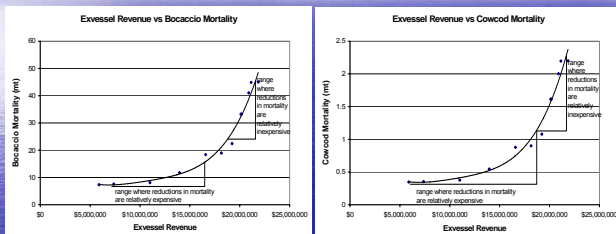
## Revenue – Overfished Species Tradeoffs in southern nearshore open access fisheries



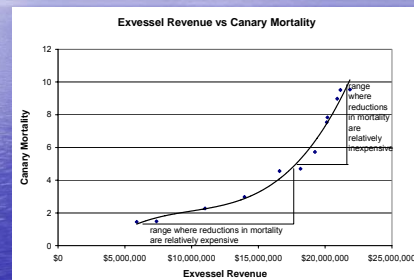
## Exvessel Revenue vs Darkblotched and POP mortality in the LE bottom trawl sector



## Exvessel Revenue vs Bocaccio and Cowcod Mortality in the LE bottom trawl sector

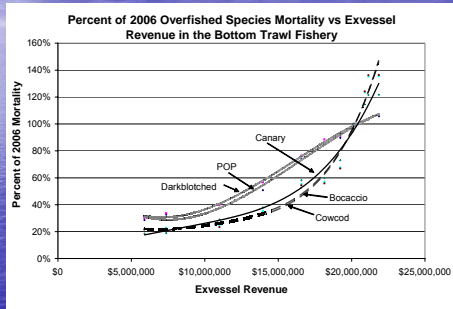


## Exvessel Revenue vs Canary Mortality in the LE bottom trawl sector





## Exvessel Revenue vs All Overfished Species Caught in LE Bottom Trawl Sector



## Level of Overfished Species Impact by Region and Groundfish Sector

AREA	SECTOR	OVERFISHED SPECIES					
		BCACCIO	CANARY	COWCOD	DRKBLTCH	POP	WIDOW YEYE
N 40 10	LE FG-DOGIFISH	ML					
	LE FG-NEARSHORE	ML					MH
	LE FG-SABLEFISH	ML					MH
	LE B-TRAWL-DEEP	ML		HIGH	HIGH	HIGH	
	LE B-TRAWL-SHELF	HIGH					
LE MW-TRAWL-WHITING			ML	ML	HIGH		
36 - 40 10	DA FG-DOGIFISH	ML					MH
	DA FG-NEARSHORE	MH					MH
	DA FG-SABLEFISH	ML					MH
	LE FG-NEARSHORE	ML	ML				
	LE FG-SABLEFISH	ML	ML				
36 - 38	LE B-TRAWL-DEEP	ML	ML				
	LE B-TRAWL-SHELF	HIGH	MH				
	DA FG-NEARSHORE	ML	ML	ML			
	DA FG-SABLEFISH	ML	ML	ML			
	LE FG-NEARSHORE	ML	ML	ML			
S 36	LE FG-SABLEFISH	ML	ML				
	LE B-TRAWL-DEEP	ML					
	LE B-TRAWL-SHELF	HIGH					
	DA FG-NEARSHORE	ML	ML	ML			
	DA FG-SABLEFISH	ML	ML	ML			

note: ML = medium low, MH = medium high

The previous two slides have shown that

1. Overfished species are found at different latitudes
2. Different sectors have different relative amounts of overfished species impacts

By identifying sectors and the principal port for each sector, we can associate ports with each overfished species

- If we take the past approach of restricting those sectors with highest overfished species impact first, we can identify which ports are most likely to be impacted by reductions in overfished species OYs

## Range Where Overfished Species are Found in the Commercial Fishery

AREA	OVERFISHED SPECIES						
	BCACCIO	CNARY	CWOOD	DRKBLTCHED	POP	WIDOW	YLLWEYE
N 40 10		√		√	√	√	√
38 - 40 10	√	√	X	√	X	√	X
36 - 38	√	√	√	√	?	√	X
S 36	√	X	√	X	?	X	?

Notes: 1) Although some of the species listed are caught outside the areas check-marked above, the check-mark only applies to the boundary where there is an ABC for these species

2) In some areas only minimal amounts of overfished species have historically been caught. These areas are checked-marked

note: a √ indicates areas where overfished species are currently caught.

3) X indicates where overfished species are potentially caught based on past landings.

4) ? indicates that there is evidence species exist in the area

source: PacFIN 2006. Personal Communication; Love et al. 2002. The Rockfishes of the Northeast Pacific

Ports Potentially Impacted by Reductions in Overfished Species Catch North of 40 10 Lat						
AREA	PORT	OVERFISHED SPECIES				
		BCACCIO	CANARY	COWCOD	DRKBILTCH	POP WIDOW YEYE
N 40 10	ASBERGHEEN					
	ASTORIA	✓		✓	✓	✓
	BANDON	✓				
	BELLINGHAM BAY	✓		✓	✓	✓
	BLAINE	✓		✓	✓	✓
	BROOKINGS	✓		✓	✓	✓
	CATHLAMET	✓				
	COOS BAY	✓		✓	✓	✓
	OHNOOK	✓				
	CRESCENT CITY	✓		✓	✓	✓
	DEFOE BAY	✓				
	EUREKA	✓		✓	✓	✓
	EVERETT	✓				
	FIELDS LANDING	✓				
	FLORENCE	✓				
	GARIBAJU (TILLAMOOK)	✓				
	GOLD BEACH	✓				
	ILWACO	✓		✓	✓	✓
	LAPUSH	✓				
	MILL CREEK	✓				
	NEAH BAY	✓		✓	✓	✓
	NEWPORT	✓		✓	✓	✓
	PACIFIC CITY	✓				
	PORT ANGELES	✓				
	PORT ORFORD	✓				
	PORT TOWNSEND	✓				
	SEATTLE	✓			✓	✓
	TOKELAND	✓				
	TRINIDAD	✓				
	WESTPORT	✓		✓	✓	✓
	WINCHESTER BAY	✓				

Ports Potentially Impacted by Reductions in Overfished Species Catch South of 40 10 Lat						
AREA	PORT	OVERFISHED SPECIES				
		BCACCIO	CANARY	COWCOD	DRKBILTCH	POP WIDOW YEYE
38 -	ALBION	✓	✓			
40 10	BODEGA BAY	✓	✓			
	FORT BRAGG	✓	✓		✓	
	POINT ARENA	✓	✓			
	POINT REYES	✓	✓			
	SHELTER COVE	✓	✓			
35 - 38	BIG CREEK	✓	✓	✓		
	BODEGA BAY	✓	✓	✓		
	ELK	✓	✓	✓		
	MONTEREY	✓	✓	✓		
	MOSS LANDING	✓	✓	✓		
	PRINCETON / HALF MOON BAY	✓	✓	✓		
	SAN FRANCISCO	✓	✓	✓		
	SANTA CRUZ	✓	✓	✓		
	SANTA CRUZ	✓	✓	✓		
35 36	AVILA	✓	✓	✓		
	BERKELEY	✓	✓	✓		
	DANA POINT	✓	✓	✓		
	LONG BEACH	✓	✓	✓		
	MISSION BAY	✓	✓	✓		
	MORRO BAY	✓	✓	✓		
	NEWPORT BEACH	✓	✓	✓		
	OCEANSIDE	✓	✓	✓		
	OWEN	✓	✓	✓		
	PLAYA DEL REY	✓	✓	✓		
	POINT LOMA	✓	✓	✓		
	SAN DIEGO	✓	✓	✓		
	SAN PEDRO	✓	✓	✓		
	SAN DIEGO	✓	✓	✓		
	SANTA BARBARA	✓	✓	✓		
	TERMINAL ISLAND	✓	✓	✓		
	VENTURA	✓	✓	✓		
	WILMINGTON	✓	✓	✓		

## Summary

This presentation can be divided in two parts:

1. The relationship between exvessel revenue and overfished species mortality
2. The relationship between sectors, ports, regions and overfished species

Each section has an implied management strategy

1. Implies that reductions in the incidental catch of overfished species is achieved by reducing low valued target species first
2. Implies that sectors with the highest impact on overfished species are restricted first

## Summary (cont)

The two approaches shown in this presentation are different but complimentary

1. Reducing the catch of low-valued target species is used to reduce overfished species mortality in a sector
  - If a multi-target sector is to reduce its catch of overfished species, it makes the most sense to achieve this reduction while allowing vessels to target high valued target species.
2. Restricting sectors with the highest impact first is used to reduce coastwide mortality of overfished species
  - If a coastwide reduction in the catch of overfished species is necessary, it makes sense for this reduction to come from sectors that have the highest impact. Taking this reduction out of sectors with a low impact may require a complete closure of that sector

## Summary (con't)

In examining both approaches we find that:

- Different overfished species have different relative values (some are inherently more valuable than others)
- Different overfished species have a different distribution of impacts (some affect different sectors, ports, and regions than others)

While there is apparently no clear objective in which consideration to follow when "taking into account the needs of communities" it may be reasonable to consider some combination of both in addition to potential others not described here.

# Preliminary Economic Analysis of Draft Groundfish Rebuilding Alternatives

April 2006 PFMC Meeting  
Sacramento, CA

April 2006

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## List of Port Groups and PCIDs in Washington

State	Port Group Area	County	PCID	Name	
Washington	Puget Sound	Whatcom	BLN	Blaine	
		Whatcom	BLL	Bellingham Bay	
		San Juan	FRI	Friday Harbor	
		Skagit	ANA	Anacortes	
		Skagit	LAC	La Conner	
		Snohomish	ONP	Other North Puget Sound Ports	
		Snohomish	EVR	Everett	
		King	SEA	Seattle	
		Pierce	TAC	Tacoma	
		Thurston	OLY	Olympia	
		Mason	SHL	Shelton	
		Unknown	OSP	Other South Puget Sound Ports	
		North Washington Coast	Jefferson	TNS	Port Townsend
			Clallam	SEQ	Sequim
			Clallam	PAG	Port Angeles
	Clallam		NEA	Neah Bay	
	South & Central WA Coast	Clallam	LAP	La Push	
		Grays Harbor	CPL	Copalis Beach	
		Grays Harbor	GRH	Grays Harbor	
		Grays Harbor	WPT	Westport	
	Pacific	WLB	Willapa Bay		
	Pacific	LWC	Ilwaco/Clifton		
	Klickitat	OCR	Other Columbia River Ports		

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## List of Port Groups and PCIDs in Oregon

State	Port Group Area	County	PCID	Name
Oregon	Astoria-Tillamook	Multnomah	CRV	Pseudo Port Code for Columbia R.
		Clatsop	AST	Astoria
		Clatsop	GSS	Gresham - Seaside
		Clatsop	CNB	Cannon Beach
		Unknown	WAL	Landed in WA; Transp. to OR
		Tillamook	NHL	Nehalem Bay
		Tillamook	TLL	Tillamook / Garibaldi
		Tillamook	NTR	Netarts Bay
		Tillamook	PCC	Pacific City
		Newport	Lincoln	SRV
	Lincoln		SLZ	Siletz Bay
	Lincoln		DPO	Depoe Bay
	Lincoln		NEW	Newport
	Coos Bay	Lincoln	WLD	Waldport
		Lincoln	YAC	Yachats
		Laine	FLR	Florence
	Brookings	Douglas	WIN	Winchester Bay
		Coos	COS	Coos Bay
		Coos	BDN	Bandon
	Curry	Curry	ORF	Port Orford
Curry		GLD	Gold Beach	
Curry	BRK	Brookings		

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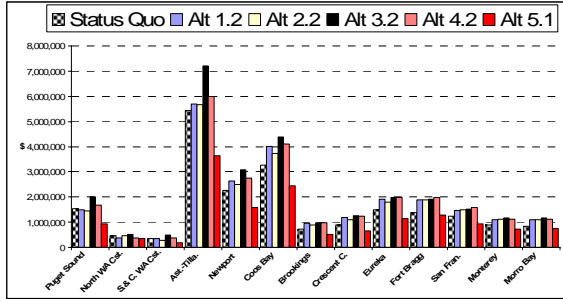
## List of Port Groups and PCIDs in California

State	Port Group Area	County	PCID	Name
California	Crescent City	Del Norte	CRS	Crescent City
		Del Norte	ODN	Other Del Norte County Ports
	Eureka	Humboldt	ERK	Eureka (includes Fields Landing)
		Humboldt	FLN	Fields Landing
		Humboldt	TRN	Trinidad
	Fort Bragg	Humboldt	QHB	Other Humboldt County Ports
		Mendocino	BRG	Fort Bragg
		Mendocino	ALB	Albion
	Bodega Bay	Mendocino	ARE	Arena
		Mendocino	QMD	Other Mendocino County Ports
		Sonoma	BDG	Bodega Bay
		Marin	TML	Tomales Bay
	San Francisco	Marin	RVS	Point Reyes
		Marin	OSM	Other Son. and Mar. Co. Outer Coast Ports
		Marin	SLT	Sausalito
		Alameda	OKK	Oakland
	Contra Costa	Alameda	ALM	Alameda
		Alameda	BKL	Berkeley
		Contra Costa	RCH	Richmond
		San Francisco	SF	San Francisco
		San Mateo	PRN	Princeton
		San Francisco	SFA	San Francisco Ara
		San Francisco	OSF	Other S.F. Bay and S.M. Co. Ports
	Monterey	San Luis Obispo	CRZ	San Luis Obispo
		Monterey	MOS	Moss Landing
		Monterey	MNT	Monterey
	Morro Bay	Monterey	OCM	Other S.C. and Mon. Co. Ports
		San Luis Obispo	MRO	Morro Bay
		San Luis Obispo	AVL	Avila
San Luis Obispo	OSL	Other S.L. O. Co. Ports		

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**Non-whiting Trawl Ex-vessel Revenue under DRAFT Rebuilding Alternatives (with High Target Species OYs)**

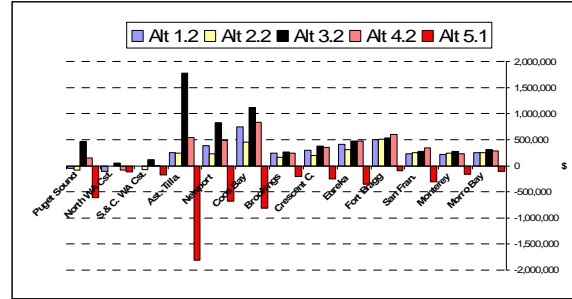


Note: The bycatch model shows that high target spp OYs are not attainable under Rebuilding Alternative 5.

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**Change in Non-whiting Trawl Exvessel Revenue (from 2006) under DRAFT Rebuilding Alternatives (with High Target Species OYs)**



Note: The bycatch model shows that high target spp OYs are not attainable under Rebuilding Alternative 5.

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**Ex-vessel Revenue Impacts to the LE and OA FG Sablefish Fishery under DRAFT Rebuilding Alternatives (with High Target Species OYs)**

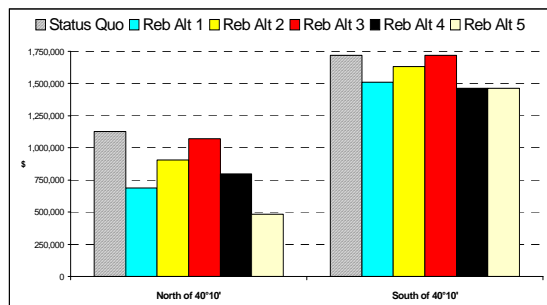
	100 fm North: 150 fm South <sup>1</sup>		100 fm North: 150 fm South <sup>2</sup> (SF Alt 2)	150 fm North: 150 fm South <sup>2</sup> (SF Alt 4)
	2005 Estimate	2006 Preseason Estimate (Status Quo)	Rebid Alts 1, 3 and 4	Rebid Alts 2 and 5
<b>Total catch OY (mt)</b>	7,486	7,363	5,723	5,723
OA Allocation (mt)	627	613	474	474
LE FG Allocation (mt)	2,538	2,482	1,920	1,920
<b>Landed catch (LC) target (mt)</b>	3,050	2,982	2,307	2,307
<b>Total potential ex-vessel value of LC target (\$,000)<sup>3</sup></b>	\$14,388	\$14,068	\$10,884	\$10,884
Difference from Status Quo (\$,000)			-\$3,185	-\$3,185
% change from 2006			-22.6%	-22.6%

<sup>1</sup>Seaward boundary of RCA at 100 fm North of 40°10' and at 150 fm South of 40°10'  
<sup>2</sup>Seaward boundary of RCA at 150 fm North of 40°10' and at 150 fm South of 40°10'  
<sup>3</sup>Only revenue from sablefish included. Assumed sablefish price per lb: \$2.14

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**Non-sablefish Directed Open Access Ex-vessel Revenue under DRAFT Rebuilding Alternatives**

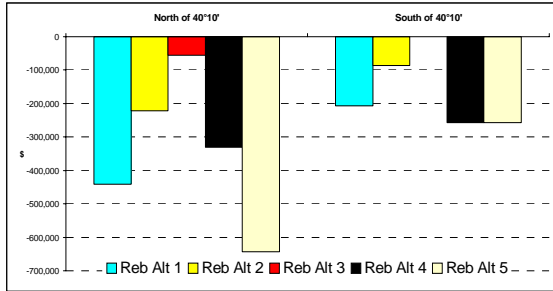


Rebuild Alts: Status Quo, Reb Alt 1, Reb Alt 2, Reb Alt 3, Reb Alt 4, Reb Alt 5  
 OA Alts: Status Quo, Alt 2, Alt 1, Alt 4, Alt 5a, Alt 3

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**Change in Non-sablefish Directed Open Access Ex-vessel Revenue under DRAFT Rebuilding Alternatives**



Rebuild Alts:	Status Quo	Reb Alt 1	Reb Alt 2	Reb Alt 3	Reb Alt 4	Reb Alt 5
OA Alts:	Status Quo	Alt 2	Alt 1	Alt 4	Alt 5a	Alt 3

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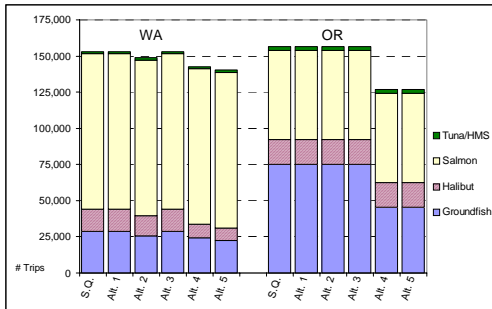
**Recreational Effort (angler trips) under the DRAFT Rebuilding Alternatives**

	Status Quo	Reb. Alt. 1	Reb. Alt. 2	Reb. Alt. 3	Reb. Alt. 4	Reb. Alt. 5
<b>Washington</b>						
WDFW Option:	2005 Season	2006 Season	Opt 1	2006 Season	Opt 2	Opt 3
Bottomfish	28,671	28,671	25,491	28,671	24,407	22,520
Halibut	15,383	15,383	14,109	15,383	9,375	8,692
Salmon	107,568	107,568	107,568	107,568	107,406	107,568
Tuna	1,515	1,515	1,515	1,515	1,515	1,515
Salm + Hibt	905	905	410	905	617	562
<b>Oregon</b>						
ODFW Option:	Opt 1	Opt 2	Opt 3	Opt 2	Opt 4	Opt 5
Groundfish	75,337	75,337	75,337	75,337	45,521	45,521
Halibut	16,871	16,871	16,871	16,871	16,871	16,871
Salmon	61,853	61,853	61,853	61,853	61,853	61,853
Tuna	2,653	2,653	2,653	2,653	2,653	2,653
Combo <sup>1</sup>	10,964	10,964	10,964	10,964	10,964	10,964
<sup>1</sup> (Salmon + at least one other target group)						
<b>California</b>						
CDFG Option:	Opt D	Opt B	Opt E	Opt F	Opt C	Opt A
Groundfish	383,758	314,400	403,372	415,948	345,022	254,634
Salmon	31,971	31,971	31,971	31,971	31,971	31,971
HMS	42,571	42,571	42,571	42,571	42,571	42,571
Misc	392,523	392,523	392,523	392,523	392,523	392,523

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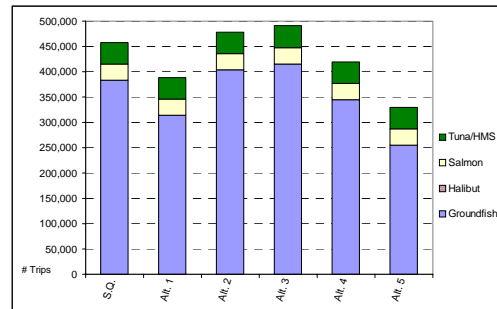
**Washington and Oregon Recreational Effort (angler trips) under the DRAFT Rebuilding Alternatives**



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**California Recreational Effort (angler trips) under the DRAFT Rebuilding Alternatives**



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## The Use of Socioeconomic Indicators to Describe Fishing Dependence, Community Resilience, and Areas of Vulnerability

## General Concept

- “Dependence” – use of a particular resource
- “Resiliency” – a community’s adaptability to change

## Literature Review

- There are no standard methods for assessing “needs of fishing communities”
- Socioeconomic indicator data is provided to decision-makers to help better inform them on fishing dependence, community resilience, and vulnerable areas
- There are a range of methods used to describe dependence, resilience, vulnerable areas

## Identifying Communities

- All ports, cities, counties, and port group areas considered as “communities” and included.

## Scale

- Some data available by port (revenue, number of vessels, buyers, permits)
- Some data available by county only (education, age, poverty rate, unemployment rate)
- Some data available by port group only (projected fishing employment, projected fishing income)

...In general, smallest scale possible was used.

## Main Objective

- Identify communities (cities, counties, port groups) that are relatively most fishing dependent, relatively least resilient in order to provide some sense of which areas will likely be most impacted by change from the status quo.

## Describing Fishing Dependence

- Indicators chosen based on lit review and data availability
  - Overall community fishing dependence
    - Number of federal and state commercial fishing permits (P,C,PG)
    - Number of commercial fishing vessels (P,C,PG)
    - Revenue from commercial fishing as a share of aggregate revenue from commercial fishing coastwide (P,C,PG)
    - Angler trips (P, CG)
    - Income from commercial and recreational fishing as a share of total personal income (PG)
    - Employment in commercial fishing as a share of total employment (PG)
    - Number of processors/buyers (P,C,PG)

P=Port C=County CG=County Group PG=Port Group

## Describing Fishing Dependence (cont'd)

- Indicators chosen based on lit review and data availability
  - Groundfish community fishing dependence
    - Number of commercial groundfish permits (P,C,PG)
    - Number of commercial fishing vessels using groundfish gear (P,C,PG)
    - Commercial groundfish revenue as a percentage of total commercial fisheries revenue (P,C,PG)
    - Commercial groundfish revenue as a share of total commercial groundfish revenue (P,C,PG)
    - Commercial groundfish income as a share of total commercial fisheries income (PG)
    - Commercial groundfish employment as a share of total commercial fisheries employment (PG)

P=Port C=County CG=County Group PG=Port Group



## Describing Community Resilience

- Indicators chosen based on literature review and data availability
  - Population characteristics diversity
    - Average age of population (C)
    - Average of highest education degree obtained (C)
  - Economic diversity
    - Average income (C)
    - Income from fishing activity as a share of total personal income (PG)
    - Total employment rate (C)
    - Unemployment rate (C)
    - Poverty rate (C)
    - Isolated areas (P)
  - Infrastructure
    - Population density (P,C)
    - Fishing infrastructure from community profiles (P,C)
    - Number of permits owned (P,C,PG)

P=Port C=County CG=County Group PG=Port Group

## Describing Community Dependence and Resilience

- Method

Step 1. Rank indicators from most dependent to least dependent and least resilient to most resilient by port/county/port group

Step 2. List top third of ports/counties/port group

## Describing Community Dependence and Resilience

- Results

- Ports/cities that rank at least 2 times
- Counties that rank at least 2 times
- Port Groups that rank at least 2 times

## Identifying Vulnerable Areas

- Indicators

- Dependency results
- Resiliency results

- Method

– Look for areas (ports/counties/port groups) with high dependency and low resilience

- If the area ranks twice in dependency tables and twice in resiliency tables, then it is listed as a vulnerable area

**Results – Relative Dependence (Cities)**

Port	Indicator "Hits"	Port	Indicator "Hits"
WESTPORT	5	MONTEREY	3
PORT ORFORD	5	ILWACO/CHINOOK	3
NEWPORT	5	BODEGA BAY	3
ASTORIA	5	NEAH BAY	3
MOSS LANDING	5	AVILA	3
BELLINGHAM BAY	5	OXNARD	3
EUREKA	5	OTH WA COASTAL PORTS	3
SANTA BARBARA	4	WILLAPA BAY	2
SAN FRANCISCO	4	TILLAMOOK/GARIBALDI	2
BROOKINGS	4	OTH SAN DIEGO CTY PORTS	2
COOS BAY	4	SEATTLE	2
CRESCENT CITY	4	OTH LA/ORANGE CTY PORTS	2
PRINCETON / HALF MOON BAY	4	OTHER STA CRUZ/MONTEREY CTY PORTS	2
BLAINE	4	OCEANSIDE	2
PORT ANGELES	4	NEWPORT BEACH	2
FORT BRAGG	4	SAN PEDRO	2
MORRO BAY	4	GOLD BEACH	2
TERMINAL ISLAND	3	EVERETT	2
LA PUSH	3	ANACORTES	2

**Current Dependence Indicators Used (Ports) – 3 overall, 3 groundfish**

- Number of commercial fishing vessels (ownership residence)
- Revenue from fish landings as a share of coastwide fish landings
- Number of buyers/processors
- Revenue from groundfish as a share of coastwide groundfish revenue
- Revenue from groundfish as a share of port fish revenue
- Number of fishing vessels using groundfish gear (non-whiting)

To be added – permits, groundfish permits, vessels using groundfish gear, angler trips (Total: 4 overall, 5 groundfish, 1 rec)

**Results – Relative Dependence (Counties)**

County	Indicator "Hits"
LINCOLN COUNTY	5
WHATCOM COUNTY	4
CLATSOP COUNTY	4
COOS COUNTY	4
MENDOCINO COUNTY	4
GRAYS HARBOR COUNTY	4
SF BAY/SAN MATEO COUNTIES	3
ORANGE/LA COUNTIES	3
CLALLAM COUNTY	3
CURRY COUNTY	2
VENTURA/STA BARBARA COUNTIES	2
MONTEREY/SANTA CRUZ	2
MARIN/SONOMA	2
PACIFIC COUNTY	2
HUMBOLDT COUNTY	2
SAN LUIS OBISPO COUNTY	2

**Current Dependence Indicators Used (Counties) – 3 overall, 2 groundfish**

- Number of commercial fishing vessels (ownership residence)
- Revenue from fish landings as a share of coastwide fish landings
- Number of buyers/processors
- Revenue from groundfish as a share of coastwide groundfish revenue
- Revenue from groundfish as a share of port fish revenue

To be added – permits, groundfish permits, vessels using groundfish gear, angler trips (Total : 4 overall, 4 groundfish, 1 rec)

### Results – Relative Dependence (Port Group Area)

Port Group Area	Indicator "Hits"
ASTORIA	7
BROOKINGS	6
CRESCENT CITY	6
EUREKA	6
COOS BAY	5
NEWPORT	5
PUGET SOUND	4
BODEGA BAY	3
CENTRAL WA COAST	3
SOUTH & CENTRAL WA COAST	3
LOS ANGELES	2
NORTH WASHINGTON COAST	2

### Current Dependence Indicators Used (Port Groups) – 5 overall, 4 groundfish

- Number of commercial fishing vessels (ownership residence)
- Revenue from fish landings as a share of coastwide fish landings
- Number of buyers/processors
- Revenue from groundfish as a share of coastwide groundfish revenue
- Revenue from groundfish as a share of port fish revenue
- Fishery-related income as a share of total personal income
- Fishery-related employment as a share of total employment
- Groundfish-related income as a share of total fishery income
- Groundfish-related employment as a share of total employment

To be added – permits, groundfish permits, vessels using groundfish gear, angler trips (Total: 6 overall, 6 groundfish, 1 rec)

### Key Points


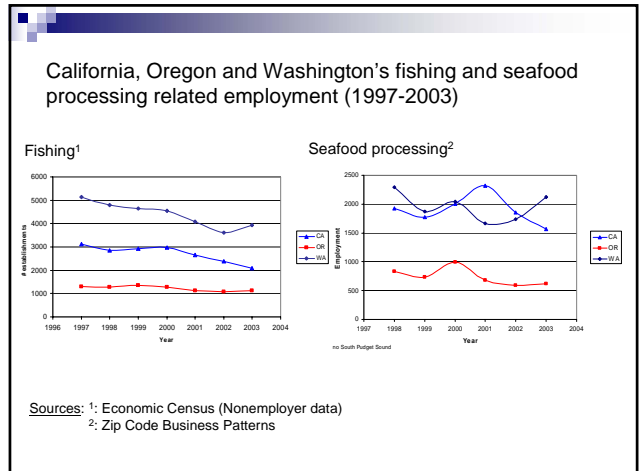
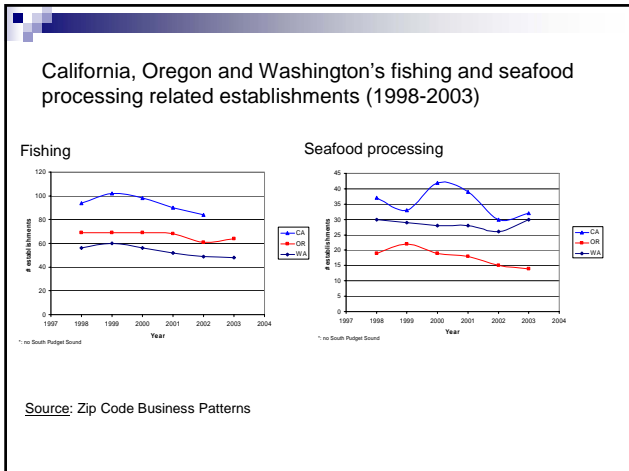
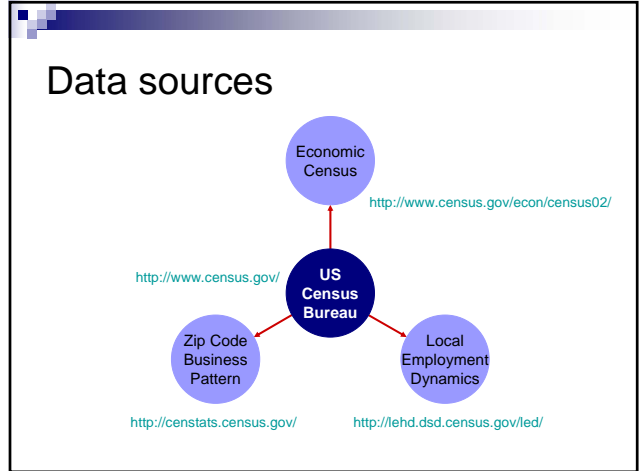
- Most useful piece of info from results – identification of “vulnerable areas”
- Usefulness of this data is very limited due to scale and use of proxies for things we have no accurate measurement of.



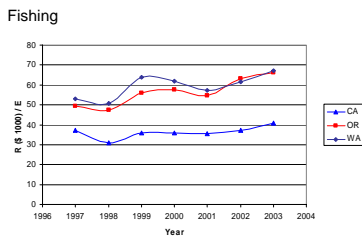
## Trends in fishing and seafood processing related establishments and employment in West Coast fishing communities (1997-2003)

Using Census Bureau data to understand the impacts of fishing policies and management

By: Eduardo Espinoza  
Sustainable Fisheries Division  
National Marine Fisheries Service  
7600 Sand Point Way NE  
Seattle, WA 98115

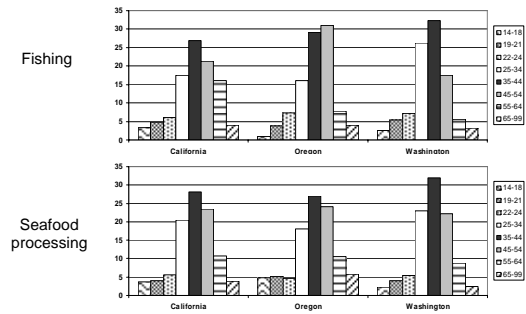



California, Oregon and Washington's counties fishing-related receipts (R) per establishments (E) (1997-2003)



Source: Economic Census (Nonemployer data)

Average age distribution (%) in fishing and seafood processing related employment by state (2003)



Source: Based on the Quarterly Workforce Indicators data (Local Employment Dynamics)

Census data available to describe community resilience

- Population characteristics diversity
  - Age
  - Education
- Economic diversity
  - Income
  - Total employment by industry
  - Unemployment
  - Poverty level
- Population density
- Fishing dependency
- Household characteristics

Future steps

- We are currently processing more information at the county and community levels, however the data does not always have the same level of resolution that is required. Some socio-economic indicators only reach the county level, leaving cities without a closer look.
- Others sources of data are being explored at the states, counties and local levels.