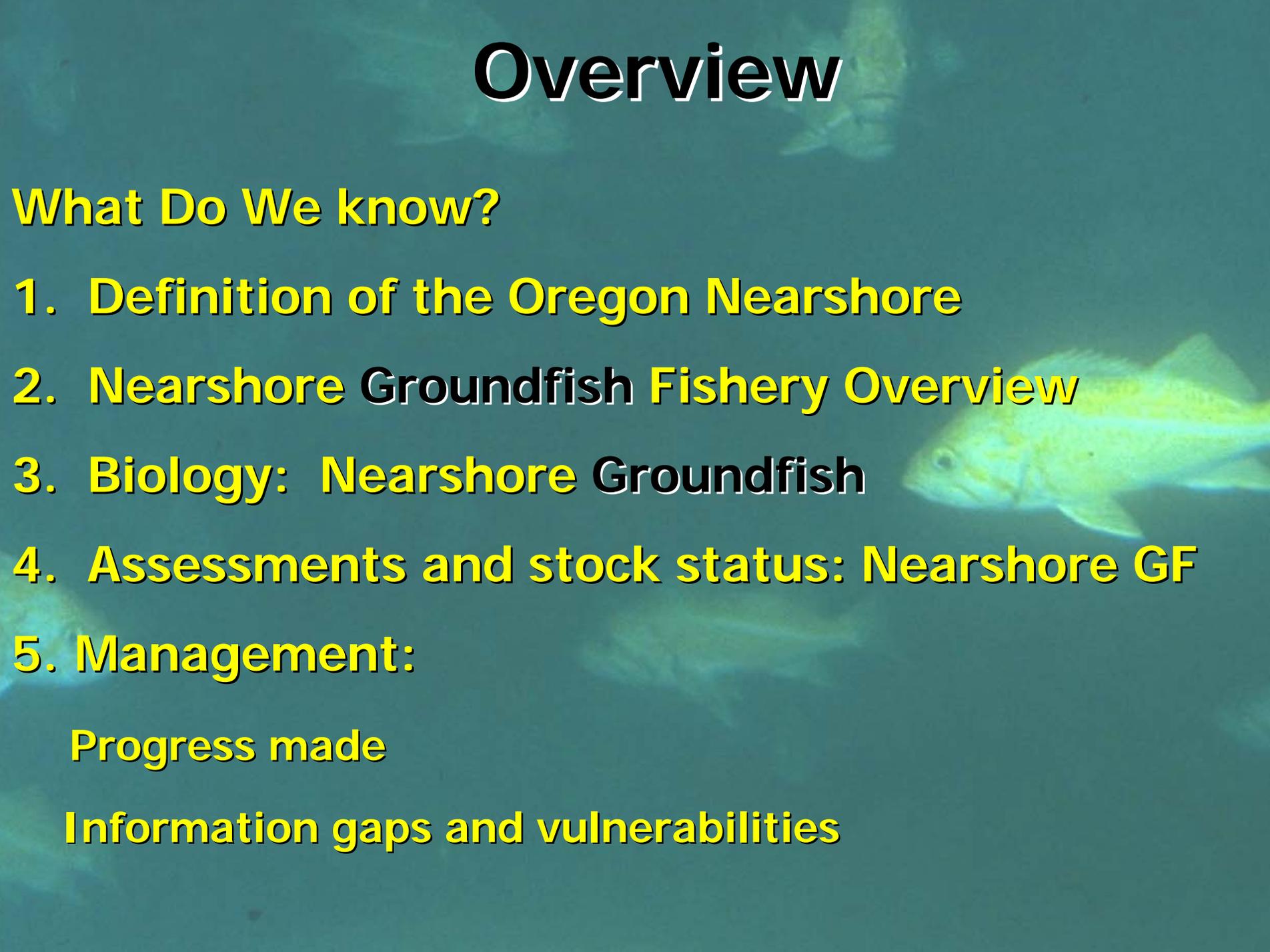


Status of Nearshore Groundfish in Oregon



Overview

The background of the slide is a deep blue-green color with a faint, repeating pattern of fish swimming underwater. The fish are rendered in a lighter, semi-transparent blue-green hue, creating a subtle, textured effect behind the text.

What Do We know?

1. Definition of the Oregon Nearshore
2. Nearshore Groundfish Fishery Overview
3. Biology: Nearshore Groundfish
4. Assessments and stock status: Nearshore GF
5. Management:

Progress made

Information gaps and vulnerabilities

Oregon's "Nearshore"

- Definition:
Species and habitats occurring from the high tide line out to the **30 fathom** (~55 m) depth contour
- This presentation focuses on **nearshore groundfish**



Nearshore Fisheries Overview

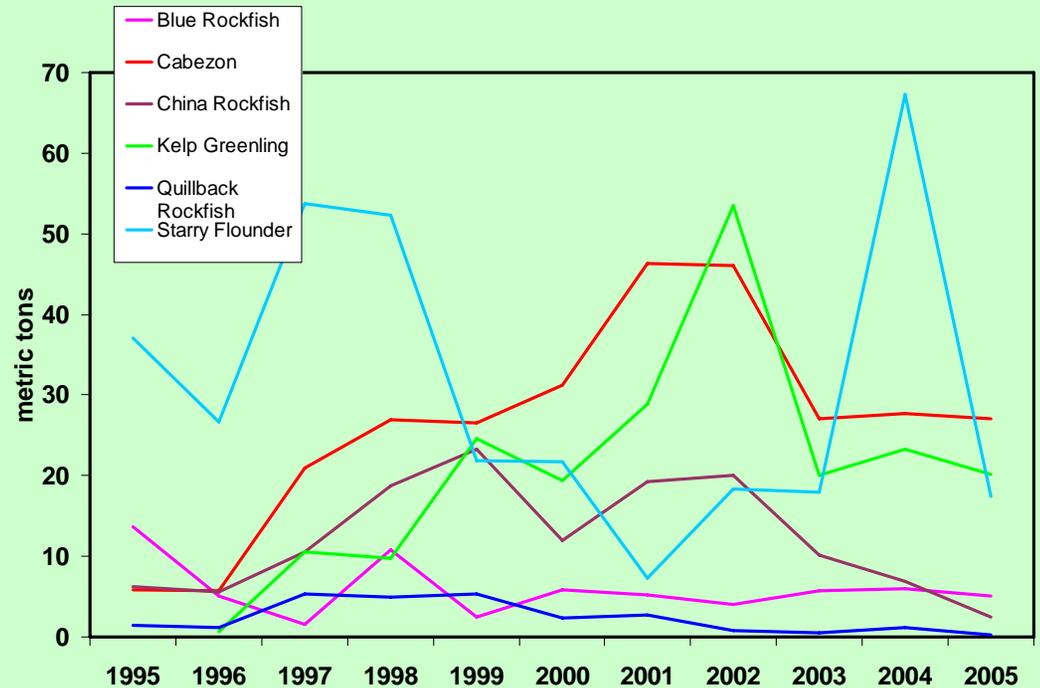


- Diverse with respect to species and gears
- Rocky reefs and unassessed rockfishes important
- Nearshore trawling focuses on mix of flatfish species

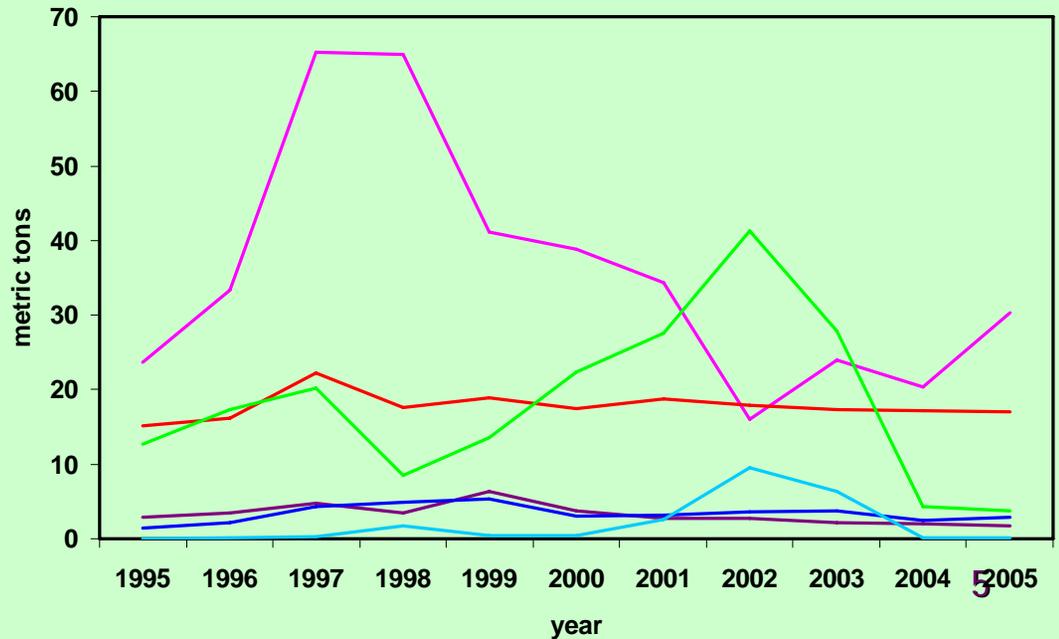
Selected Nearshore Groundfish Catch Histories 1995 - 2005

Highly variable catch histories reflect markets and management measures in addition to abundance

Commercial 1995 - 2005



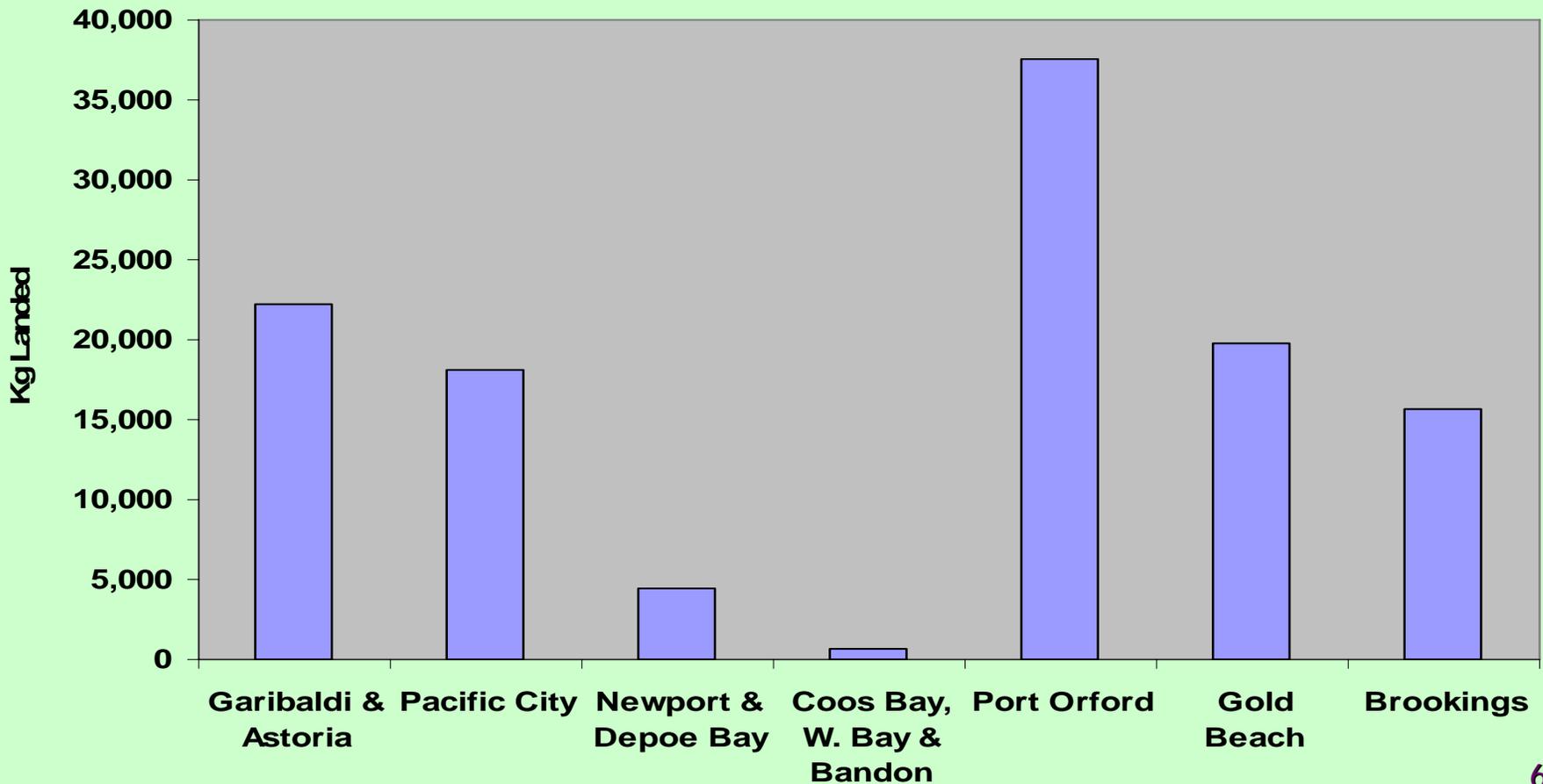
Recreational 1995 - 2005



Commercial nearshore rockfish landings 2004

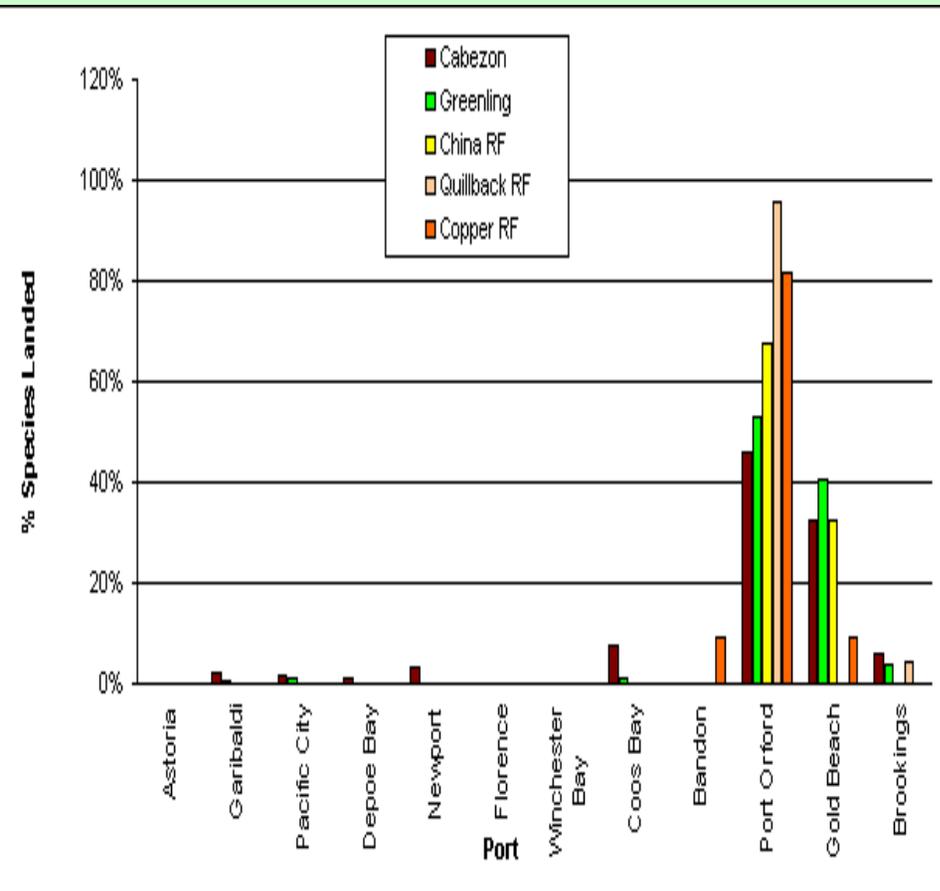


Black RF and Blue RF by Port

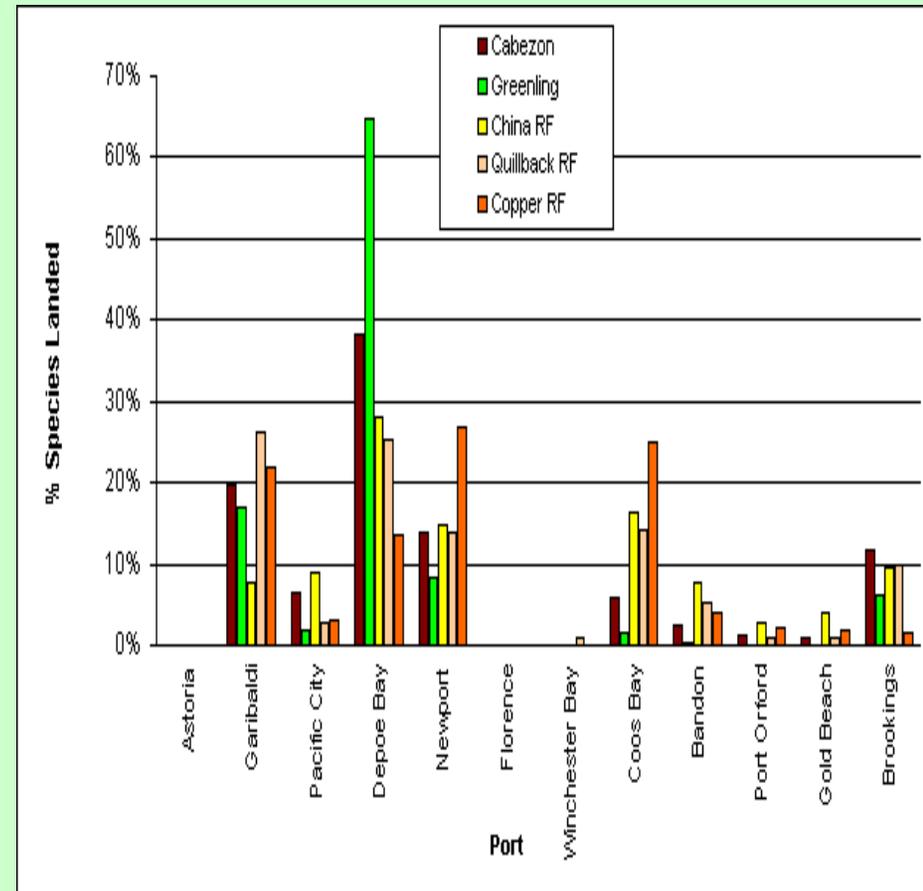


Commercial vs. Recreational Landings (%) Oregon Nearshore 2000

Commercial

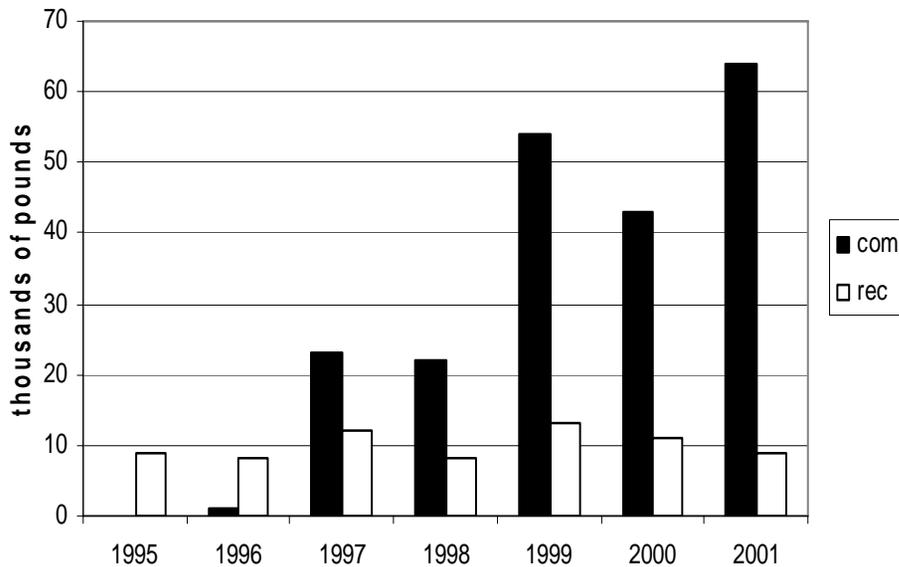


Recreational

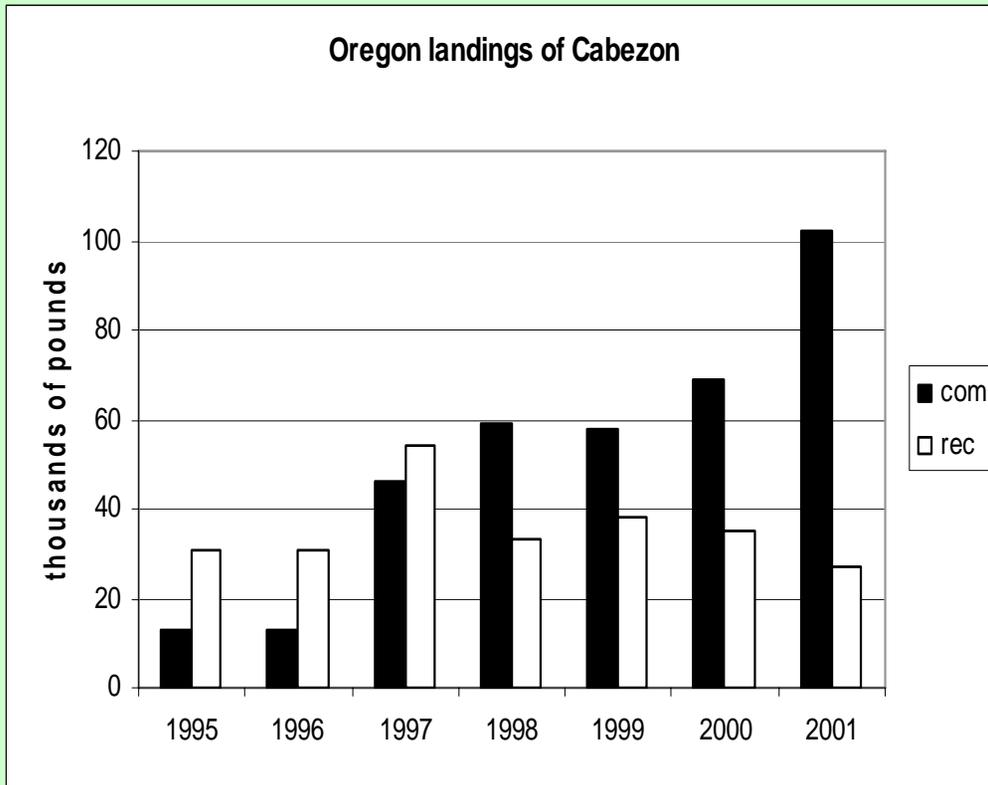


Oregon Landings of Greenling 1995-2001

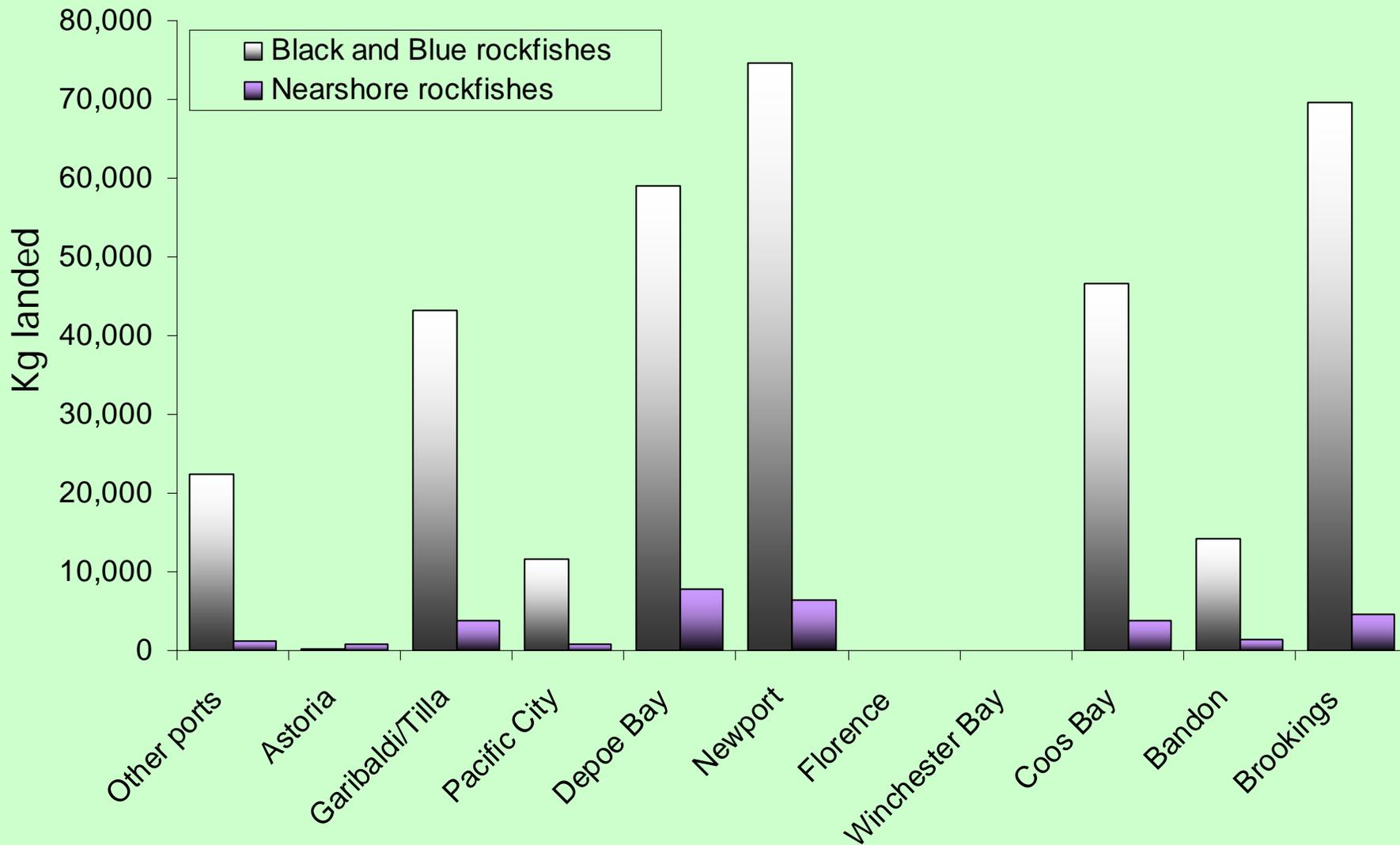
Oregon landings of Greenling spp



Oregon Landings of Cabezon 1995-2001



Recreational landings of nearshore rockfish 2004



The Live-fish Fishery

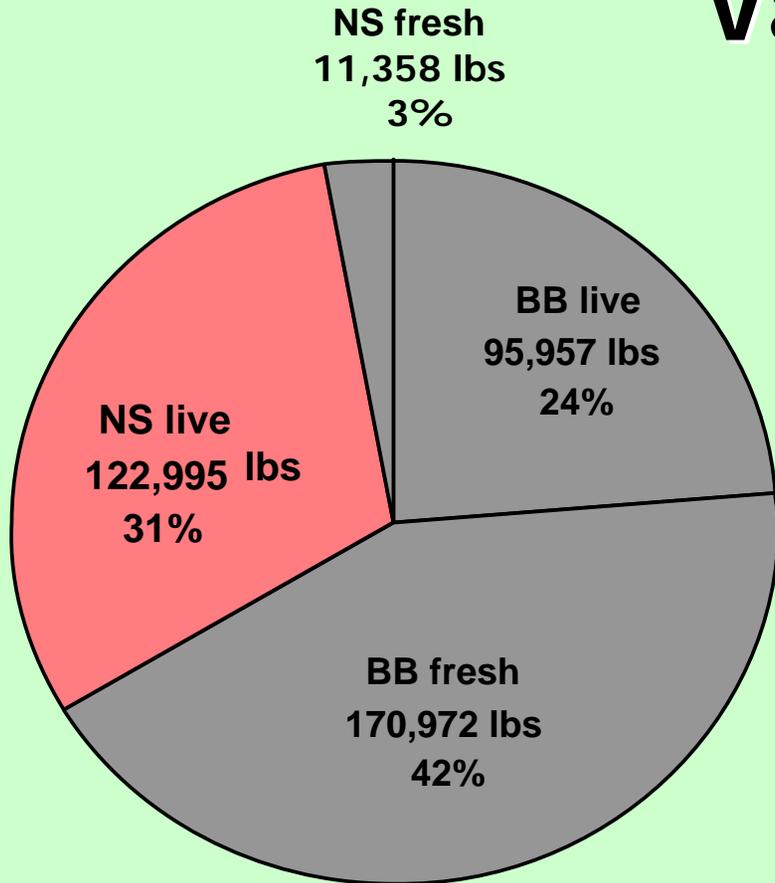


- Developed in mid 1990s in OR (started earlier in California)
- High value relative to fresh fish market (\$5-\$6/lb live)
- Most landings black and blue rockfish
- Targets less common (unassessed) nearshore species
- Outlet for displaced fishing effort (salmon, offshore groundfish)
- Expansion cause of concern for managers and fishers by 2002
- Became limited entry in 2002-3

Nearshore Fisheries Economic Contributions to Oregon

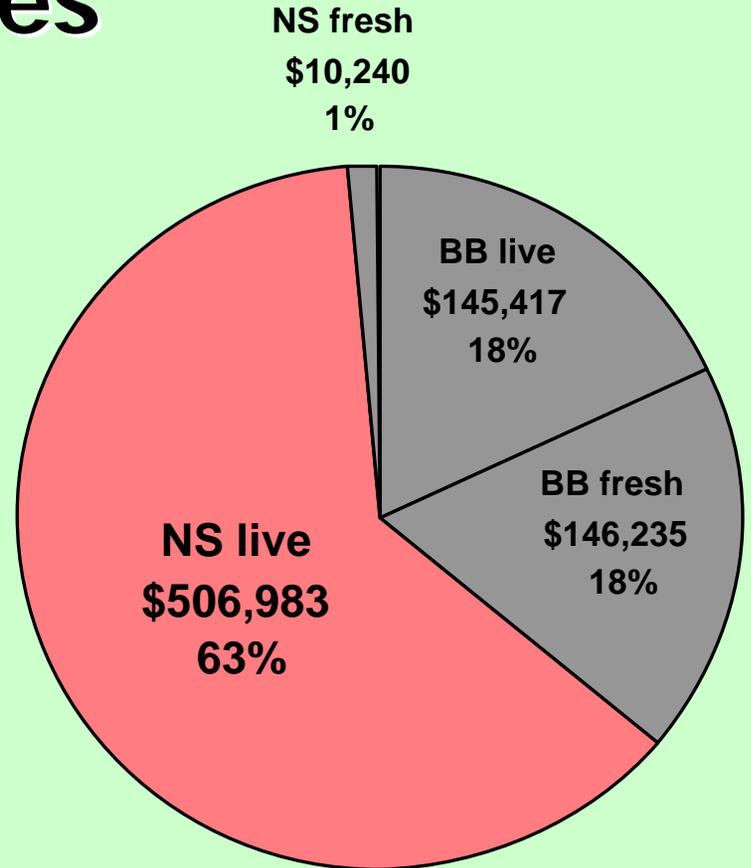
- Commercial nearshore groundfish fishery - \$2 million in personal income in 2004
- Ocean nearshore bottomfish recreational fishery (excludes salmon, halibut, crab) - \$3.66 million in 2004
- Source: The Research Group, Corvallis, 2005

2004 Nearshore Commercial Groundfish Fishery—Landings & Values



Pounds

by species and condition



Values

by species and condition

Biology of Nearshore Rockfishes



Groundfish in Oregon's Nearshore

-43 "groundfish" species

- 20 rockfishes

- 1 lingcod & 4 greenlings

- 8 flatfishes

- 4 sculpins

- 6 cartilaginous fishes



West Coast Rockfishes

- Over 60 species
- Inhabit intertidal to over 1500 m depth
- Many are long-lived
- Bear live young
- Larvae released in late winter/early spring
- Long larval phase in water column
- Small populations for many species



Rockfish Are OLD!

Maximum Age in Years:

<u>Slope (>300m)</u>		<u>Shelf (55 -00m)</u>		<u>Nearshore (0-55 m)</u>	
D.blotched	105	Bocaccio	50?	Black	53
Aurora	75	Canary	84	Blue	39
POP	98	Cowcod	55	China	79
Yellowmouth	99	Yelloweye	118	Copper	50
Rougheye	205	Yellowtail	64	Quillback	90
Shortraker	157	Greenstriped	54		
		Chilipepper	35		

Rockfish Age at 50% maturity (years)

<u>Slope</u>		<u>Shelf</u>		<u>Nearshore</u>	
Darkblotched	8	Boccacio	?	Black	10
Aurora	5	Canary	9	Blue	6
POP	9	Cowcod	?	China	6
Yellowmouth	8	Yelloweye	19	Copper	7
Rougheye	20	Yellowtail	9	Quillback	11
Shortraker	12	Greenstriped	7		
		Chilipepper	4		

Rockfish maximum larval production per spawning event (1000's)

<u>Slope</u>		<u>Shelf</u>		<u>Nearshore</u>	
Darkblotched	610	Bocaccio	2,298	Black	?
Aurora	?	Canary	1,900	Blue	525
POP	505	Cowcod	1,925	China	?
Yellowmouth	?	Yelloweye	2,700	Copper	640
Rougheye	?	Yellowtail	1,993	Quillback	?
Shortraker	?	Greenstriped	295		
		Chilipepper	538		

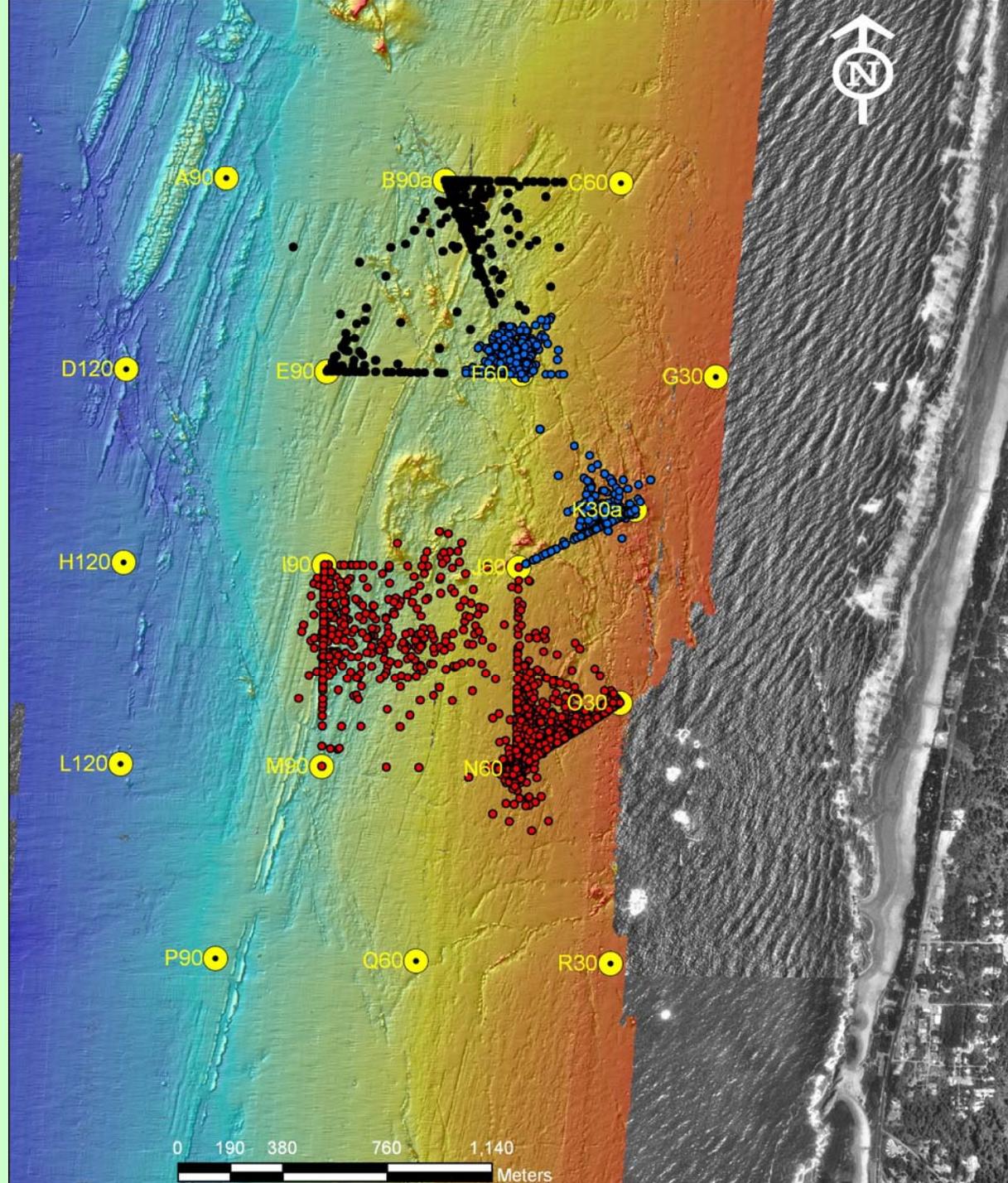
Rockfish Movement

ODFW acoustic telemetry of black rockfish indicates relatively little movement

Continuing work at Siletz Reef on six species

Puget Sound tagging studies suggest movements mostly under 10 miles,

- infrequently longer distances
- evidence of homing from displaced individuals.



Rockfish Maternal Effects: BOFFs

- Older black rockfish females provision larvae with greater energy resources



- Larvae of older females are more resistant to starvation
- Studies of additional species underway
- Older females may be disproportionately valuable as contributors to future generations

Rockfish are Vulnerable to “Barotrauma”



- Closed gas bladders
- Gas expands as fish is brought to surface
 - Distension of viscera
 - Bubbles on skin, in eyes & gills
 - ‘Tight’ body
- Fish released with barotrauma are often helpless at surface

Biology and Stock Status of Nearshore Groundfish



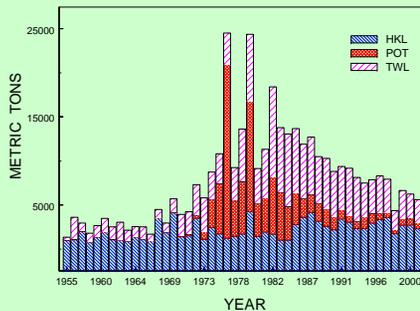
"Counting fish is just as easy as counting trees,
except they are invisible and they move."
- *John Shepherd*

Information needed for stock assessments



Biology

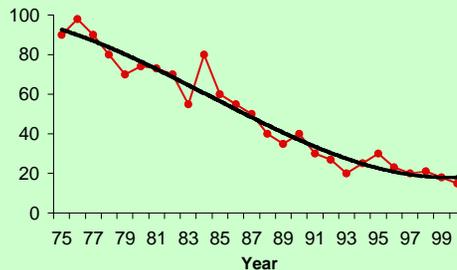
Growth and Age
Maturity and Fecundity
Natural Mortality
Movement and Migration



Fishery
Catch

Population
Model

Population
Status



Abundance
Index

Fishery Independent Survey

All the data are used to statistically reconstruct the most likely population status

Stock status of assessed nearshore species

- Black rockfish
- Canary rockfish
- Yelloweye rockfish
- Yellowtail rockfish
- Lingcod
- Kelp greenling
- Starry flounder
- English sole

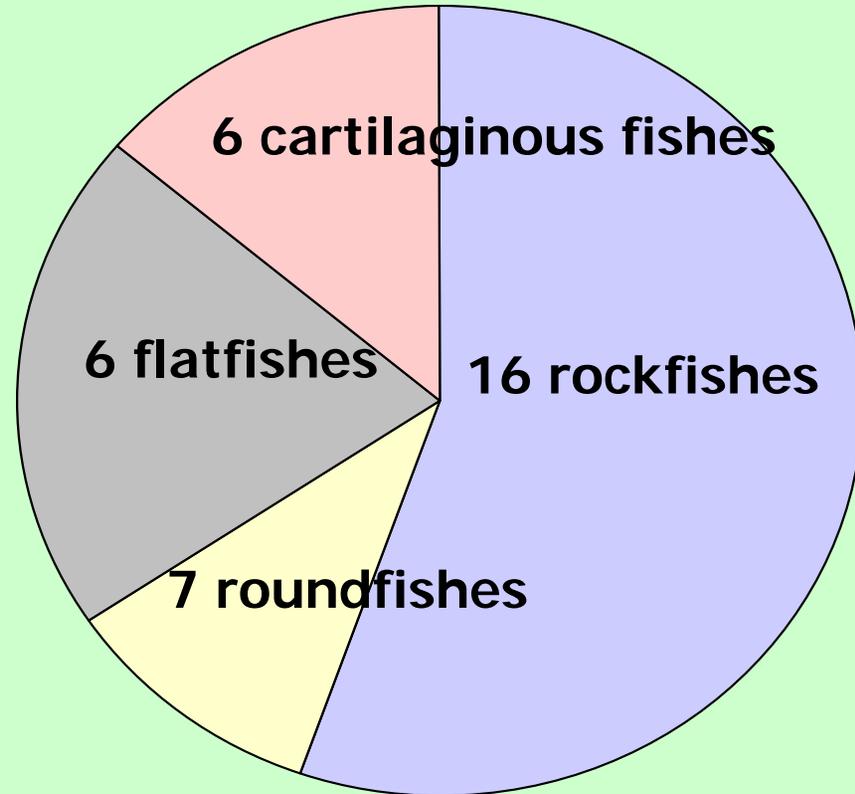


Nearshore Groundfish Stock Assessments

8 Assessed



35 Not Assessed



“Depleted”: spawning biomass less than 25% of estimated unfished biomass

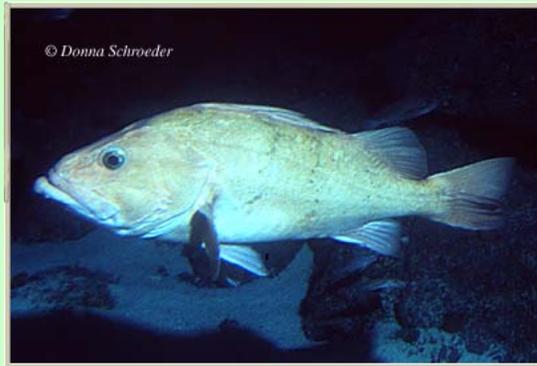
West Coast Depleted Rockfishes



Widow rockfish



Pacific ocean perch



Cowcod



Yelloweye rockfish



Canary rockfish



Boccacio

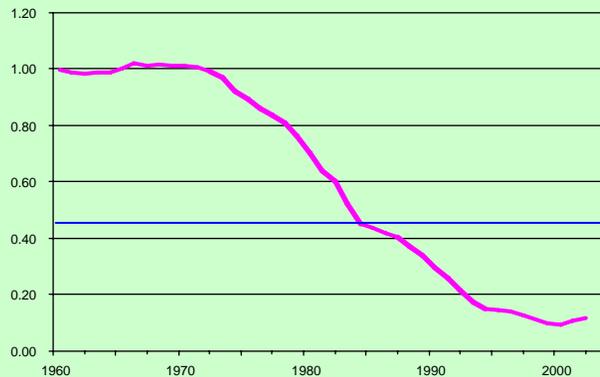


Darkblotched rockfish
Darkblotched rockfish

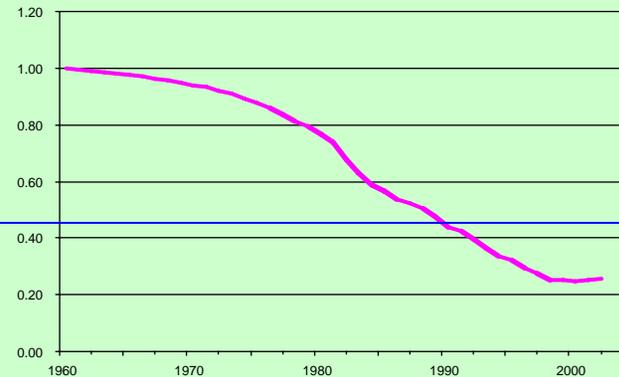
Depleted Oregon Nearshore Rockfishes

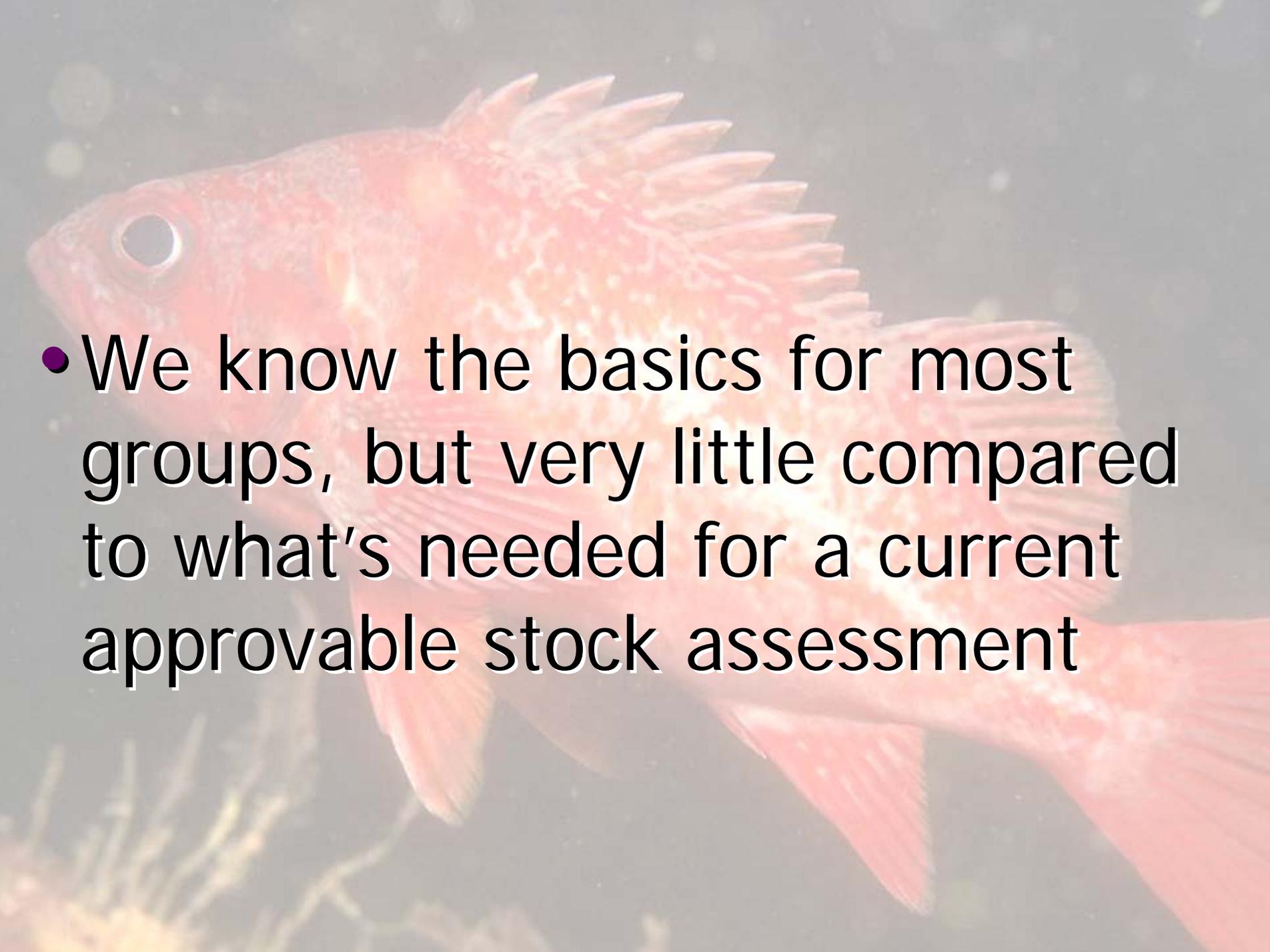


Canary rockfish



Yelloweye rockfish



- 
- We know the basics for most groups, but very little compared to what's needed for a current approvable stock assessment

Black Rockfish Stock Status



- CA-OR assessment in 2003
- New assessment in 2007
- Recreational fishery core species
- 46% of estimated unfished spawning biomass
- Allowable catch trend projected downward due to low recent recruitment
- Relies on recreational catch per unit effort (CPUE) for trends

Canary Rockfish Stock Status

- Depleted species; 5-10 % of estimated unfished spawning biomass
- Long-term problem: rebuilding plan extends to 2074
- Juveniles nearshore, migrate deeper with age
- 42-44 mt coastwide mortality limit (7 mt for OR sport)
- No retention



Yelloweye Rockfish Stock Status



- **Depleted species: 24% of estimated unfished spawning biomass**
- **Rebuilding target is 2058**
- **No retention, 26 mt mortality limit to decrease to only 13.5 mt in 2011**
- **Mainly juveniles in nearshore**

Greenling, Lingcod : Biology



- Much lower fecundity (egg production) than rockfishes
- Aggressive predator (significant predation on rockfish)
- Males guard nests in winter/early spring
- No air bladder/no barotrauma issues
- Shorter life cycle/easier to recover from harvest impacts



Lingcod: Stock Status

64% of estimated unfished spawning biomass coastwide

-87% in OR-WA

-24% in California

- Northern portion of stock rebuilt quickly (2007) from depleted status**
- Poor survey information**
- Uses rocky habitat**
- Fisheries cannot access fully due to rockfish bycatch**

Kelp Greenling: Stock Status



- 48% of estimated unfished spawning biomass in Oregon
 - But downward trend due to low projected recruitment.
- No fishery independent survey
- Assessment not used for regulation
- Monitoring and data collection challenges
 - Prominent in live-fish fishery – cannot obtain samples
 - Shore-based fishery is currently not monitored

Flatfishes: Biology

Examples: Pacific sand dab, starry flounder, English sole

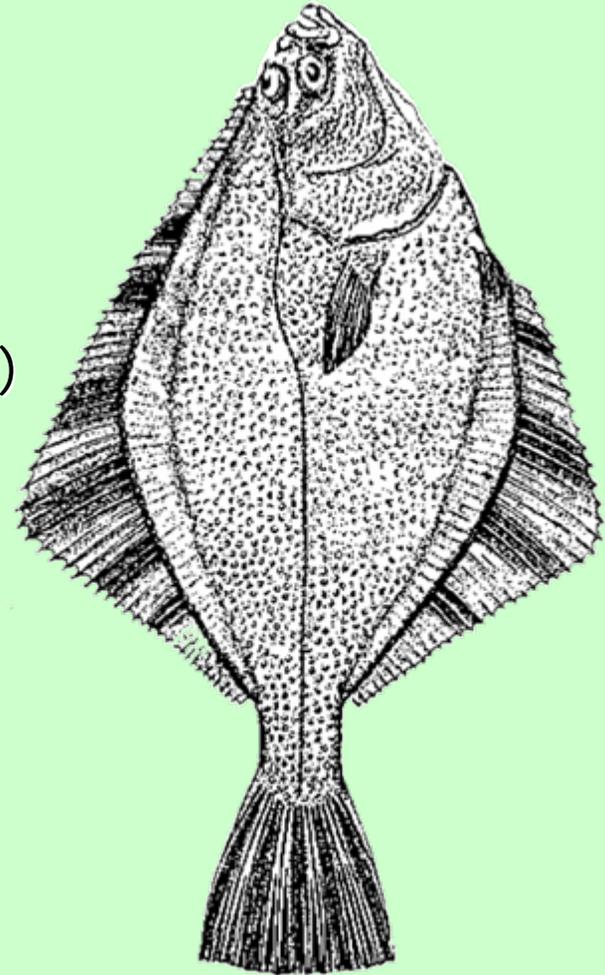
Relatively abundant and productive populations

Annual onshore/offshore migration



Starry Flounder: Stock Status

- OR-WA stock
 - Mostly trawl landings (72 mt vs 6 mt)
 - 44% of estimated unfished spawning biomass in 2005
 - No independent survey
 - No discard information
 - Life history information poor
 - CA- Females mature by age 2 yrs (37 cm)



English Sole: Stock Status



- Building from 27% to 92% of estimated unfished spawning biomass in last decade
- Life history well documented
- Indexed by NOAA survey
- Harvested by shelf bottom trawl

Cabezon: Biology and Stock Status



- Biology: Sculpin family, no air bladder caught on hook and line and in pots
- Males guard red/purple eggs late winter
- Shallow water and near-tidal habitat
- Stock status: Assessed off of California only
- WA – OR assessment not accepted due to limitations of catch data
- Life history data dated and location specific. Mostly Puget Sound and CA

Other Nearshore Fishes

- **Surfperches**
 - Livebearers; low number of offspring per breeding event
- **Green Sturgeon**
 - Little oceanic information
 - Tagging studies show long distance movement
- Many other species not taken in nearshore fisheries (e.g. sandfish, gunnells, sand lance....)



Shiner perch

Most (35 of 43) nearshore species
have not been assessed



Advances in Oregon Nearshore Fishery Management to Date



Ways To Seek Sustainable Fisheries:

- Collaborative research: with POORT, Depoe Bay etc.
- SAFE coordination
- Port Liaisons
- Advisory Committees (nearshore, shellfish, crab, sport groundfish etc.)
- ODFW Partnership award
- Web Page Information on research and regulations



ODFW Collaborative Research Funding

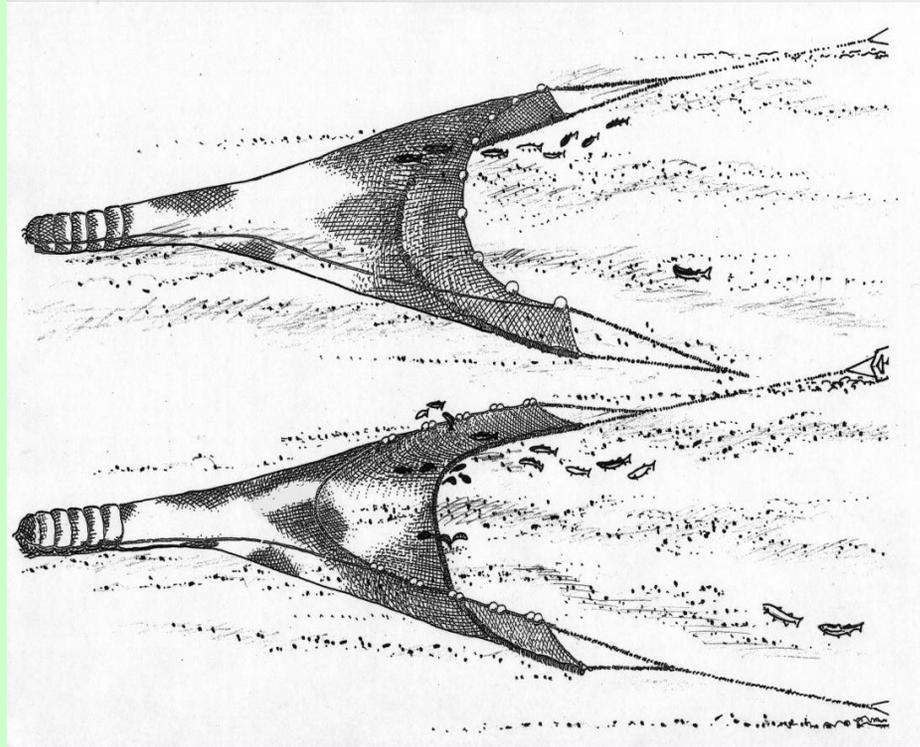
- Stock Assessment Research (State)
 - \$460,000 in 2005/07 biennium
- NMFS Groundfish Disaster Relief Funding
 - \$75,000 in FY 2006



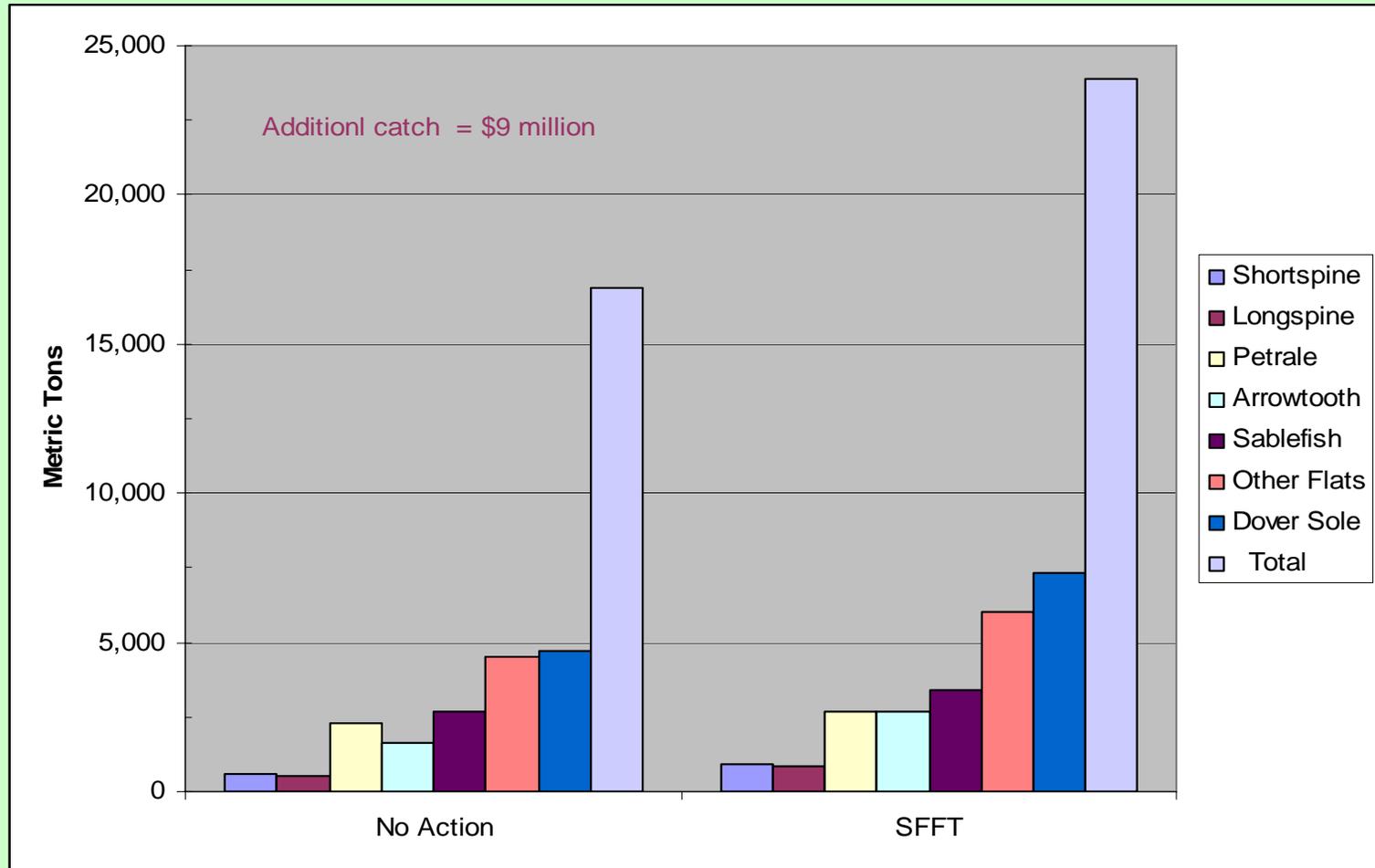
ODFW Research in Support of Fisheries Management

- Oregon is a leader in gear research and bycatch reduction research on the West Coast.
- Innovations start with cooperative research partnering fishermen's and gear-makers' expertise with testing and evaluation by ODFW scientists

Selective Flatfish Trawl: Bycatch Reduction



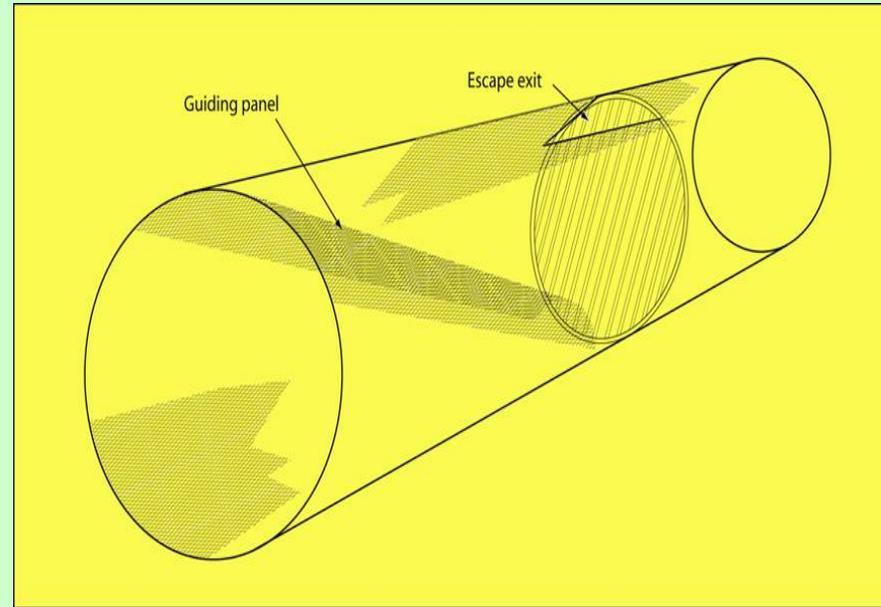
Selective Flatfish Trawl Access Additional Catch



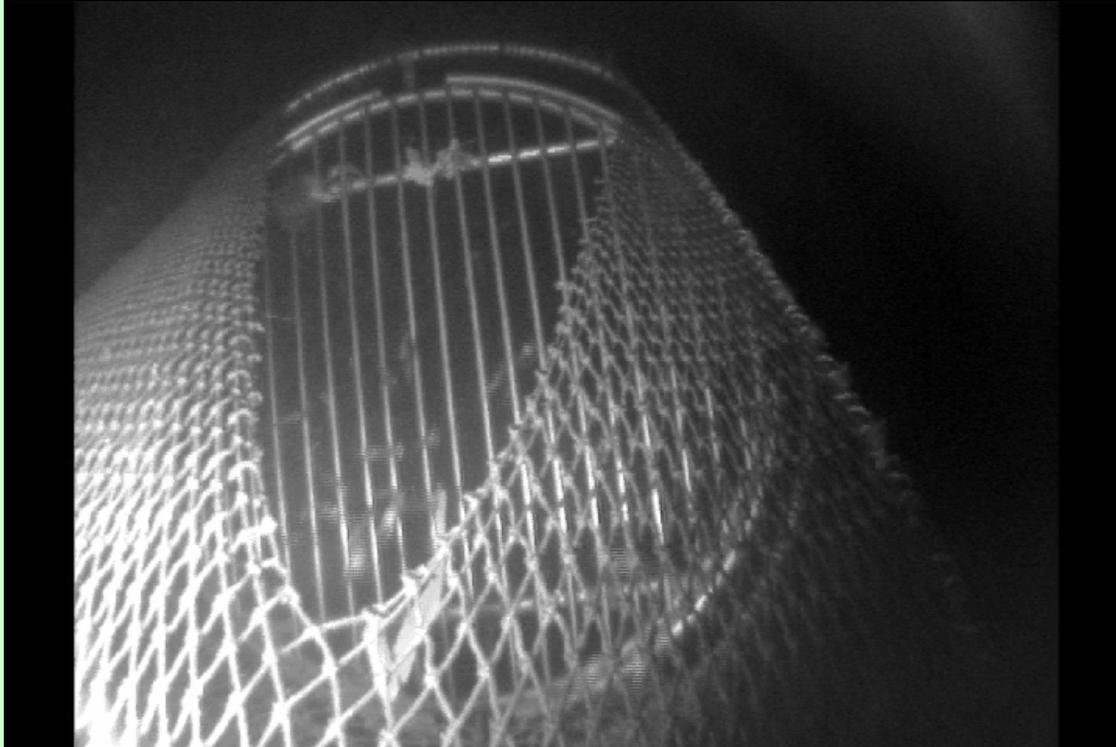
Results of 2001-02 SFFT Tests

- The selective flatfish trawl increased the catch of most target flatfish by 25-59%, consistent with its increased wing spread.
- Decreased the catch of large rockfish, most roundfish and 2 flatfish.
 - canary rockfish (-76%)
 - redstripe rockfish (-86%)
 - Pacific hake (-97%)
 - large shortspine thornyhead (-34%)
 - flathead sole (-14%)
 - large Pacific halibut (-29%)

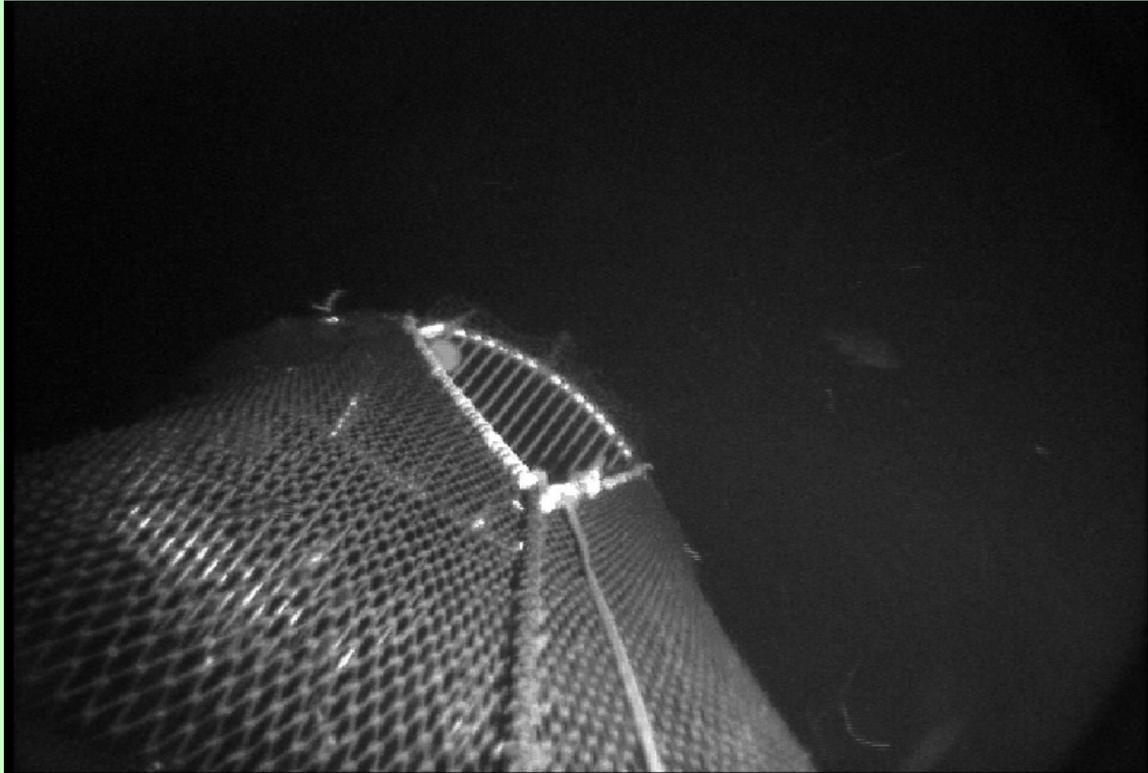
Collaborative Research and Gear Development has Maintained Fishing Opportunities



Bycatch reduction devices in
shrimp trawl fishery



Halibut excape clip.avi



LingcodCanary exit 4.avi

Barotrauma Studies

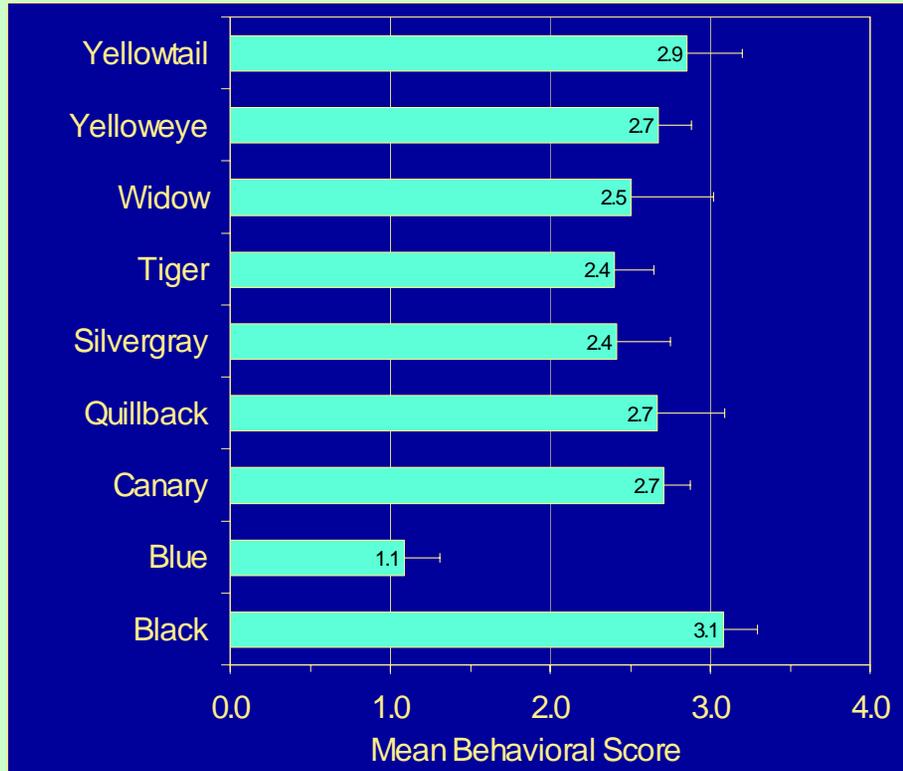
- Release fish at depth
- Observe behavior in real-time at the surface
- Ambient light
- Recompresses fish to 50 m quickly
- Observed behavior of 9 rockfish species across a wide depth range (hook and line)



Movietagged.wmv

Rockfish Recompression & Release Summary

Number of fish



14 of 23 blue rockfish scored a 1 or 0, compared to 1 of 24 for black Rockfish

Scores reflect orientation and directed swimming behavior: 0 is lowest possible, 4 is highest possible

Management Tools in Use

- Harvest mortality limits
 - PFMC reductions in target fishing mortality rates used to calculate acceptable biological catch (2000)
 - ODFW tracking of nearshore species against landed catch caps (commercial and recreational)
 - Implemented through commercial landing limits and recreational bag limits

Web Tracking of Sport Harvest



ODFW's goal for the 2005 sport groundfish fishery is to provide 12 months of fishing opportunity.

The daily marine bag limit has been reduced from 8 fish to 5 fish, effective Saturday, July 16, 2005. The lingcod limit remains the same at 2 fish per day. The reduction is based on preliminary reports of increased groundfish effort and catch in June and is designed to better ensure a full season. [See the news release here.](#)

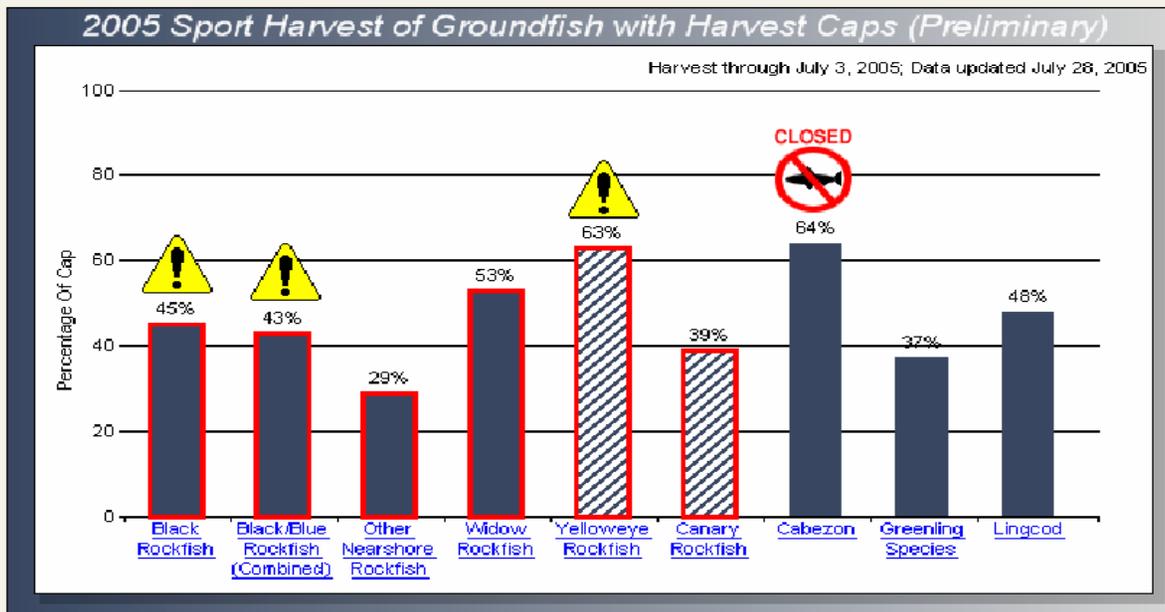
Additional inseason regulation changes may be adopted before the end of the season.



Species of particular concern at this time are indicated on the chart below with a , which can be clicked on for more information.

Note that accelerating toward or reaching the cap of one species can affect fishing for other species. [Click here to find out how.](#)

Catch estimates for each month are posted at the end of the following month.



Attention!

Reaching the cap on one of these species or species groups may affect fishing for other species. [Find out why.](#)



Why are there harvest caps on species you cannot keep? [Find out here.](#)

Management Tools in Use (cont'd)

- Gear restrictions

- Small footrope rule to limit canary rockfish catch in rocky areas

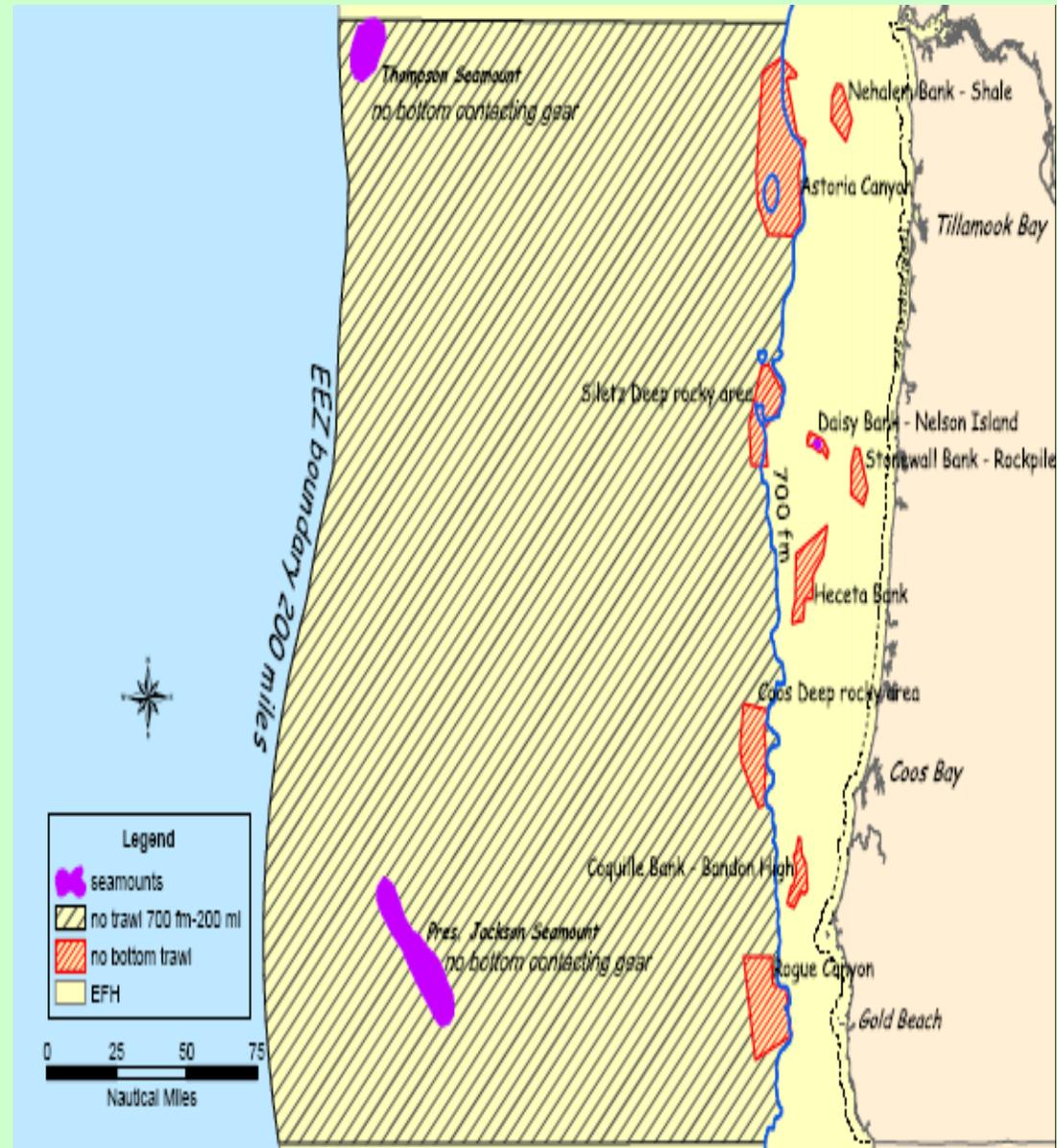
- Gear development and adoption

- Cut-back trawl – allows increased access to abundant flatfish stocks while avoiding rockfish bycatch

- Bycatch reduction devices in shrimp trawl fishery

Management Tools in Use (cont'd)

- **Spatial Management**
 - Rockfish conservation areas (to reduce mortality and facilitate rockfish rebuilding)
- **No bottom-trawl zones:** PFMC action in 2005 to protect essential fish habitat (right)



The Oregon Nearshore Strategy

Mission: To promote actions that will conserve ecological functions and nearshore marine resources to provide long-term ecological, economic and social benefits for current and future generations of Oregonians



Identifies:

- conservation and management priorities
- key nearshore species and habitats
- research and monitoring needs
- opportunities for public to contribute to resource sustainability

Strategy does NOT:

- set regulations
- address issues or species covered by other efforts (e.g., marine reserves, snowy plover)

The Oregon Nearshore Strategy



16 recommended ODFW actions in the areas of:

- **education and outreach**
- **research and monitoring**
- **management and policy**

Funding:

- **2002 State Wildlife Grants (SWG) program provided nationwide funding for wildlife conservation planning**
- **SWG funds available for dedicated nearshore staff until 2007**
- **Obtaining additional funding is a priority**



Continuing Information Needs for Nearshore Fishery Management

Basic biology of Species

- Population structure
 - Demographics
 - Genetics
- Movement patterns
- Reproductive behavior
- Reproductive biology
- Habitat associations

Develop Better Information for Management

- Fishery independent abundance estimates
- Survey methods for rocky reef species (in development)
- Spatial patterns and intensity of harvest (fishery behavior)

Ongoing ODFW Nearshore Research in Support of Management Needs

- Estimate black rockfish exploitation rates – PIT tagging
- Maturity studies of nearshore species (otolith aging)
- Barotrauma physiology and discard mortality
 - Recompression, venting, and release methods
- Movement patterns (acoustic telemetry)
- Fishery selectivity studies
(OR South Coast)
- Habitat mapping
- Fish-habitat associations



Summary: Nearshore Groundfish Stock Status

- The vast majority of nearshore groundfish species are neither assessed or indexed.
- Two of eight of the assessed nearshore groundfish species are depleted/overfished.
- Depleted stocks limit fishery access and harvest opportunity of more abundant stocks under precautionary management

Summary: Progress

- **Direct Measurement of Harvest Rate**

(PIT tagging) – Helpful to establish better stock assessment baseline information (may not be applicable to less abundant species).

- **Selective Capture Gears**

Has promise, but much more work needed for hook and line etc.

- **Spatial Management**

Within certain depth limits, acoustic tagging can provide information on movements and survival. More data on where fish live and movement data for less common species is needed.

- **Nearshore Strategy**

Begins putting nearshore resources into broader ecological context; identifies significant non-fishing concerns; non-regulatory

Questions?

