ESA-Listed Rockfish Conservation and Recovery Planning

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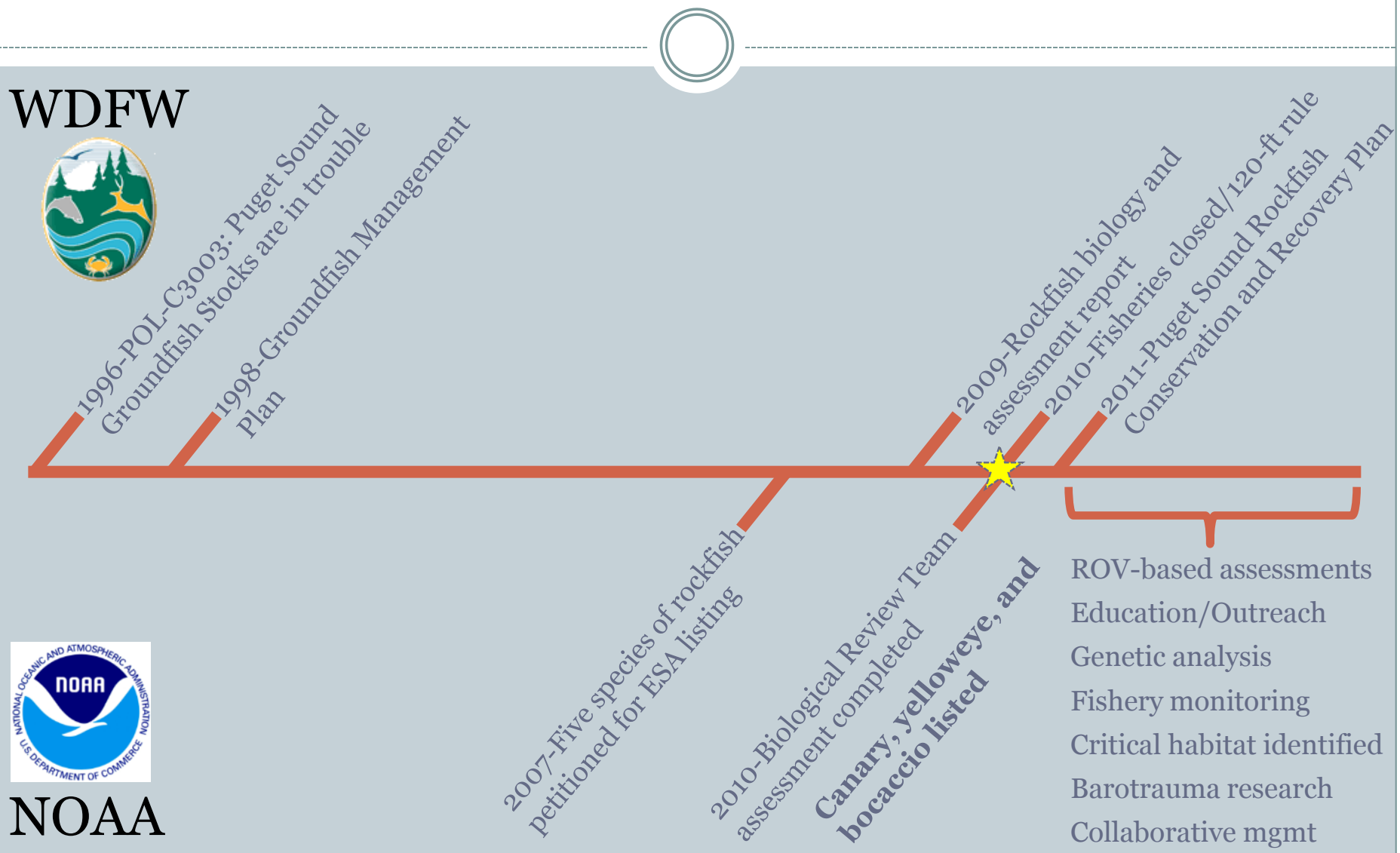
Presentation Outline

- Background
  - Recent history of Puget Sound rockfish management
  - 2010 ESA listing of canary, yelloweye, and bocaccio
  - Brief overview of Puget Sound Rockfish Conservation Plan
- Recovery planning
  - Overview of Rockfish Recovery Team composition and focus
  - Goals and components of a recovery plan
  - Overview of key on-going research
  - Implications of recent findings
- The Biological Review Team and proposed timeline for next steps

Recent Rockfish Management



Elements of the Conservation Plan

- Outlines comprehensive approach to assessment and conservation using sound scientific data
- Defines data gaps and priority actions
- Recognizes the three ESA-listed species
- Funding/staff time focused on specific actions:
  - Reduce fishery mortality
  - Remove derelict gear, and prevent re-accumulation
  - Determine distribution, abundance, and habitat associations
  - Evaluate effects of fishery changes, and estimate bycatch
  - Educate and engage the public
  - **Develop federal recovery plan for ESA-listed species**

ESA-listed Rockfish Recovery Team

- Federally convened team of rockfish and population demography experts tasked with developing formal recovery plan
- Distinct from Biological Review Team that evaluated stocks for listing
- Meetings began in Feb. of 2013, occurred monthly through Sept. 2014. Writing since then.
- Plan relies heavily on WDFW data and incorporates many recommendations from Conservation Plan

Team Composition and Focus

- Dayv Lowry & Bob Pacunski (WDFW)
- Don Gunderson, Lorenz Hauser & Terrie Klinger (University of Washington)
- Jason Cope, Kelly Andrews & Dan Tonnes (NOAA)
- Keith Lutz, then Will Beattie, then Chris James (Northwest Indian Fisheries Commission)

Elements of Recovery Planning

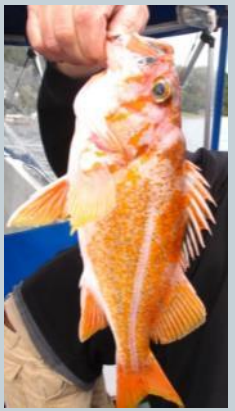
- Set biological background and identify threats
- Develop recovery strategy
  - Includes research & management actions
- Create recovery goals & criteria
  - Biological thresholds & threats criteria
- Develop implementation schedule and preliminary cost estimates
- *Draft plans are released for public comment, then revised & finalized*

Preliminary Research & Recovery Efforts

- 2007–now: ROV-based abundance/distribution work
  2011: Salish Sea Rockfish Workshop, formation of the Rockfish Workgroup
- 2011/12: NMFS/UW research with local anglers on rockfish recovery (500+ interviews)
- 2011–15: Larval rockfish abundance, contribution to salmonid diets
- 2011–now: Derelict fishing gear research, removal, and prevention efforts
- 2012–15: Assessments of historic rockfish data
- 2012–now: Cooperative research w/ anglers

Distinct Population Segments (DPS)

- Must be "discrete"
  - Separate from other populations based on physical, physiological, ecological, or behavioral factors
    - Markedly different genetics
    - Life history traits, e.g., site fidelity
    - Ecological features of the environment
  - Delimited by international governmental boundaries

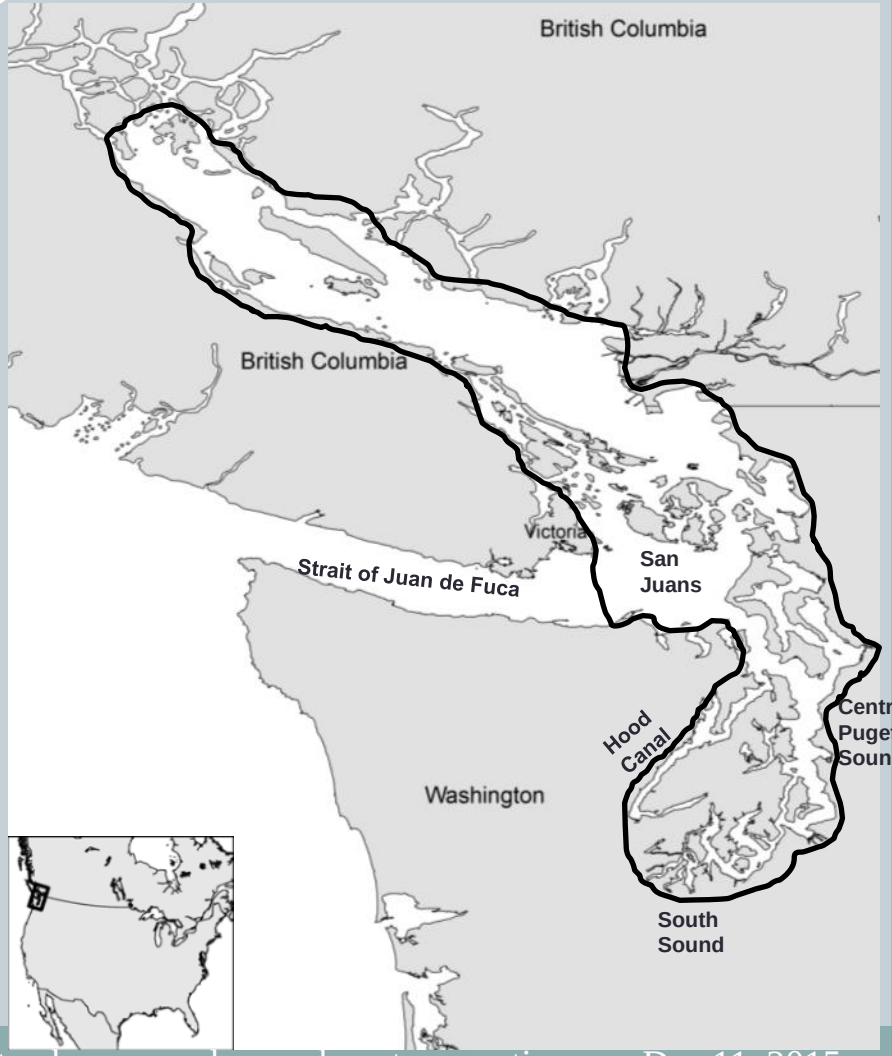


- Must be "significant"
  - Unique ecological setting
  - Loss would result in significant gap in geographic range
  - Represents the only surviving natural occurrence

See DPS Policy at: http://www.nmfs.noaa.gov/pr/pdfs/fr/fr61-4722.pdf

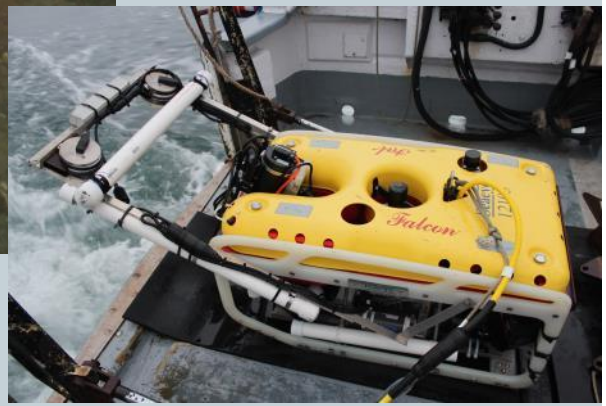
Puget Sound/Georgia Basin DPS

- Boundaries align for all three species



http://www.westcoast.fisheries.noaa.gov/publications/frn/2010/75fr22276.pdf

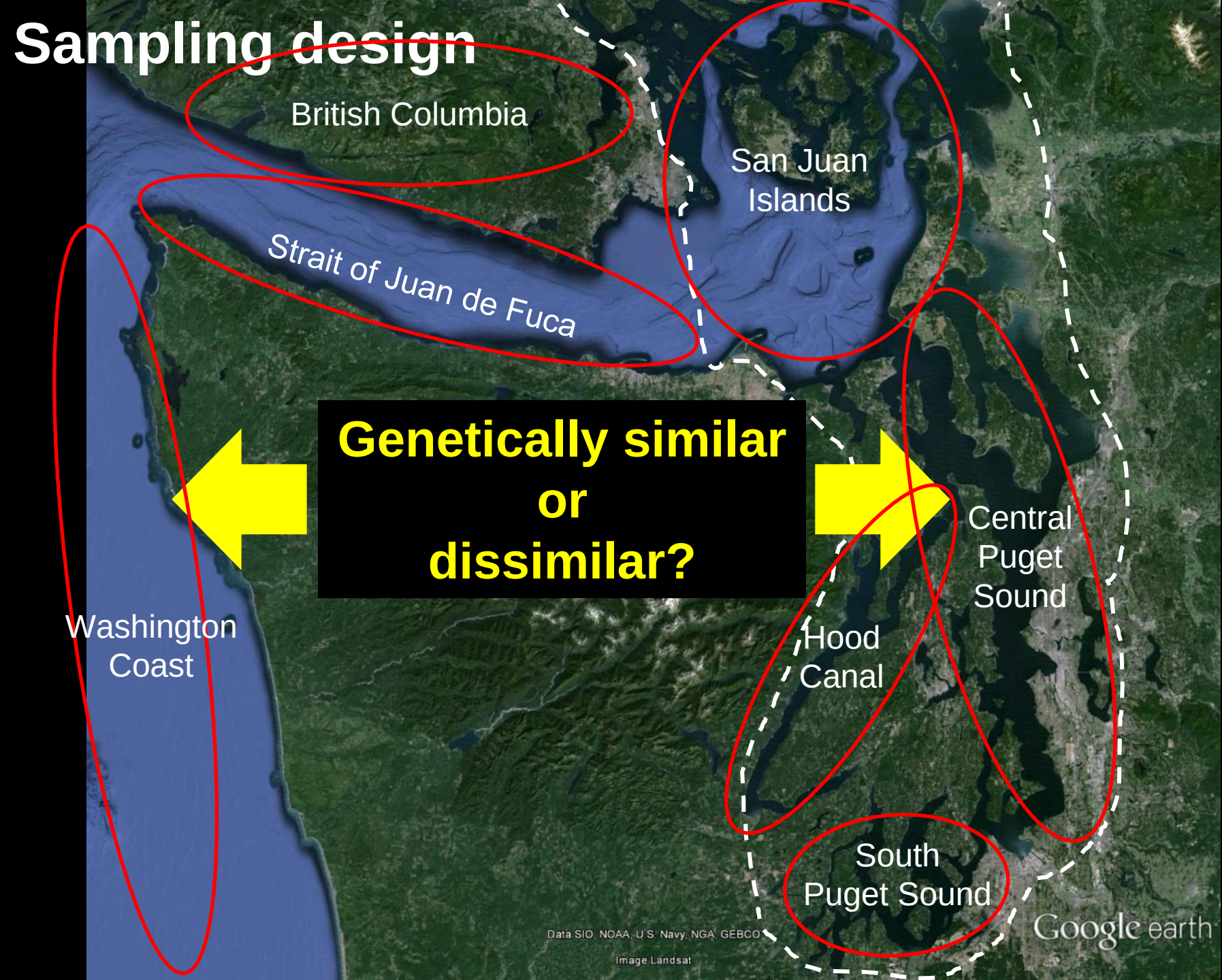
2015-16 Remotely Operated Vehicle Survey



- 12/9: 464 stations finished
- Several dozen ESA-listed rockfish observed
- Video review ongoing
- Similar design for 2016

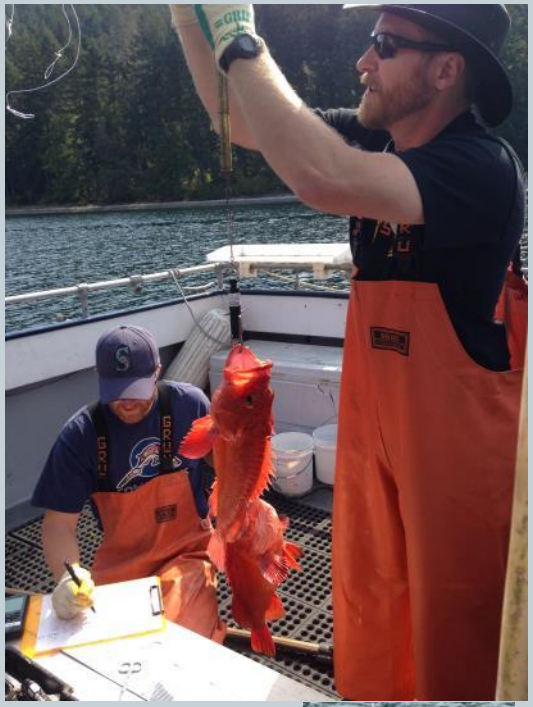
Cooperative Research/Rockfish Genetics

- 9 captains, 73 fishing trips, 98 volunteers


Sampling design
British Columbia
San Juan Islands
Strait of Juan de Fuca
Genetically similar or dissimilar?
Washington Coast
Hood Canal
Central Puget Sound
South Puget Sound
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
Google earth

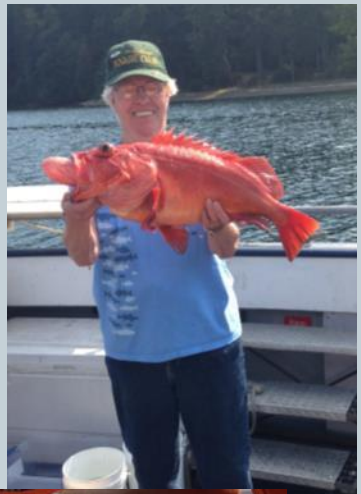
Fishing Effort

- Directly targeted “good” areas
  - Historical locations of catch
  - ROV/diver sightings
  - Captain’s “hunches”
- Hook and line sampling
  - Bait (live and dead) and jigs
- Biological sampling
  - Length, weight, sex
  - Fin clip
  - External Floy tag
  - Release with descender




Listed species collected
30 Yelloweye
28 Yelloweye
26 Canary
19 Yelloweye
22 Canary
5 Yelloweye
25 Canary
3 Bocaccio
16 Yelloweye
0 Canary
30 Yelloweye
30 Canary
0 Yelloweye
0 Canary
Data SIO, NOAA,

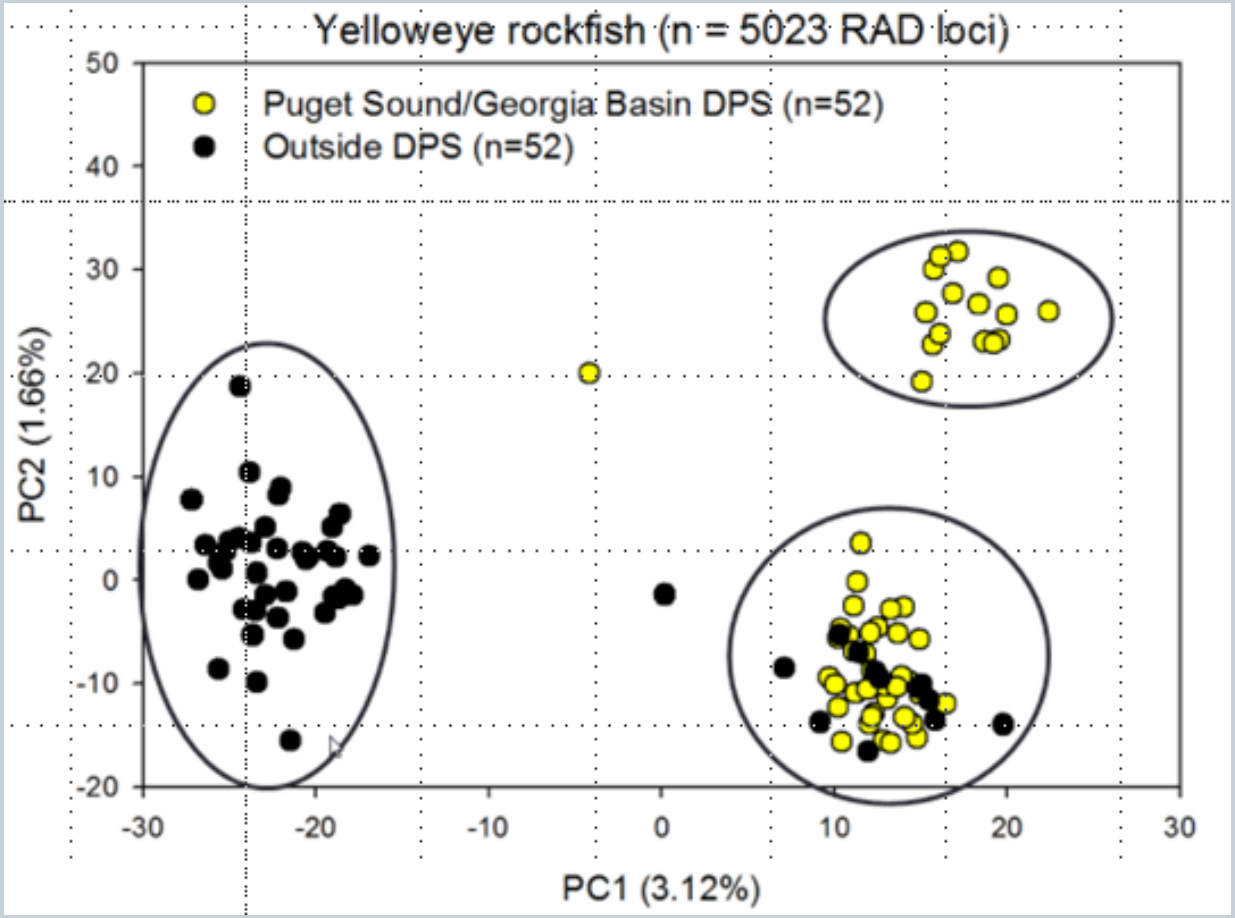
Are They Genetically Distinct?



- Restriction-site Associated (RAD) DNA sequencing
- Provides 1000s of individual sequence reads (SNPs)
  - Requires fewer samples
  - Critical for ESA-listed species research

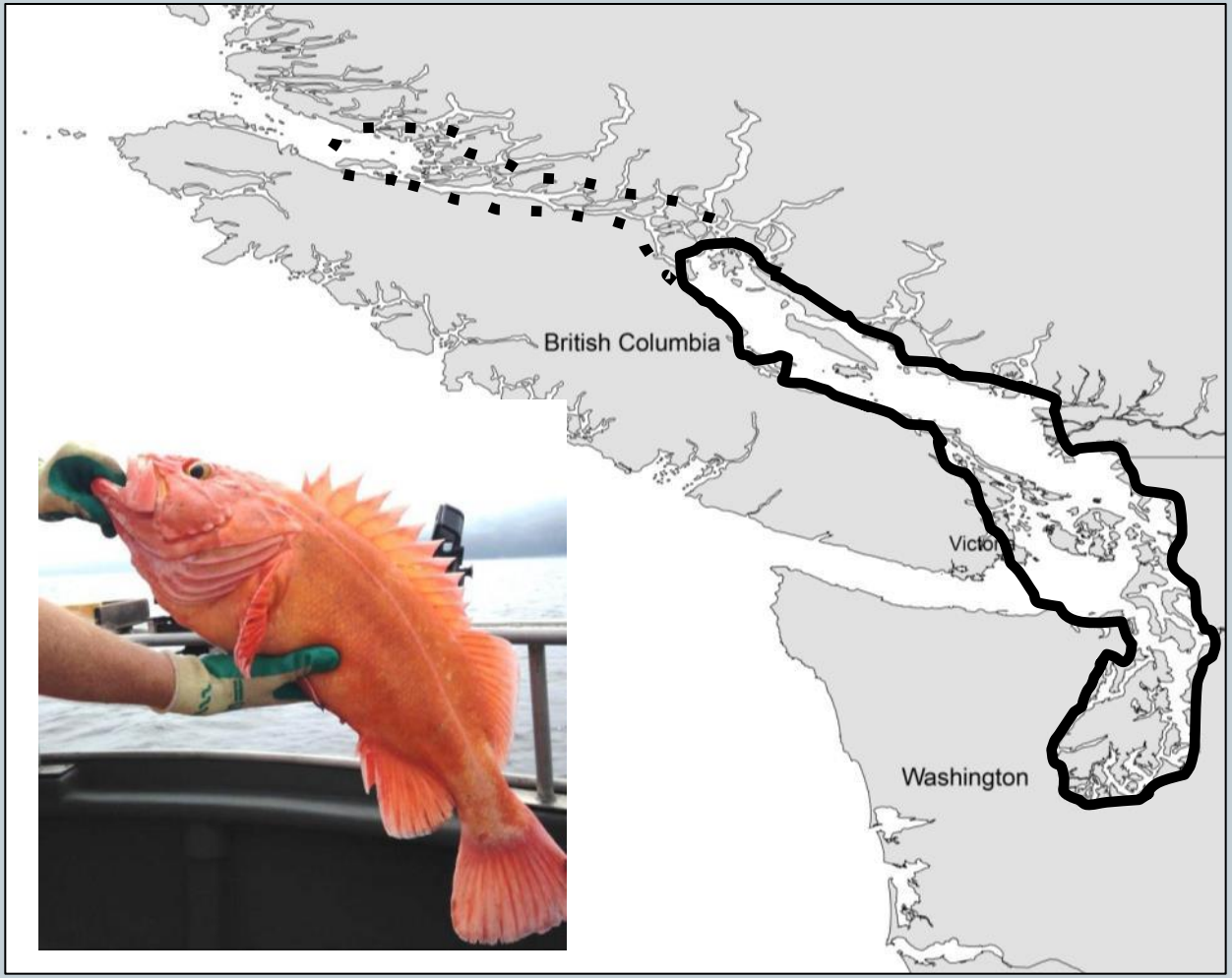
Yelloweye **are** Genetically Distinct

- Three distinct clusters based on genetic variation



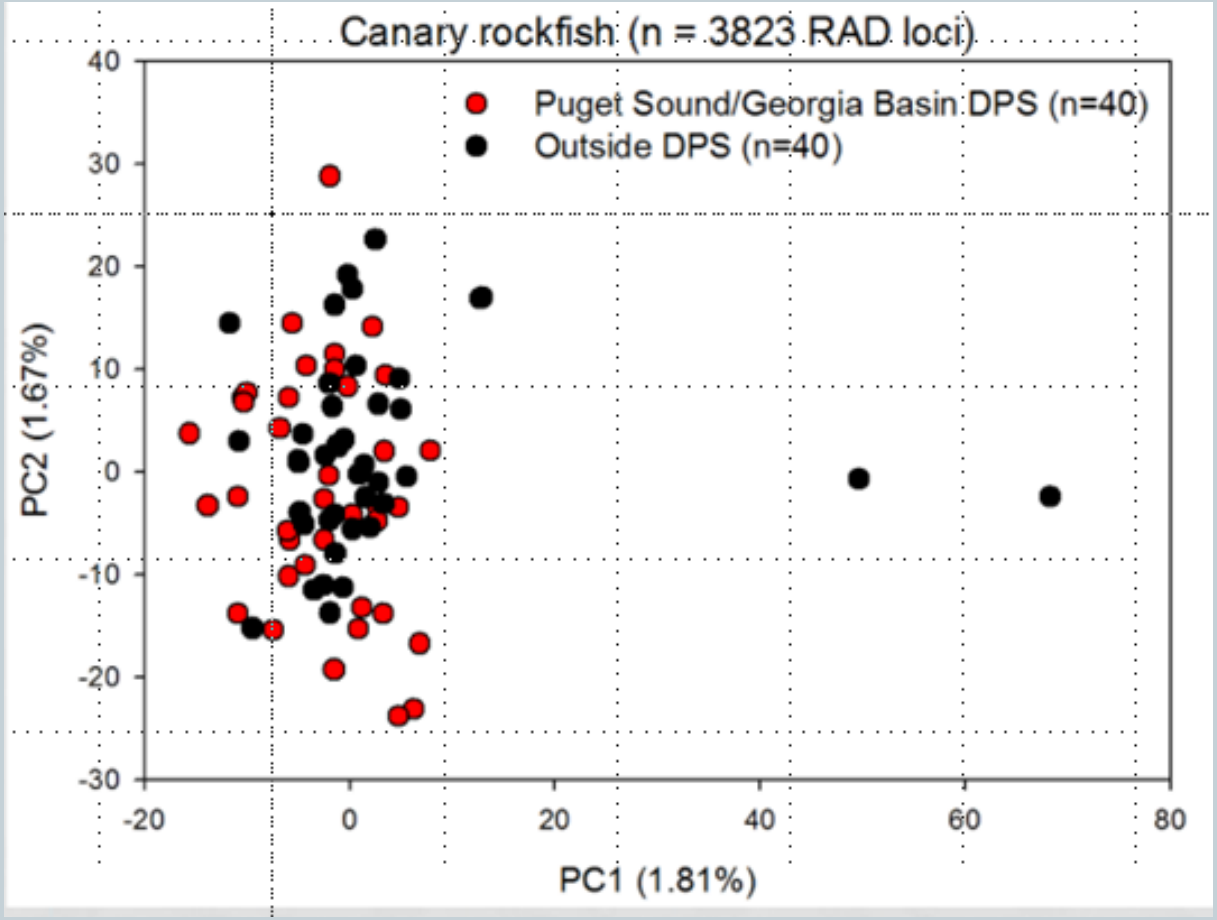
Potential DPS Boundary Change?

- Extending DPS north captures full geographic extent of the genetic unit



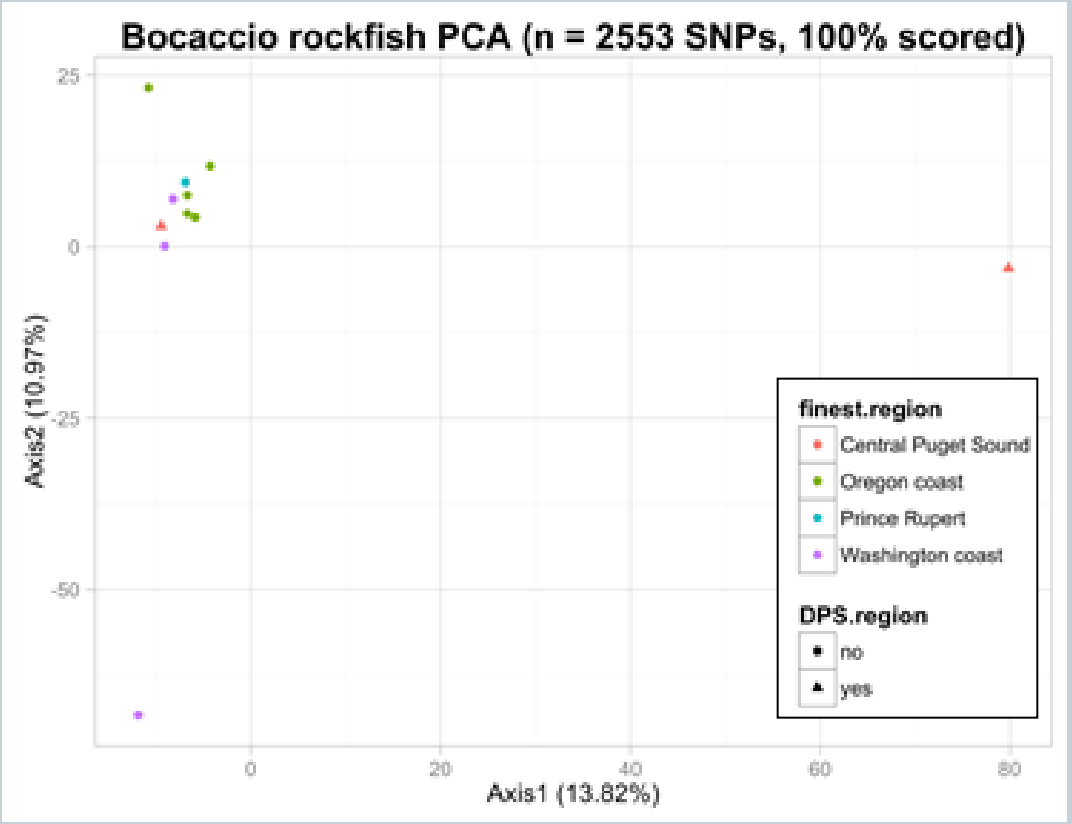
Canary **are not** Genetically Distinct

- No distinct structure observed



Data Lacking for Bocaccio

- Only 3 samples from the DPS
- Efforts ongoing to collect additional samples



Genetics Summary

- Yelloweye
  - Multiple analyses support differentiation inside/outside DPS
  - Hood Canal collections differentiate from rest of DPS
    - Will be treated separately in Recovery Plan
  - Potential increase in the northern extent of the DPS
- Canary
  - No clear structure observed inside/outside DPS
  - **Delisting is likely based on new science**
- Bocaccio
  - Clearly not abundant
  - More genetic samples needed to evaluate population structure

Merging the Genetics & ROV Surveys

- One resighted female yelloweye brooding eggs
  - Demonstrates validity of descenders

- Floy tags inserted during genetic sampling can be seen with ROV
  - 4 tags resighted to date

Next Steps and Timeline

2016:

- 5-year review: Describe implications of new genetic information, recommend any change in status. *Due for release late March.*
- Potential proposed listing status change and modification of DPS boundary (yelloweye)
- Draft Recovery Plan for public review: incorporate reviews, genetic information, & 2015 ROV work.
  - 2016 ROV surveys and other work = adaptive management

Summary

- Population issues noted in mid-1990s
- Intense data collection/analysis through 2000s
- WDFW assessment report in 2009
  - Research and management priorities identified
- Canary, yelloweye, and bocaccio listed in 2010
- Recovery Team convened in 2013
  - Draft recovery plan nearing completion
  - Numerous projects and outreach efforts in progress
- 5-year review to conclude in March 2016
- Recovery plan out for broad review in Spring 2016

Questions?