Marine Bottomfish Communities in the Whidbey Island Basin

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Snohomish County Beach Watchers, March 27, 2020



Overview

Bob Pacunski



- B.S., Seattle Pacific University, 1984
- M.S., University of Washington, 1990
- With WDFW since 1992
- Lead of Mill Creek team
- ROV Program manager, diver



Jen Blaine

- B.S., Wittenberg University, 2006
- M.S., Washington State University Vancouver, 2011
- With WDFW since 2013
- Lead on Trawl project
- ROV pilot, diver

- Intro to Puget Sound waters
- Marine Fish Survey methods
- Whidbey Fish Communities
 - 6 Major Species Groups
 - Group overview
 - Key Species ID
 - Key Species
 Populations
- WI comparison to rest of Sound
- Wrap-up & Questions

Puget Sound Marine Fish Habitat

- Surface area of US waters of Salish Sea ~2217 mi²
- ~75% of waters > 120 ft deep
 - Avg = 460 ft; Max = 919 ft
- Puget Sound delineated into 8 basins
- Whidbey Basin is 64%
 "deep" (>120 ft)
- Substrate varies, but largely mud/sand with scattered pockets of rock
- Mudstone/sandstone walls along basin margins provide some complex habitat but are not "true" rock



Sampling Marine Fish & Habitat: Beach Seining

Spawning beaches & shallow waters to 20 ft * Forage fish, other "ecosystem" species



Sampling Marine Fish & Habitat: Diving

10-100 ft * All habitats * All "big" fish, but focused on lingcod and rockfish



Sampling Marine Fish & Habitat: ROV

30-1000 ft * All habitats, focus on deep, rocky, complex * All fish, focus on rockfish



Sampling Marine Fish & Habitat: ROV



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Sampling Marine Fish & Habitat: Bottom Trawl

30-1000+ ft * All habitats, but focused on deep, flat * All fish on trawlable habitats



Sampling Marine Fish & Habitat: Bottom Trawl



https://www.youtube.com/watch?v=g6CBEGTu55o&t=9s



Putting it all together...



- ... takes caution, care, and attention to detail
- Each method/tool has its own inherent selectivity & bias
- Organism behavior impacts selectivity/catchability
- No single tool samples all species, let alone all life stages, across all seasons
- Suite of methods, consistently applied year after year = powerful trend analysis



Questions on PS waters or our group's survey methods?









Whidbey Basin Bottomfish Communities

(based on trawls since 2014)



~90% of the WI bottomfish community consists of Flatfish, Ratfish, & Codfish

Whidbey Basin Bottomfish Communities



Flatfish: 55% of WI fish biomass, 61% of abundance



- 12 species of flatfish caught in bottom trawl since 2014 in WI
- Dominated by English Sole and Rock Sole



English Sole

- Right-eyed
- ≤ 24 in long
- Live 22+ years
- Sandy bottoms
- Common at all depths

Rock Sole

- Right-eyed
- ≤ 24 in long
- Live 26+ years
- Pebbly or sandy bottoms
- Most commonly 30-240 ft





Pacific Sanddab

- Left-eyed
- ≤ 16 in long
- Live 9+ years
- Muddy or sandy bottoms
- Most commonly 120-240 ft

Starry Flounder

- Right- OR Left-eyed
- ≤ 36 in long
- Live 24+ years
- Sandy bottoms
- Most commonly 30-120 ft

Slender Sole

- Right-eyed
- ≤ 14 in long
- Pebbly & mud bottoms
- Most commonly >120 ft









- English Sole highest biomass in 2017
- In 2018, higher English sole abundance but lower biomass indicated more smaller/younger
- 2019 estimates back down to 2014 estimates
- Rock Sole lowest in 6 years

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Abundance: Millions of individuals



Questions on Flatfish?

Whidbey Basin Bottomfish Communities



Ratfish: 26% of WI fish biomass, 5% of abundance

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Whidbey Basin Bottomfish: Spotted Ratfish

Spotted Ratfish

- Cartilaginous fish
- ≤ 24 in long (M), ≤ 38 in (F)
- Mildly venomous dorsal spine
- Easy to sex
- Lay egg cases
- Live ? years
- All bottom types
- Most commonly >100 ft







Whidbey Basin Bottomfish: Spotted Ratfish



- Population has gone up and down in WI, and 2019 was the highest in recent years.
- Most dominant fish in Puget Sound, by both weight and numbers!

Questions on Spotted Ratfish?

Whidbey Basin Bottomfish Communities



Codfish: 10% of WI fish biomass, 21% of abundance

Whidbey Basin Bottomfish: Codfish



- 4 species of codfish caught in bottom trawl since 2014; Pacific Hake are dominant (>98%)
- Pacific Cod only caught in 2016



Whidbey Basin Bottomfish: Codfish

Pacific Hake (Whiting)

- ≤ 36 in long
- Live 20+ years
- Near bottom or in
 - water column
- Most commonly >240 ft

Walleye Pollock

- ≤ 36 in long
- Live 10+ years
- Pebbly bottoms
- Most commonly >240 ft

Pacific Tomcod

- ≤ 12 in long
- Mud/sand bottoms
- Most commonly 30-360 ft





Whidbey Basin Bottomfish: Hake

- WI Hake are part of Georgia Basin Pacific Hake Distinct Population Segment (DPS)
- Port Susan and Saratoga Passage are known spawning hotspots





Whidbey Basin Bottomfish: Hake

- WI Hake are part of Georgia Basin Pacific Hake Distinct Population Segment (DPS)
- Port Susan and Saratoga Passage are known spawning hotspots
- Historical Hake (Whiting) fishery used to be big in WI, closed in 1991
- Populations/biomass dropped during fishery and haven't recovered
- Hake in Puget Sound used to be at least 50% larger



Source: NOAA-NMFS-NWFSC TM-44 & EoPugetSound

Whidbey Basin Bottomfish: Hake



- Population increased by 21x from 2015-2018, but dropped in 2019
- Even 2018 was far below fishery levels
- Mostly small fish

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Questions on codfish?



Whidbey Basin Bottomfish Communities



Sharks & Skates: 3% of WI fish biomass, 0.4% of abundance

Whidbey Basin Bottomfish: Sharks & Skates



- 3 species caught in bottom trawl since 2014
- WI elasmobranchs dominated by Longnose Skate

Whidbey Basin Bottomfish: Sharks & Skates

Longnose Skate

- ≤ 5 feet long
- Live 26+ years
- Mud/sand bottoms
- Most commonly >240 ft
- Lay egg cases

Spiny Dogfish

- ≤ 5.25 feet long, live 100+ years
- All bottoms & midwater
- Most commonly >240 ft
- One of the longest gestation of any vertebrate: 18-24 months!
- Bear live young (2-11 pups)

Big Skate

- ≤ 8 feet long
- Live 26+ years
- Mud/sand bottoms
- Most commonly >90 ft
- Lay egg cases



Whidbey Basin Bottomfish: Sharks & Skates

Number of Invididuals



- Catch too few to produce reliable estimates
- Longnose skate catches have mostly increased, esp. in 2019
- Dogfish and Big Skate catches have been relatively consistent



Questions on sharks & skates?

Whidbey Basin Bottomfish Communities



Sculpins & Poachers: 1% of WI fish biomass, 4% of abundance

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Whidbey Basin Bottomfish: Sculpins & Poachers



- 12 species of sculpins and poachers in trawl since 2014
- Catches of most species are sporadic due to catchability differences
- Roughback sculpins most prevalent and consistent species

Whidbey Basin Bottomfish: Sculpins & Poachers

Roughback Sculpin

- ≤ 9 in long
- Sandy bottoms
- Buries during day, feeds at night
- Most commonly 30-120 ft

Sturgeon Poacher

- ≤ 12 in long
- Sandy/muddy bottoms
- Most commonly 120-240 ft

Pacific Staghorn Sculpin

- "Bullhead", commonly caught by kids in shallows
- ≤ 18 in long
- Sandy or pebbly bottoms
- Most commonly 120-240 ft







Whidbey Basin Bottomfish: Sculpins & Poachers



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Questions on sculpins & poachers?

Whidbey Basin Bottomfish Communities



Other Fish: 5% of WI fish biomass, 9% of abundance



- 25 other species of fish caught in WI trawls since 2014
- 53% (by weight) was made up by 7 species of rockfish
- Bottom trawl isn't designed to catch these other fish species
- Can't produce reliable estimates

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Blackbelly Eelpout

- ≤ 18 in long
- Muddy/sandy bottoms
- Most commonly 120-360 ft

Shiner Perch

- ≤ 8 in long
- Midwater, near structures
- Most commonly <360 ft

Plainfin Midshipman

- ≤ 15 in long
- Have photophores
- Sing during courtship
- Sandy or pebbly bottoms
- Most commonly <360 ft

Pacific Herring

- ≤ 9 in long
- Midwater; beach spawning
- Most commonly <360 ft









Most Common Rockfish

Copper Rockfish

- ≤ 26 in long
- Live 50+ years
- High-relief rocky areas
- Most commonly 30-240 ft

Quillback Rockfish

- ≤ 24 in long
- Live 95+ years
- High-relief rocky areas... or tires/crab pots on mud
- Most commonly >120 ft

Yellowtail Rockfish

- ≤ 26 in long
- Live 64+ years
- Commonly schooling off-bottom
- Most commonly 120-240 ft



THREATENED

ENDANGERED

Other rockfish of note:

Brown Rockfish

- ≤ 22 in long
- Live 34+ years
- High-relief rocky areas... or tires in the mud
- Most commonly <360 ft

Yelloweye Rockfish

- ≤ 36 in long
- Live 120+ years
- High-relief, high complexity rocky areas
- Most commonly 300-600 ft

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- ≤ 36 in long
- Live 50+ years
- High-relief rocky areas
- Most commonly >120 ft

What about Rockfish Fishing?

- Retention in Puget Sound is prohibited
- Rockfish caught deeper than 60 feet may suffer mild to extreme barotrauma
- Descending rockfish can save them
- Anglers are legally required to carry a descending device

Send that fish... DOWN!

As fish are brought to the surface, gases in the swim bladder expand causing the stomach and eyes to bulge. This is known as **barotrauma**.



Sending fish with barotrauma to their depth of capture recompresses them, improving short- and long-term survival.

There are several types of devices you can use to send them DOWN:



Questions on rockfish & other fish?





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- WI has second highest density in recent years
- WI is most similar to HC



 WI & HC separate out from the rest of the regions in terms of fish assemblages











Where Do We Go From Here?

- Bottom trawl just one of many surveys conducted to monitor marine bottomfish
- All survey tools don't yet go together seamlessly
- Starting to utilize modeling to combine survey data to produce better estimates and to design future surveys
- Working toward the ability to develop full stock assessments for key species in the Sound
- Talk to your legislators to encourage fully funding WDFW



For More Information

Washington Department of About WDFW News Get involved A Fish and Wildlife					ews Get involved ADA/A	Accessibility Q
Home	Species & Habitats	Fishing & Shellfishing	Hunting	Licenses & Permits	Places to go	D
Home / Species & Habitats / Species in Washington / Bottomfish						
Species & Ha	abitats E	Bottomfish				
Species in Washington		The marine waters of Washington State are home to over 90 species of bottomfish. As defined by state law (WAC				
Living with wildlife		220-16-340(2), these include Pacific cod, Pacific tomcod, Pacific nake (or writing), walleye poliock, all species of dabs, sole and flounders (except Pacific halibut), lingcod, ratfish, sablefish, cabezon, greenling, buffalo sculpin, great sculpin, red Irish Iord, brown Irish Iord, Pacific staghorn sculpin, wolfeel, giant wrymouth, plainfin midshipman, all species of				
At-risk species		shark, skate, rockfish, rattail, and surf perches (excluding shiner perch).				
Habitat recovery and Fisheries management						
Aquatic Invasive Species		The federal <u>Pacific Coast Groundfish Management Plan</u> includes most of the 90 species of bottomfish off the Washington, Oregon and California coasts. This Management Plan describes how the Council develops decisions for management of fisheries. In some cases, it also contains specific, fixed fishery management designations.				
Wildlife diseases		Management information for Washington's bottomfish is available at:				

- <u>https://wdfw.wa.gov/species-habitats/species/bottomfish</u>
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Questions?



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