

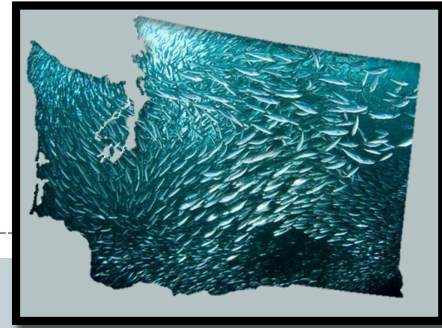
Using Science to Improve Protection of Forage Fish



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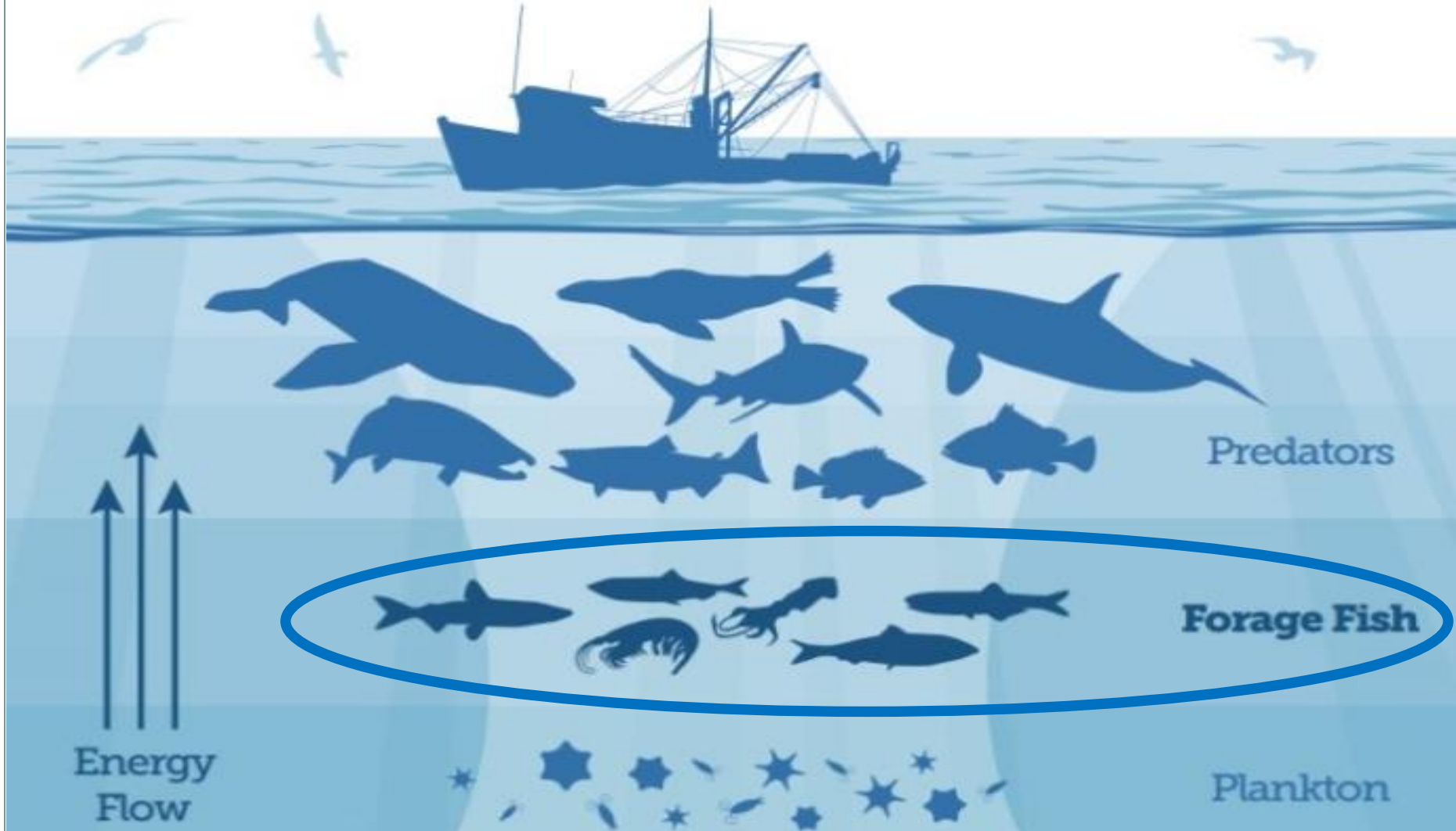


Overview



- What are forage fish and why are they important
- How we document surf smelt habitat
- Recommended change to definition of *occupied* surf smelt spawning beach

What are Forage Fish?



Surf Smelt are Forage Fish



Surf Smelt spawn on the beach



Risks to surf smelt habitat :

- Direct habitat loss
- Loss of riparian cover
- Sediment starved beaches

Former
Surf Smelt
Habitat

Sampling Methods



Sample Collection



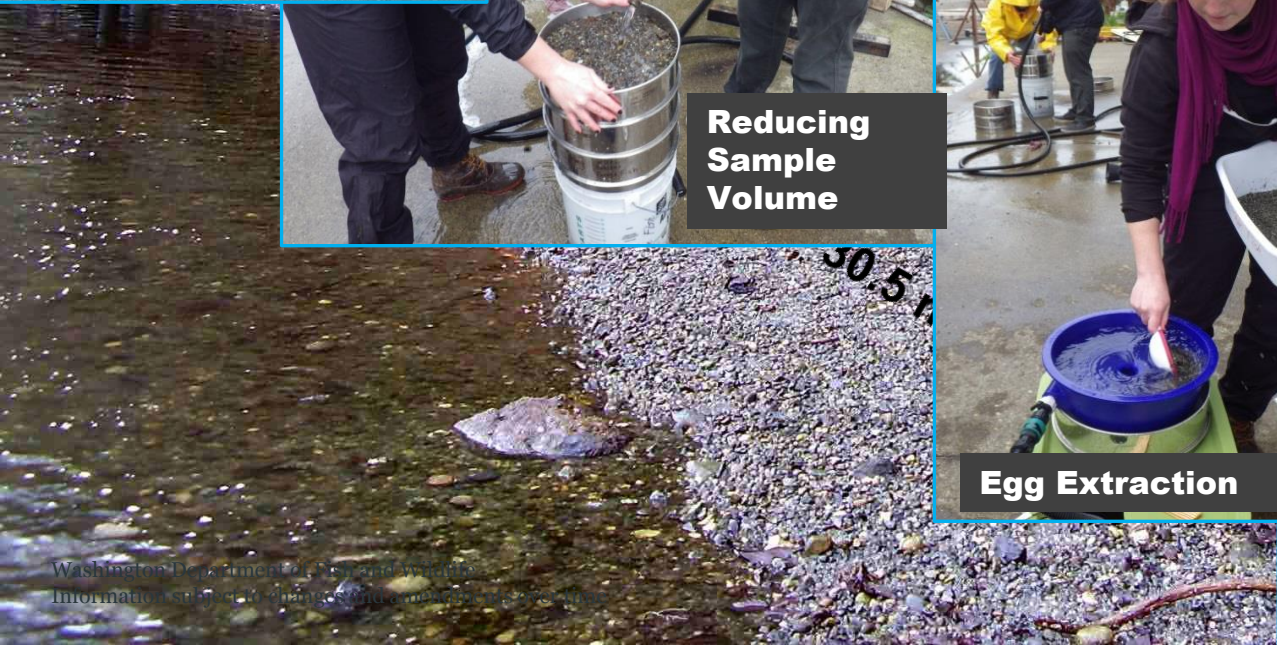
Reducing Sample Volume



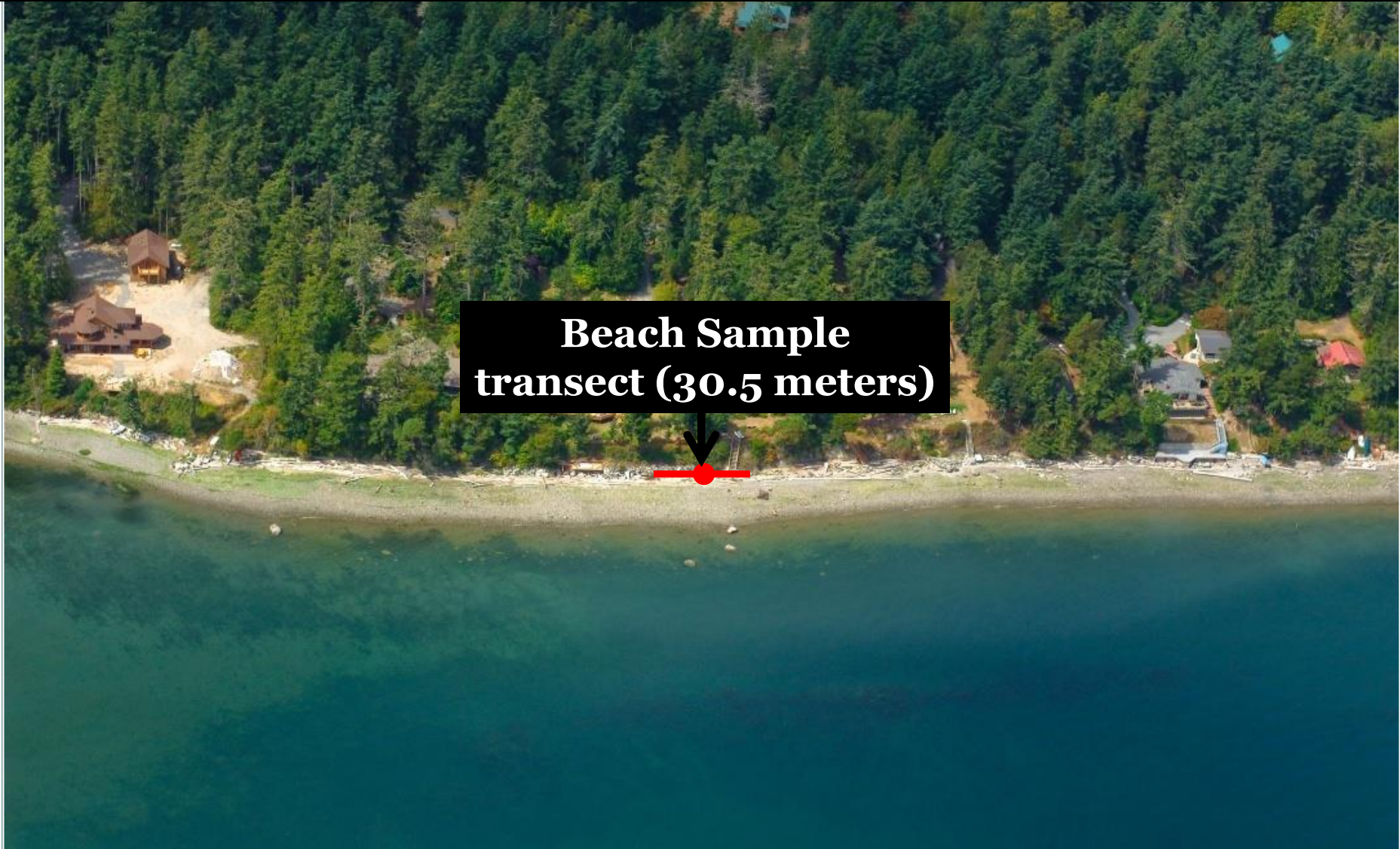
Egg Extraction



Lab Analysis



Habitat Program has mapped locations of forage fish spawning beaches for over 35 years



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**Beach Sample
transect (30.5 meters)**

305 meters

**Transect expanded to occupied
beach length based on field work
informed expert opinion**

Map of Documented Spawning Beaches



Challenge of Documenting Spawning Beaches



Surveyed 24 times
2001-2008, eggs
found once.

Surveyed 6 times
1992-2002, eggs
found twice.

Never surveyed.

Surveyed once in
2001, eggs found.

Surveyed once in
2002, no eggs found.

0 300 600ft

These data were collected by WDFW staff with contributions from the North Olympic Salmon Coalition and the Friends of the San...

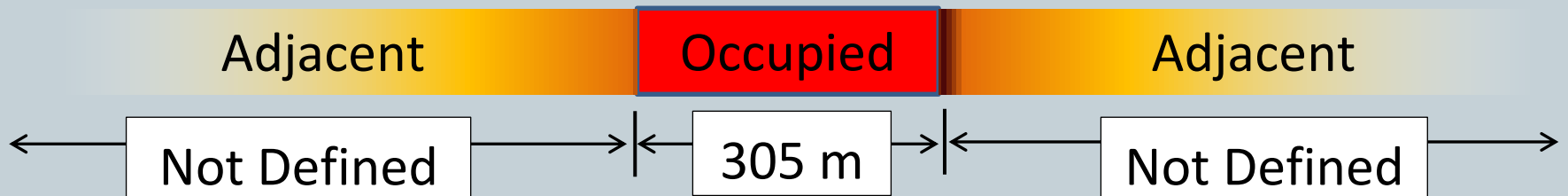
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Occupancy Vs. Adjacency



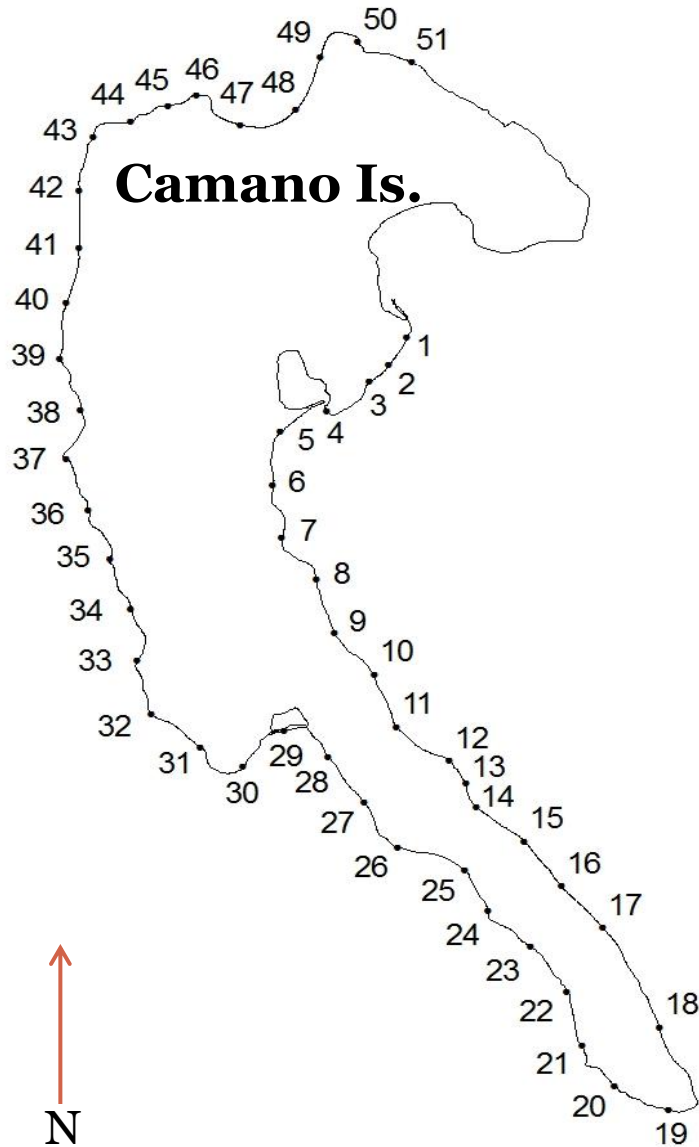
Occupied Habitat

- Occupied habitat requires work timing restrictions.
- Occupied habitat can require additional protection/mitigation requirements.
- In some cases landowners can work outside work windows if a survey fails to find eggs.



Areas adjacent to occupied Habitat

- WDFW can require surveys in areas adjacent to occupied habitat
- “Adjacency” not defined

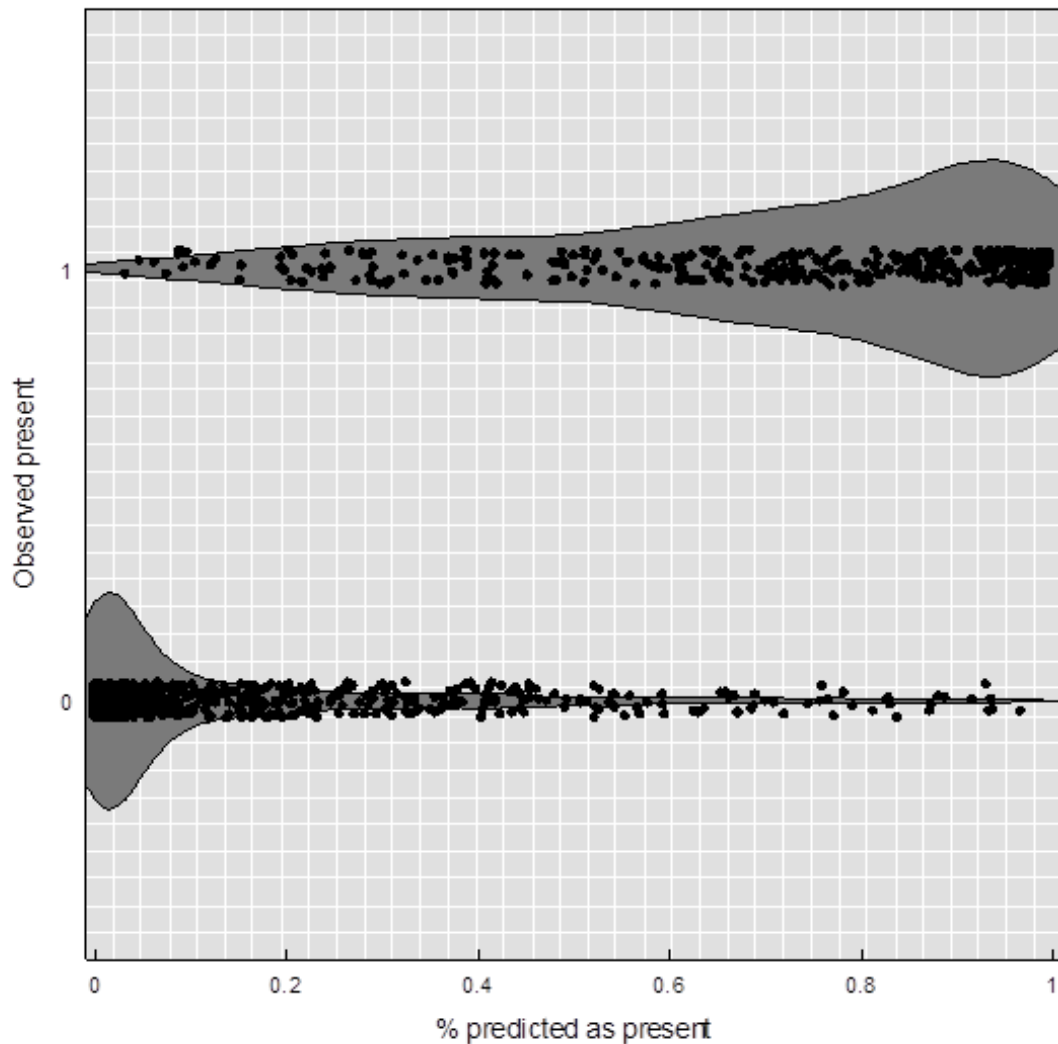


2012 Camano Is Study: sampled 52 sites every two weeks for over a year

Explored variables that explained presence/absence

Determined that smelt presence/absence at one site significantly correlated with adjacent site 1.2 km apart

Quinn, T. Krueger, K. Pierce, K. Penttila, D. Perry, K. Hicks, T. and D. Lowry. 2012. Patterns of Surf Smelt, *Hypomesus pretiosus*, intertidal spawning habitat use in Puget Sound, Washington State. *Estuaries and Coasts* 35: 1214-1228.



The model is
good, not
perfect

Figure 2 Posterior predictive check. A vector of 1200 random draws was generated from the posterior $[y^* \sim Ber(\hat{\theta} = \Pr(\theta | y)) \in \{0,1\}]$ for every point (site x time) in the data set and the proportion of successes (from 1200) plotted against the true value of Y_{it} .

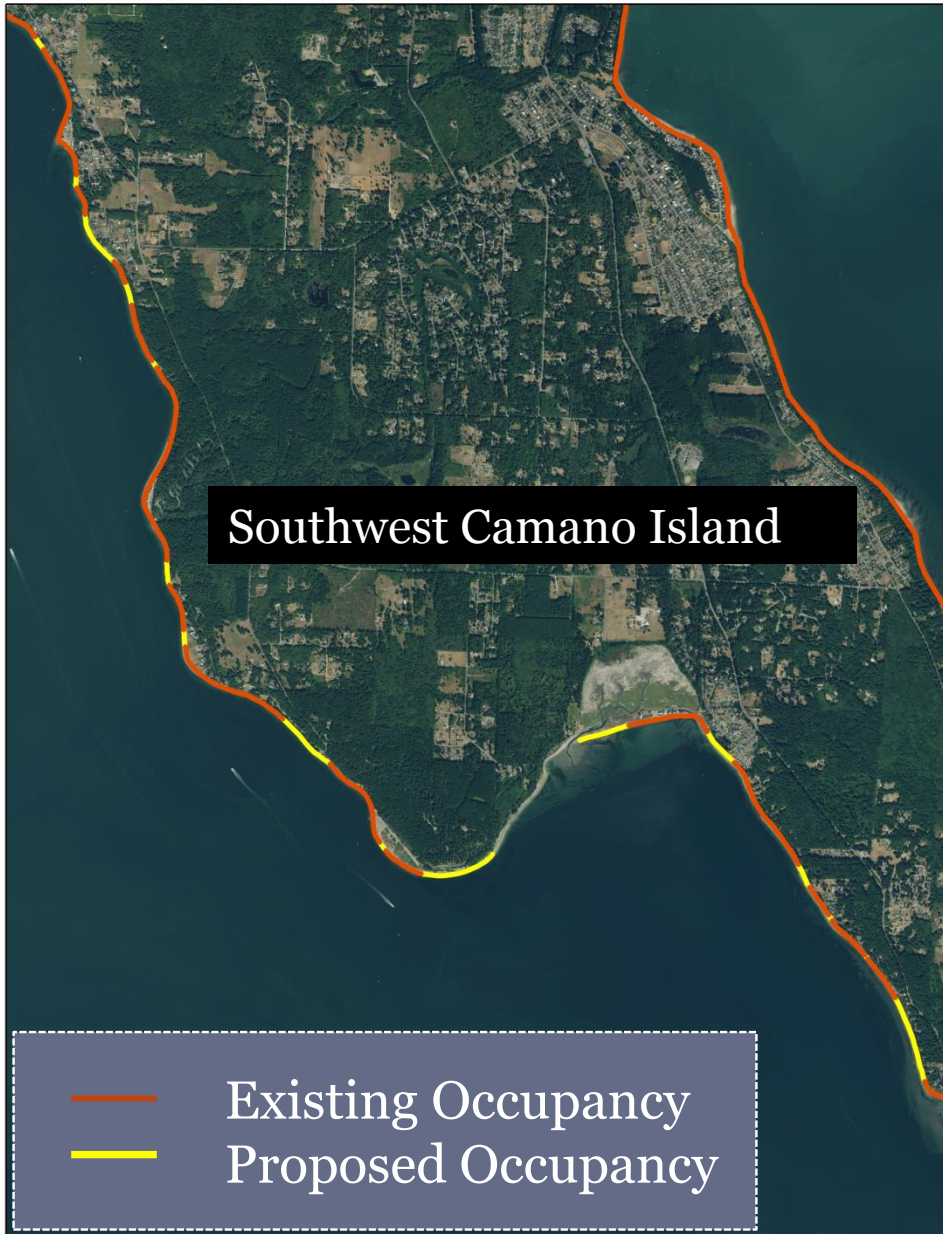
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**Beach Sample
Transect**

305 meters

1268 meters

**Occupied beach length
-based on new information**



Surf smelt spawning beaches currently mapped (in orange) and *proposed* (in yellow).



Southern King Co.

Surf smelt spawning beaches currently mapped (in orange) and *proposed* (in yellow).

Coast wide, the proposed expansion would roughly double the mapped length of spawning beaches.

— Existing Occupancy
— Proposed Occupancy

Summary



- Importance of the forage fish in the marine food web becoming better understood
- WDFW has updated the science on forage fish – continuing this work as resources allow
- New data provides evidence for expanding occupied area for surf smelt based on egg presence

Forage Fish Spawning Habitat Occupancy and Adjacency Standards

Alternatives Considered and Evaluated



Randi Thurston

HABITAT PROGRAM PROTECTION DIVISION



Advisory Group Membership

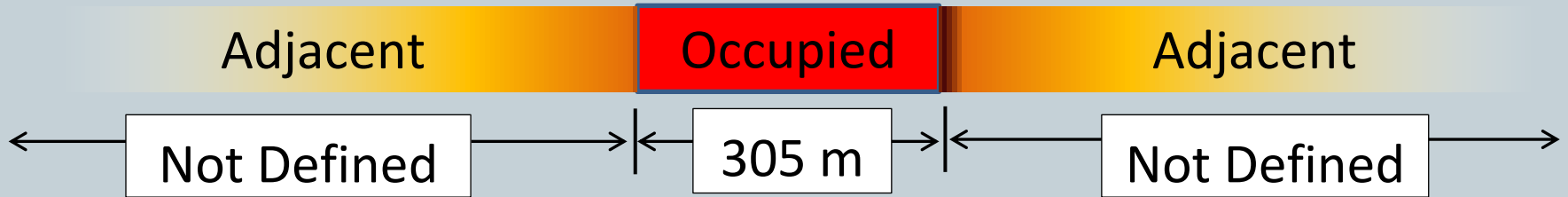


- Environmental Organizations (3)
- Regional Fish Enhancement Groups
- Forest Management (2)
- Commercial Fishers
- Ports
- Agriculture
- Prospectors
- Building Industry
- Consultant/Contractor

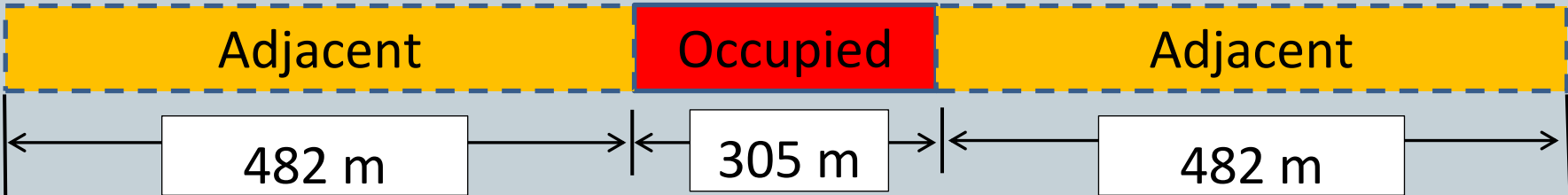
3 Alternatives



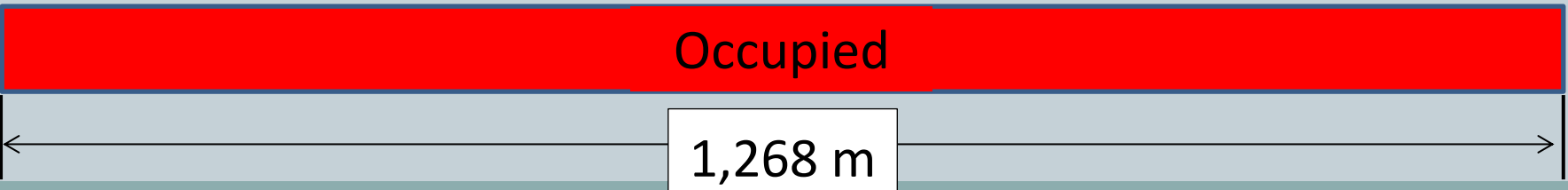
1. No occupancy change, adjacency case by case



2. No occupancy change, defined adjacency for Smelt



3. Increase occupancy for Smelt



Advisory Group Recommendation



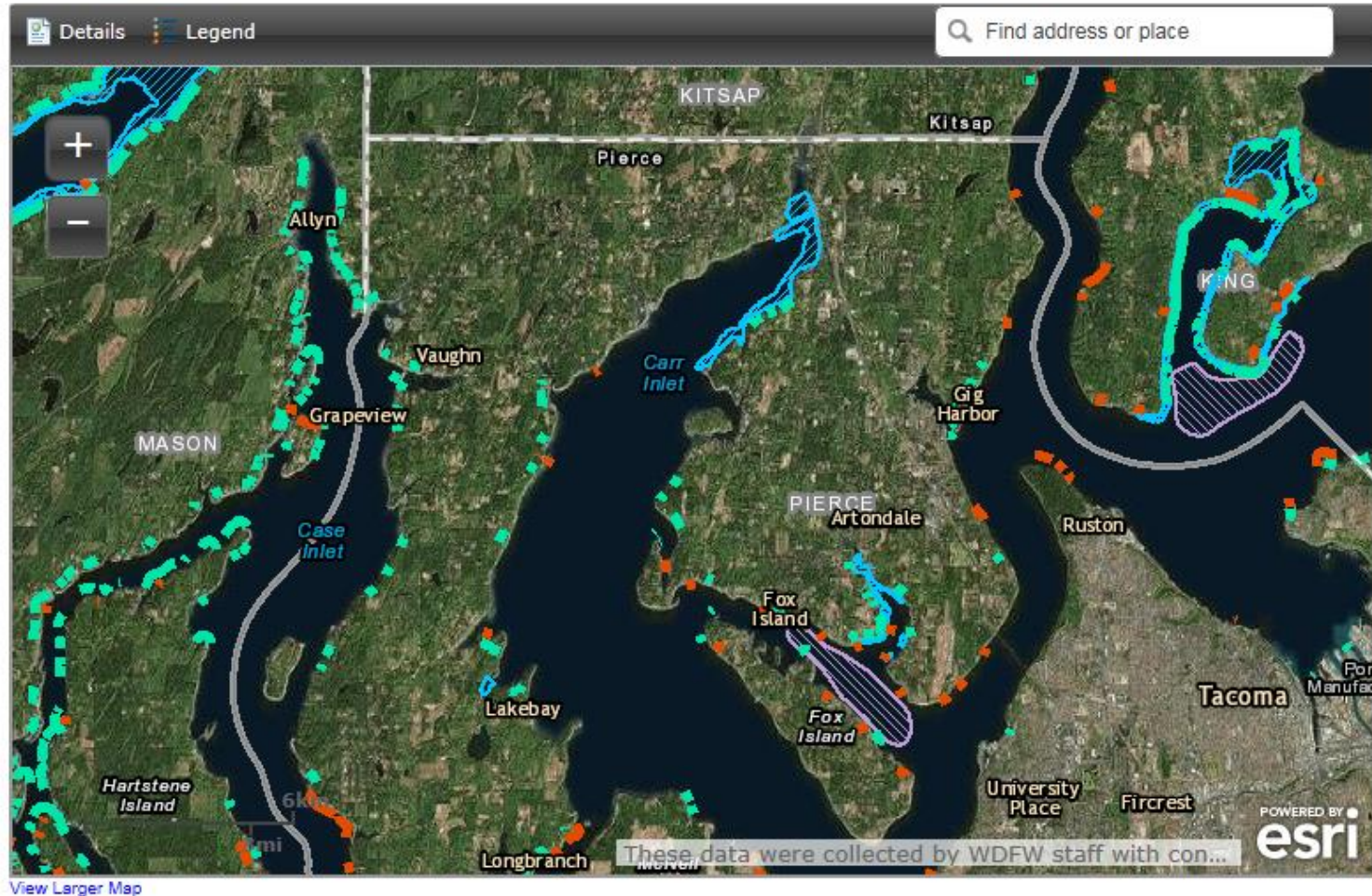
- Extend the proposed new beach occupancy standard for Surf Smelt
- Incorporate new occupancy standard into Agency GIS maps
 - WDFW Forage Fish Spawning Location Map
 - Priority Habitat and Species (PHS) on the Web

WDFW Spawning Location Map/GIS Update

http://wdfw.wa.gov/conservation/research/projects/marine_beach_spawning/

Spawning Location Map NEW!

The map below shows the documented spawning locations of Pacific Sand Lance, Surf Smelt, and Pacific Herring in Washington State. This map should not be considered all inclusive of spawning habitat because not all potential spawning habitat has been surveyed, and it is possible for surveys to fail to detect eggs even when eggs are present.



Potential Affects on Stakeholders



- **Saltwater Habitats of Special Concern**
 - ✦ Expansion of documented surf smelt spawning areas

- **Authorized work times in saltwater areas**
 - ✦ Current work windows restrictions
 - No work in documented areas with surf smelt spawning seasons shorter than 6 months
 - Surveys required in areas where surf smelt spawning seasons are 6 months or longer

Permittee/Contractor Comments



- Contractors want to know if project is **in** or **out** of an “occupied” area for planning purposes
- Concerns about narrowing work windows (salmon, forage fish, etc)
- Want compensatory mitigation instead of closures or mitigation based on egg density
- Want more flexible mitigation options when impacts to forage fish habitat are unavoidable
- Want regulatory agencies to coordinate on mitigation requirements

Next Steps



- State Environmental Policy Act process
 - Provide a forum for the public and other government agencies to comment on the proposal
 - Ensure environmental values are given appropriate consideration in decision making along with economic and technical considerations
 - Provides a response to all comments and explain measures WDFW will use to lessen concerns
- Change maps if all goes well