

# Marine Shorelines in the San Juans



Tina Whitman, MS  
Science Director

**Friends** *of the*  
**San Juans**  
Andrew Reding Image

# Protecting

- The Salish Sea
- Island Resources & Communities
- Shoreline Ecosystems
- The Future

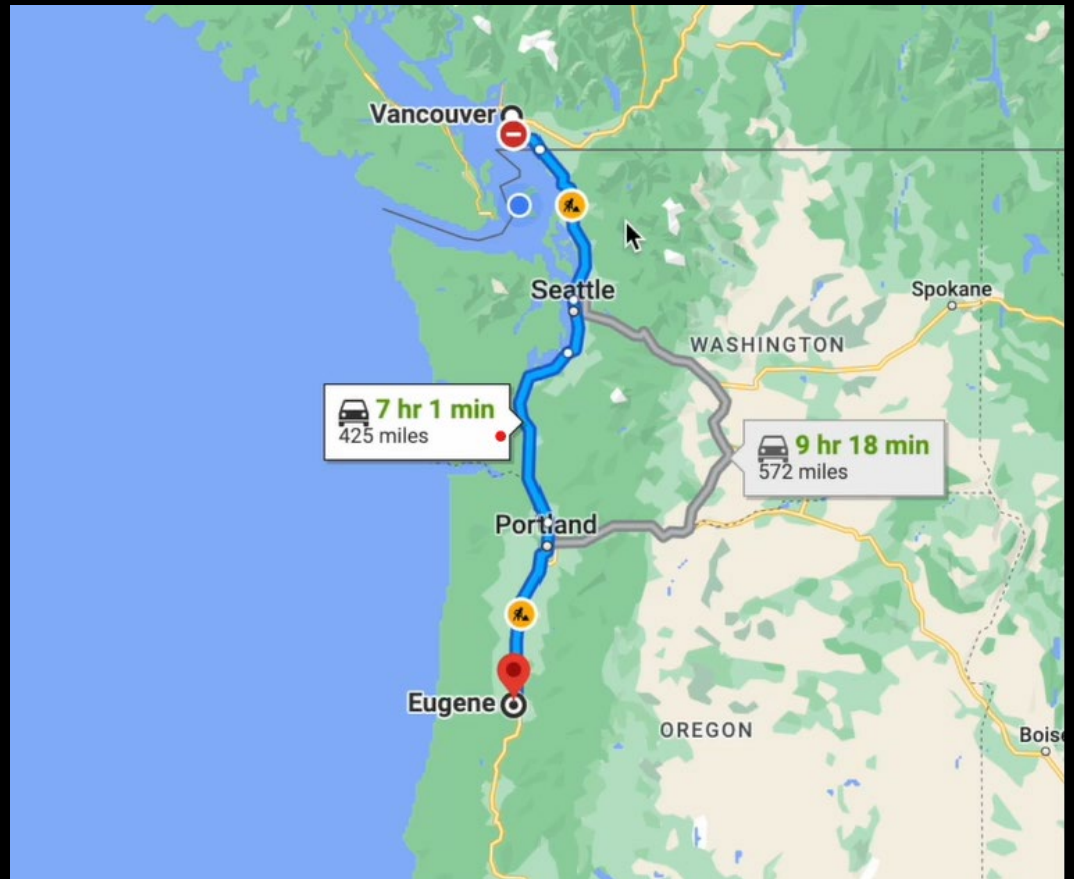
A wide, rocky beach at low tide with a blue sky and distant mountains. The foreground shows a rocky shoreline with some green grass and a fallen log. The middle ground is a vast, flat beach covered in small rocks and pebbles, with shallow pools of water reflecting the sky. In the background, there are dark, forested hills and a range of blue mountains under a clear blue sky.

**Friends** *of the*  
**San Juans**

# Shorelines in the San Juans

Shorelines define us!

> 400 miles



# SJC Shorelines

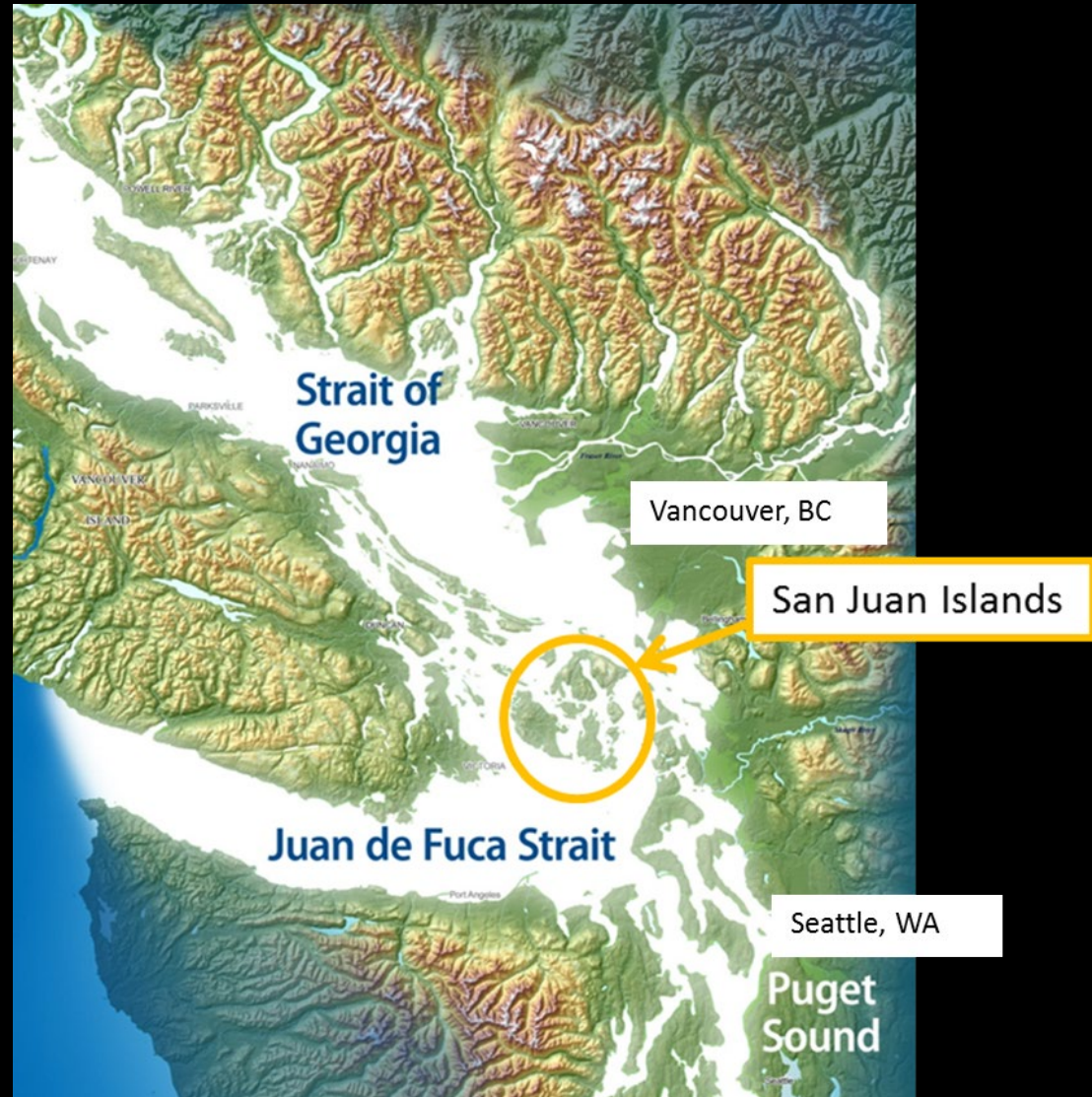


# Shorelines in the San Juans

5,000 shoreline parcels

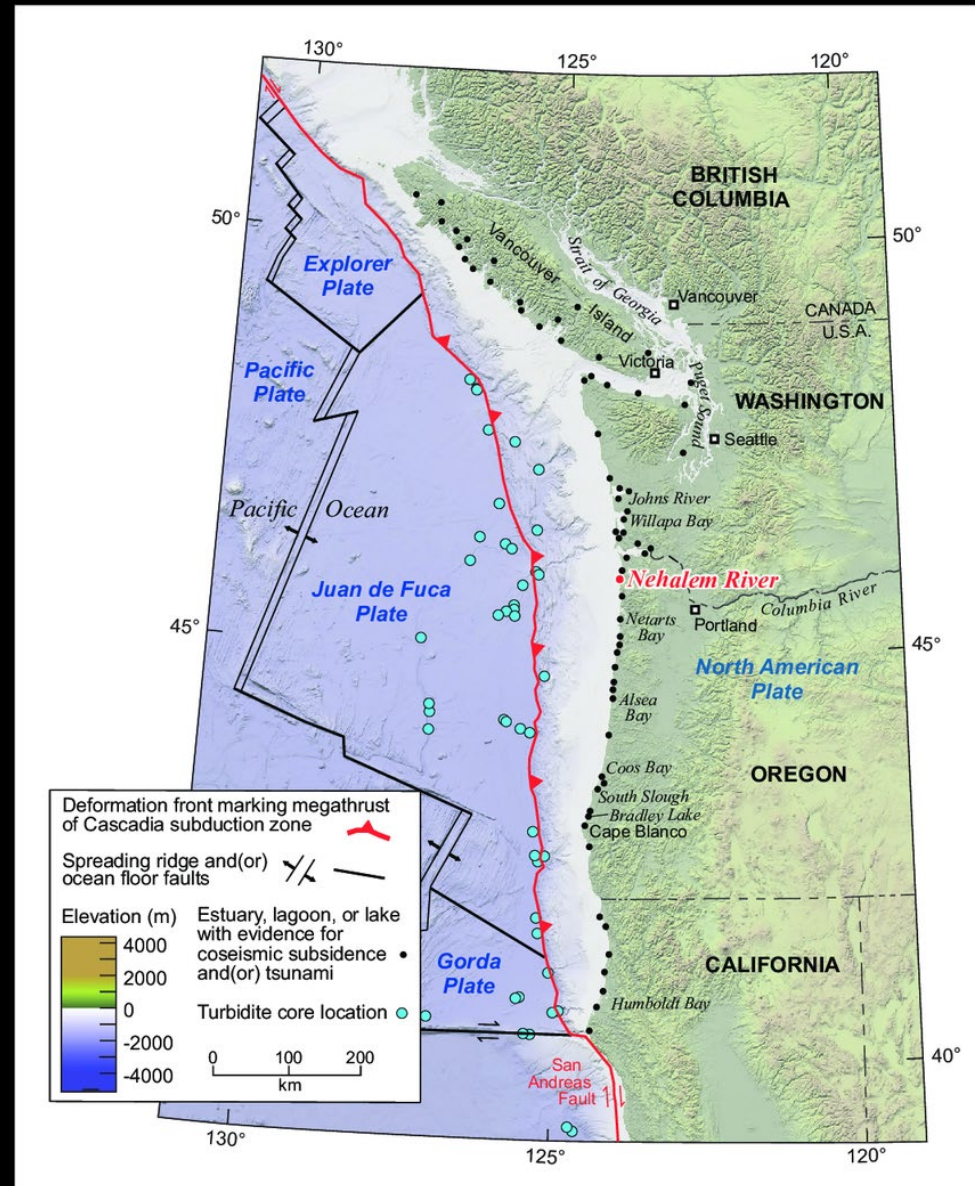
90% private

Ecosystem Services



# Geology - the big picture

## Plate Tectonics

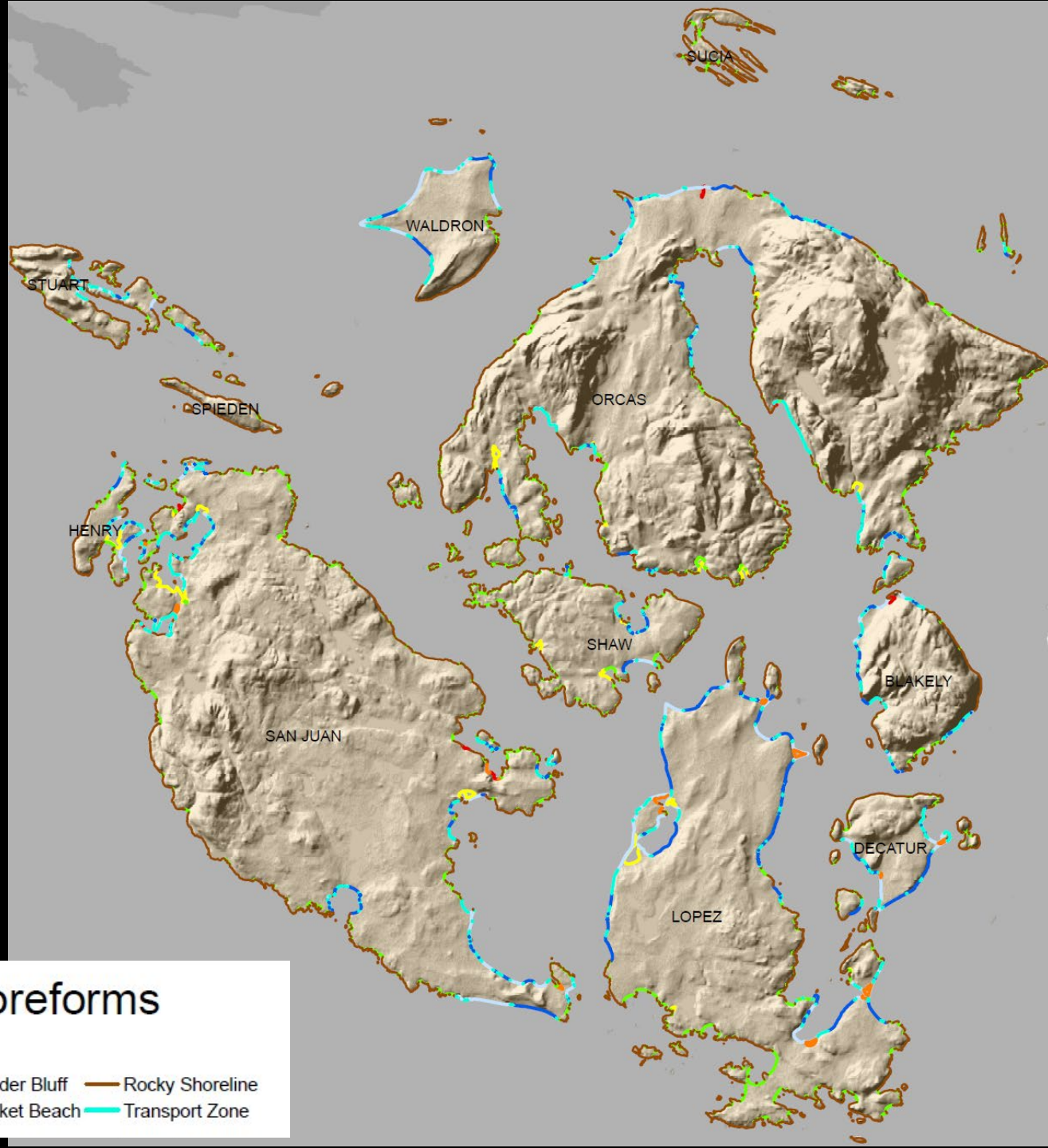


# Geology - the big picture

## Glaciation



# Local Geology- shore forms



## Geomorphic Shoreforms

### Shoreforms

- Artificial
- Embayments - Estuary
- Feeder Bluff
- Rocky Shoreline
- Barrier Beach
- Embayments - Lagoon
- Pocket Beach
- Transport Zone



# Local Geology

## Coastal shoreforms

- Rocky
- Pocket beaches
- Beaches, bluffs and spits (aka drift cells)



# High Habitat Diversity

Coastal Wetland



Rocky



Bays



Beaches



Feeder bluffs



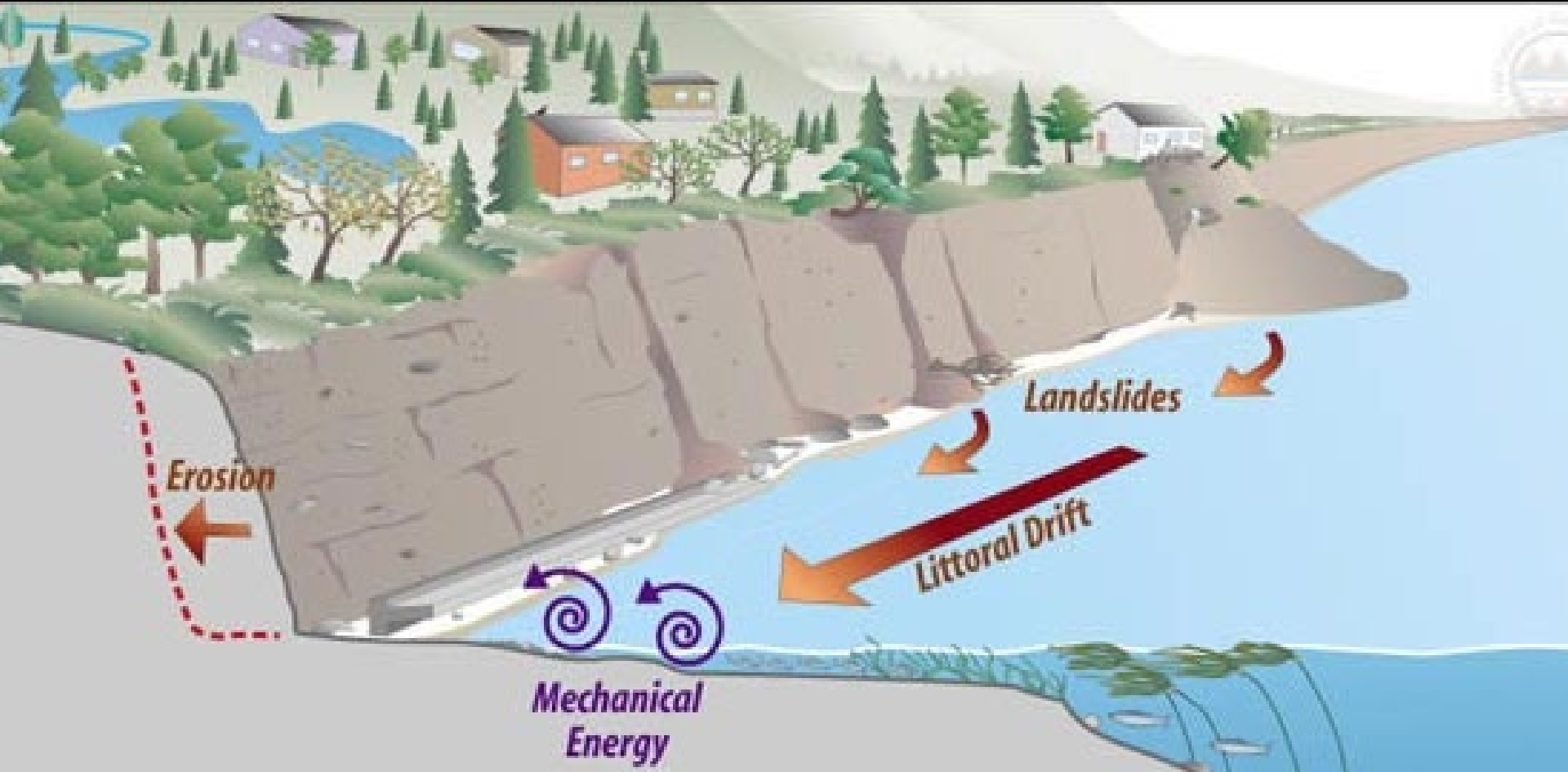
Eelgrass

# Coastal Processes

Sediment supply and transport

Wind creates waves that move sediment

90% of beach material comes from shoreline banks and bluffs

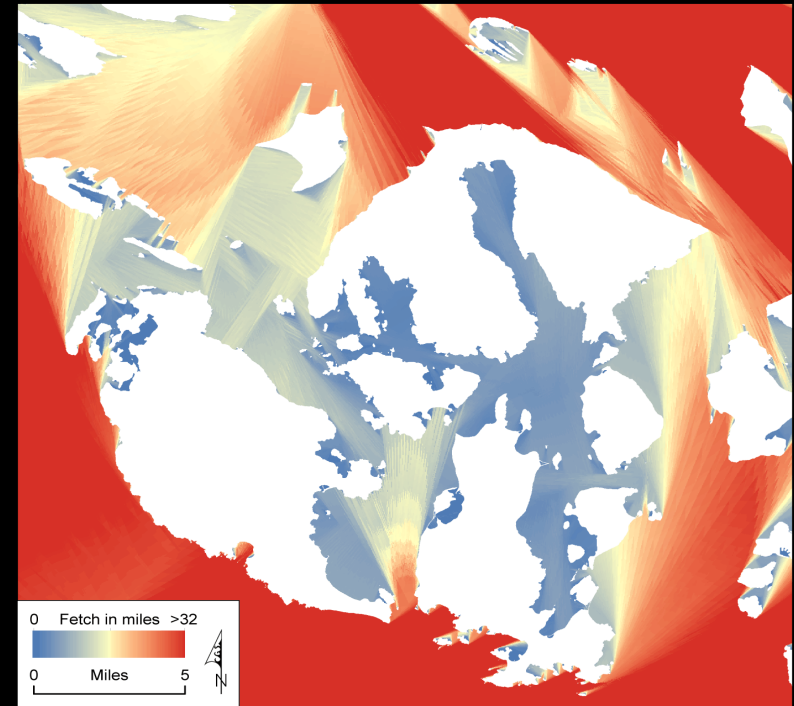


# Coastal Processes

Sea Level Rise

Storm Events- flood & erosion hazards

Sites will respond differently (geology, orientation, land use)



Coastal Geologic Services Fetch Model

# Ecology- beaches



# Ecology- kelp



# Ecology- Eelgrass



# Marine Food Webs





# Forage Fish

Pacific herring



Spawn on eelgrass & kelps



Pacific sand lance

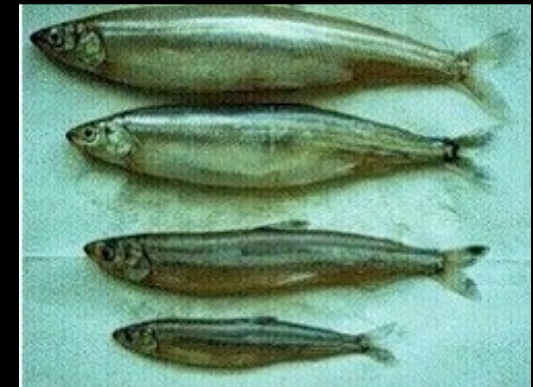
← Beach spawners

↙ Surf smelt

Northern anchovy

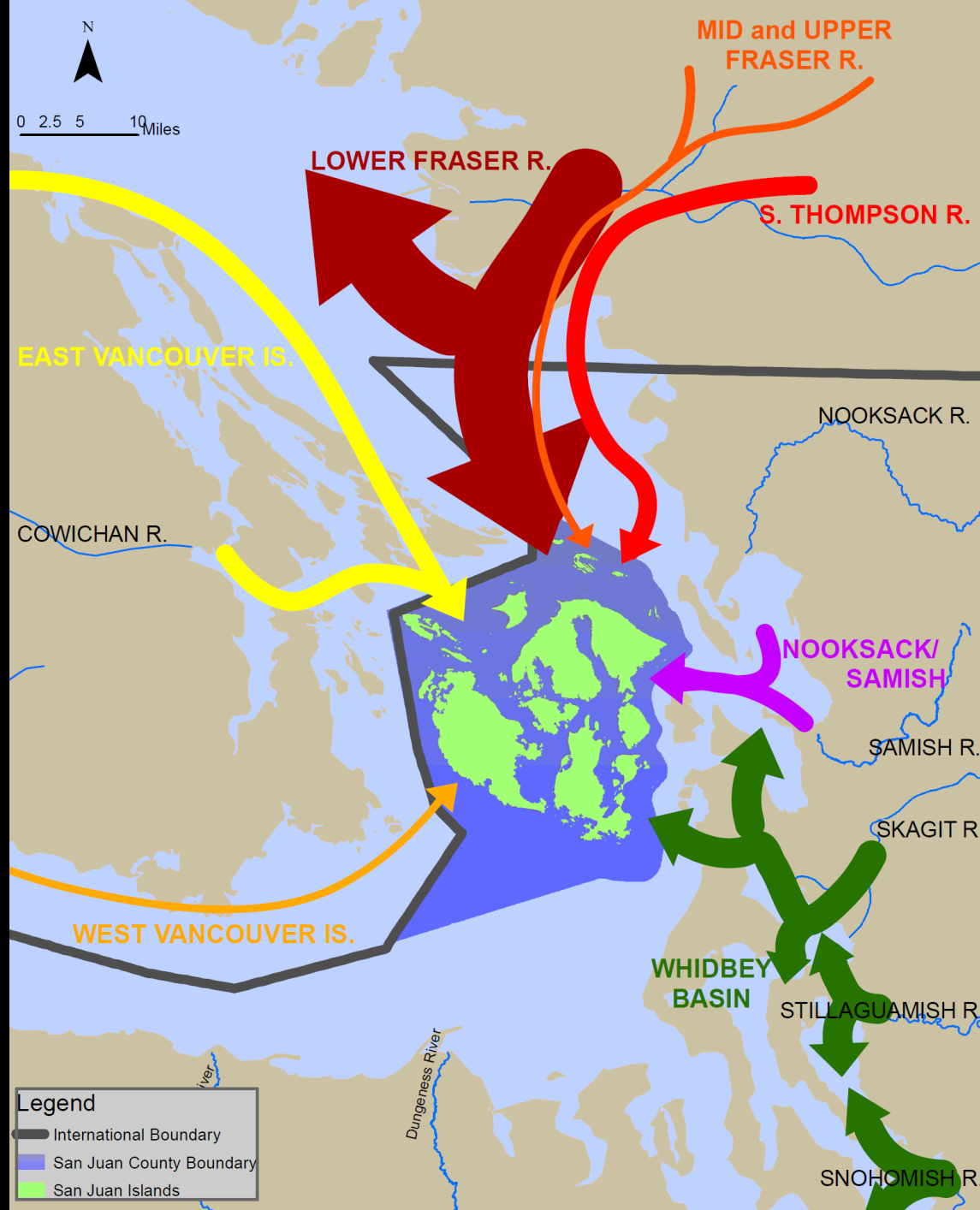


Pelagic spawner



# Salmon Highways

Juvenile chinook  
salmon from across  
the region rear in the  
San Juans



# Chinook salmon & SRKW's



# SJC Shorelines- Riparian Vegetation

- food web
- habitat
- structure
- microclimate
- hydrology
- sediment supply



# Marine Food Webs

Out-migrating juvenile salmon eat:

Plankton

Terrestrial Insects

Larval and juvenile forage fish



# Vegetation- Microclimate and Shade



# SJC Shorelines- Vegetation



Reduced erosion = Reduced demand for new hard armor