

**Genetic Analysis of Juvenile Chinook Salmon
in shoreline and offshore Habitats of WRIA 6 and the
Whidbey Basin:**

Preliminary Results for Samples Collected in 2008 and 2009

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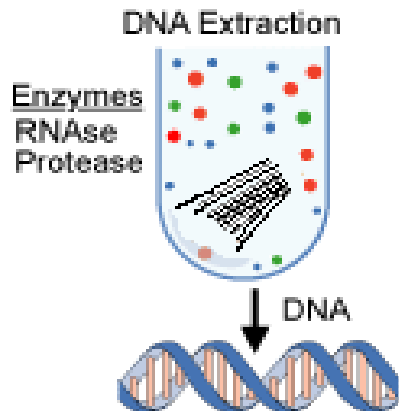
Skagit River System Cooperative

Tulalip, Stillaguamish

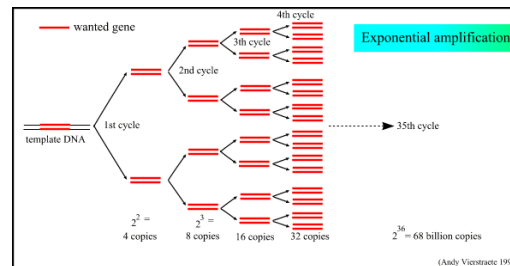
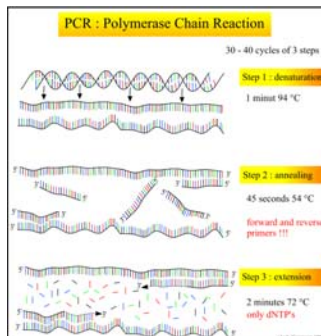
Overview

- **Background on Methods**
 - Genetic Stock Identification (GSI)
 - Collection of Microsatellite DNA Data
 - GAPS Genetic database
- **Analyses of 2008/2009 Samples**
 - Habitat and Spatial Patterns

Microsatellite DNA Data Collection



PCR Amplification



Fragment Analysis

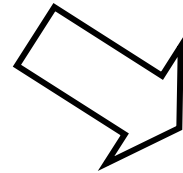
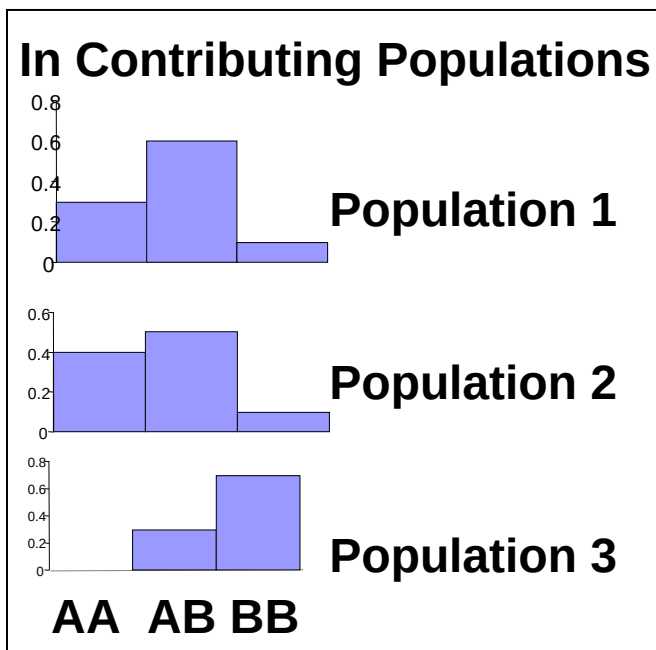
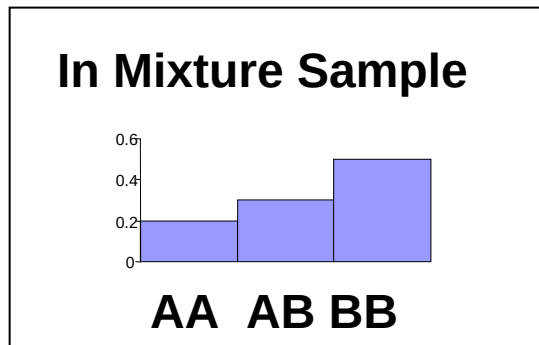


Microsatellite Repeats

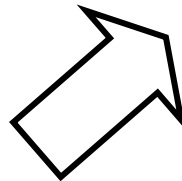
108	CA CA CA CA CA CA
106	CA CA CA CA CA
104	CA CA CA CA
102	CA CA CA

Genetic Stock Identification (GSI)

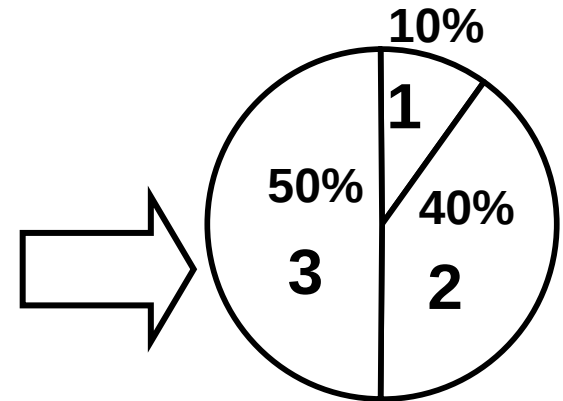
Frequency of Genotype



**Estimation of
most likely
composition
of mixture**



Contribution Estimates



From Milner, Teel, Utter, and Winans 1985

Genetic Analysis of Pacific Salmonids (GAPS)

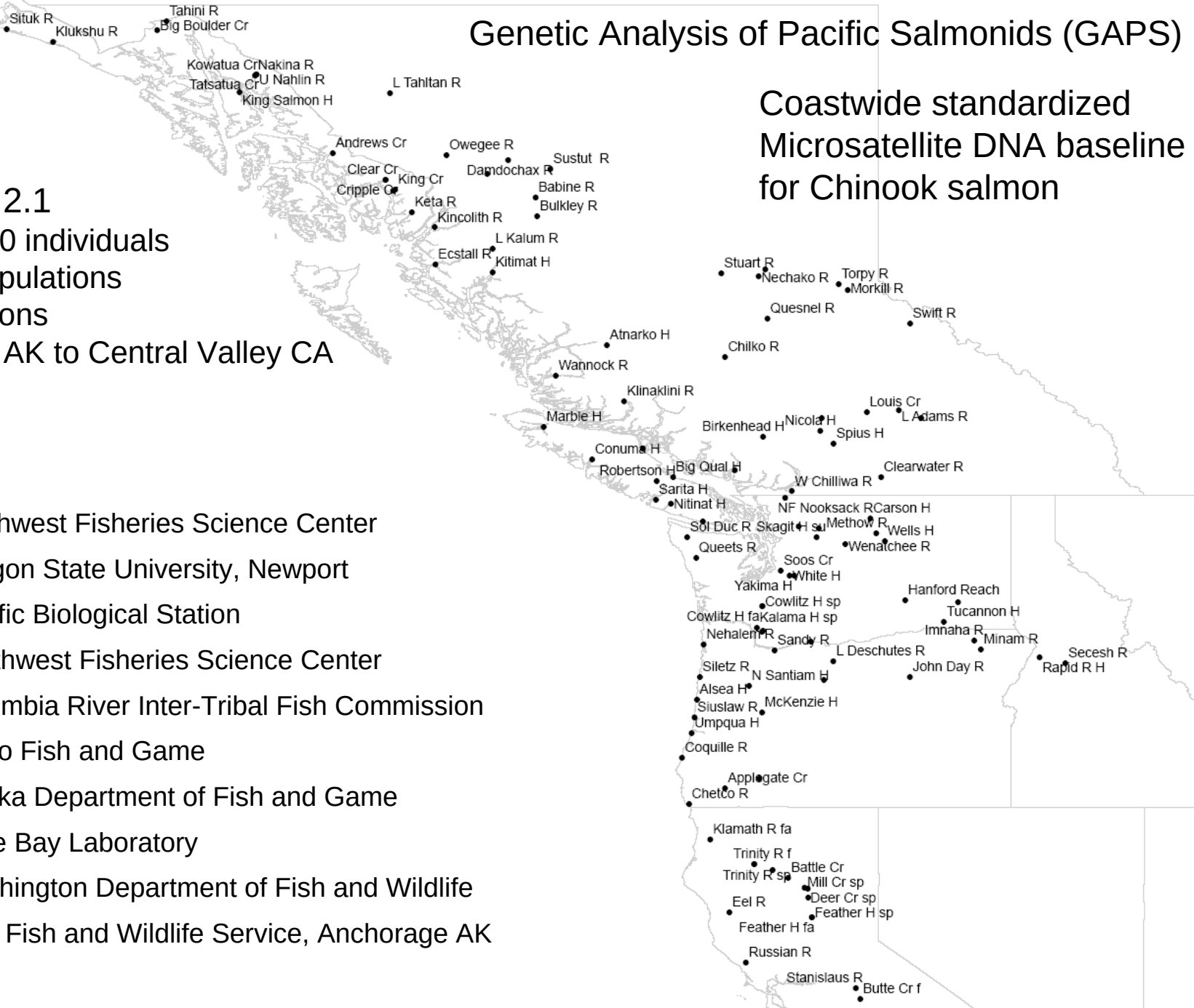
Coastwide standardized
Microsatellite DNA baseline
for Chinook salmon

Version 2.1

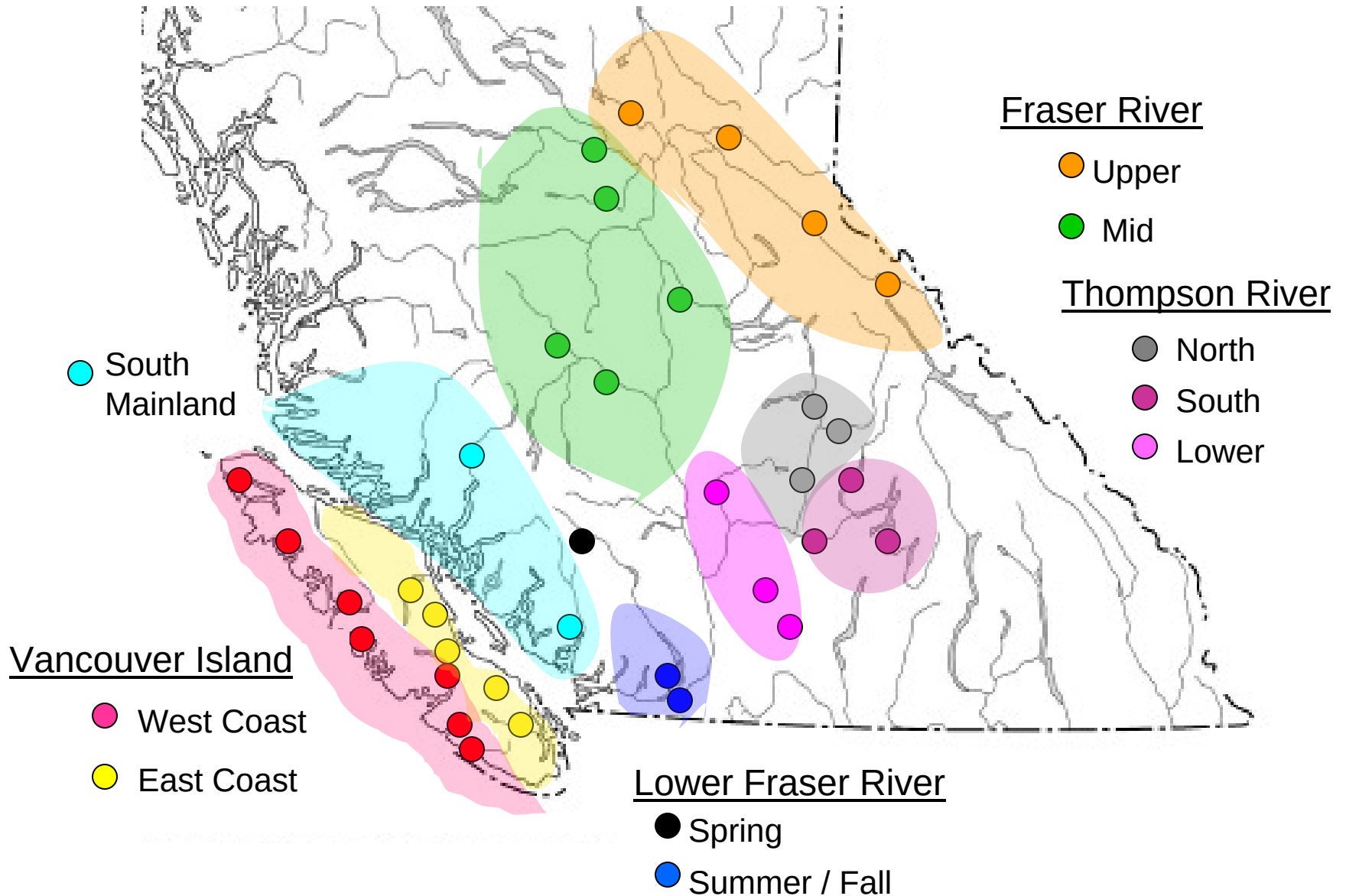
- ~22,200 individuals
- 166 populations
- 41 regions
- Gulf of AK to Central Valley CA

Labs

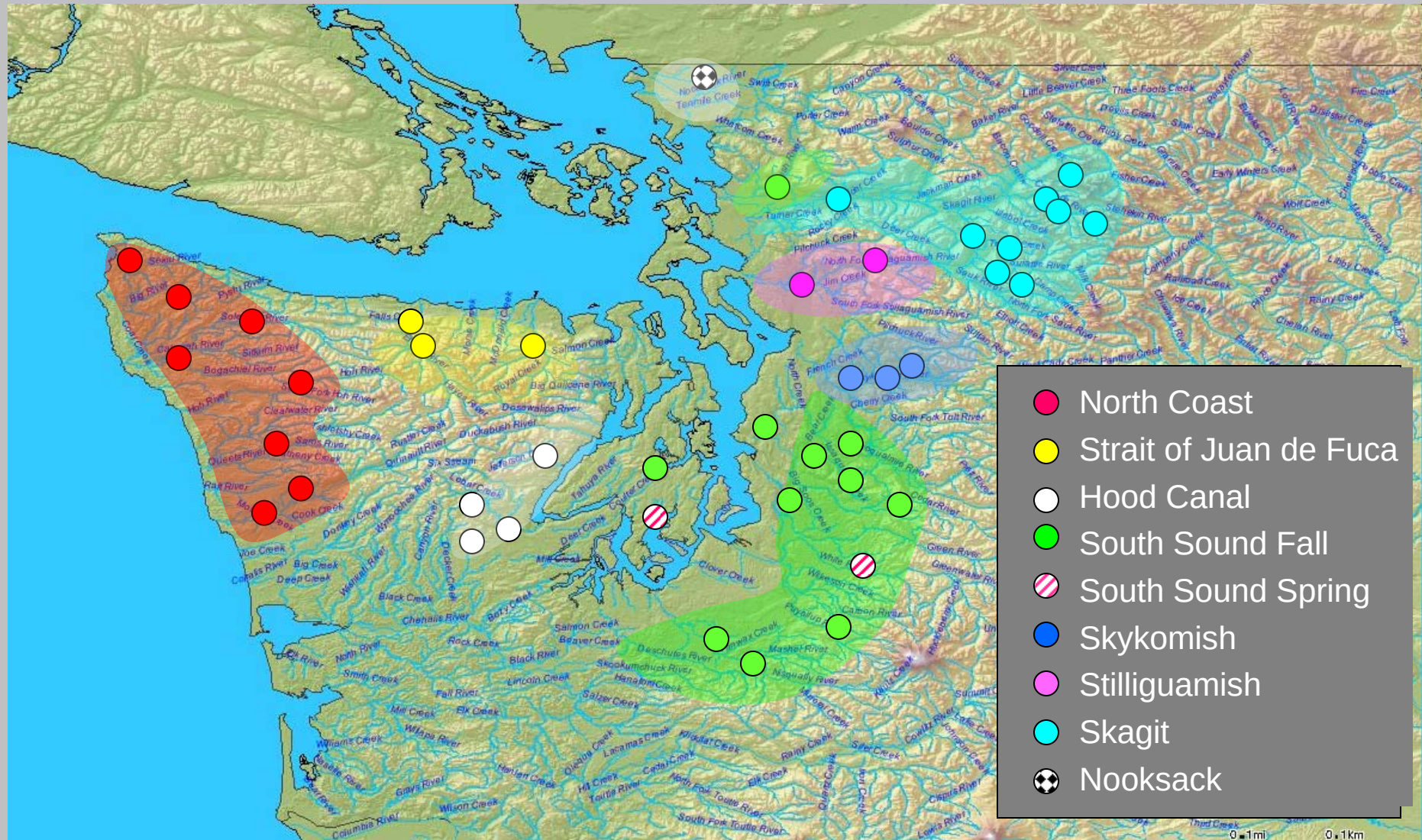
Northwest Fisheries Science Center
Oregon State University, Newport
Pacific Biological Station
Southwest Fisheries Science Center
Columbia River Inter-Tribal Fish Commission
Idaho Fish and Game
Alaska Department of Fish and Game
Auke Bay Laboratory
Washington Department of Fish and Wildlife
U.S. Fish and Wildlife Service, Anchorage AK



Genetic Groups in British Columbia



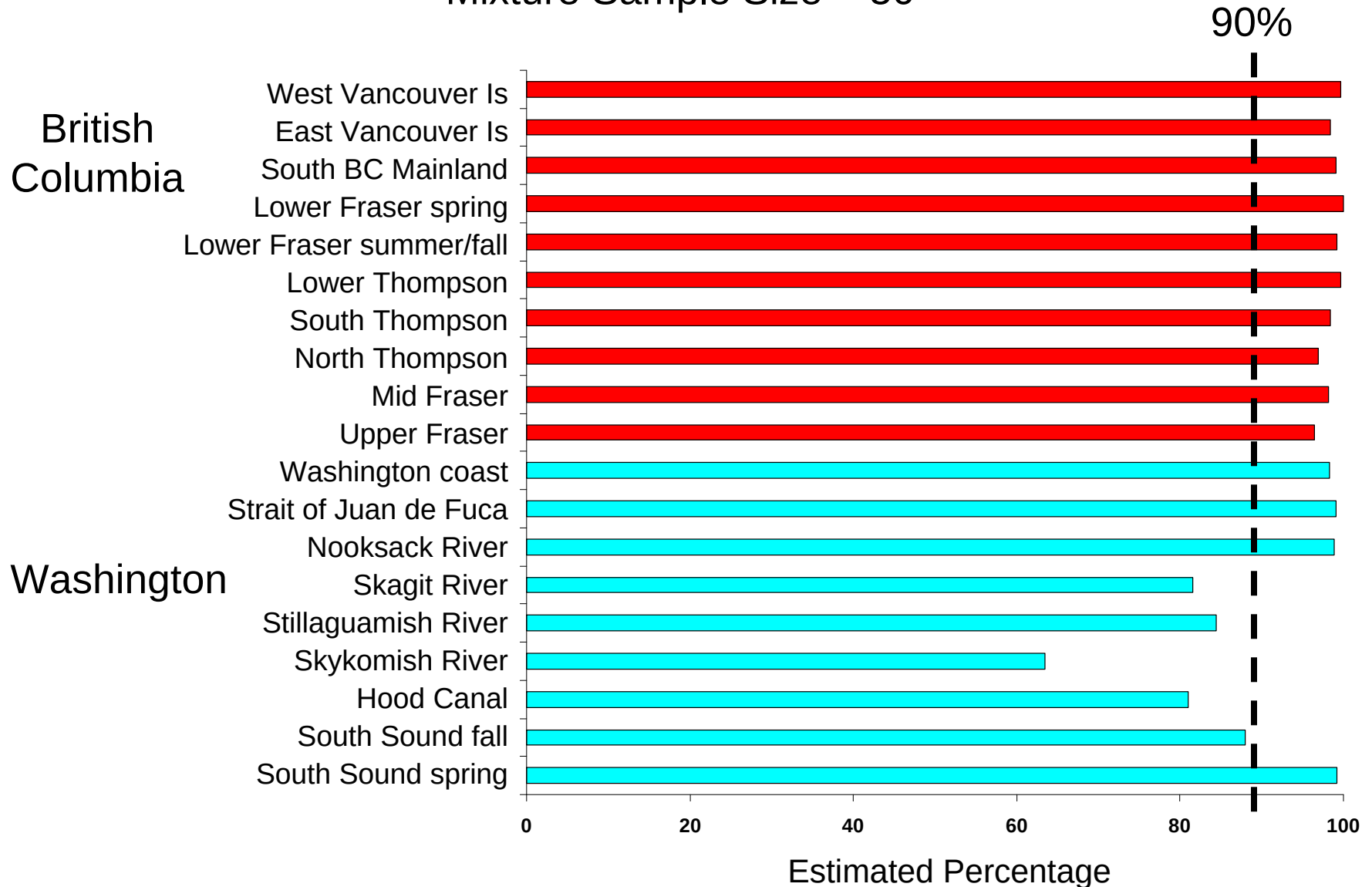
Genetic Groups in Northwest Washington



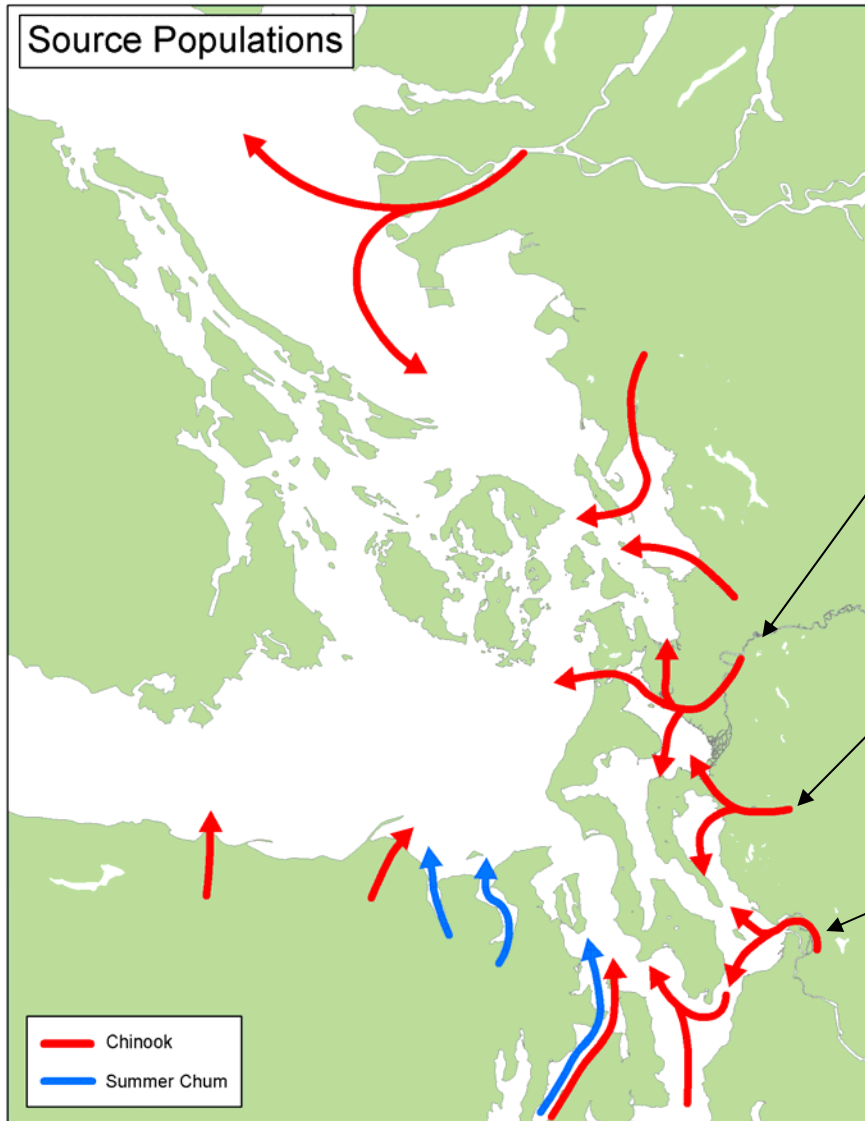
Analysis of Samples of Known Origin

Computer Simulations of “100% Mixtures”

Mixture Sample Size = 50



Stratification: “space” within the landscape



- **Skagit River**

(up to 7 million wild juvenile Chinook per year)

- **Stillaguamish River**

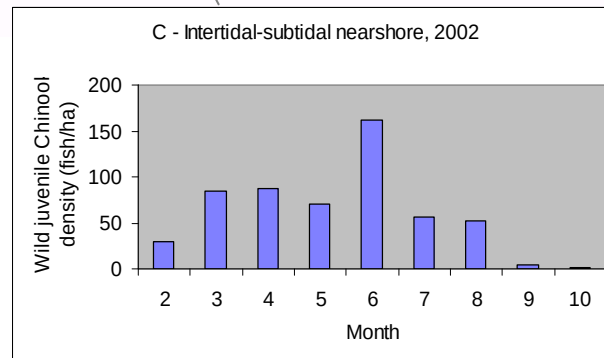
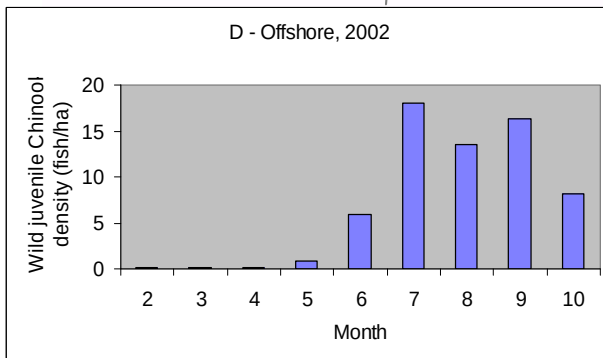
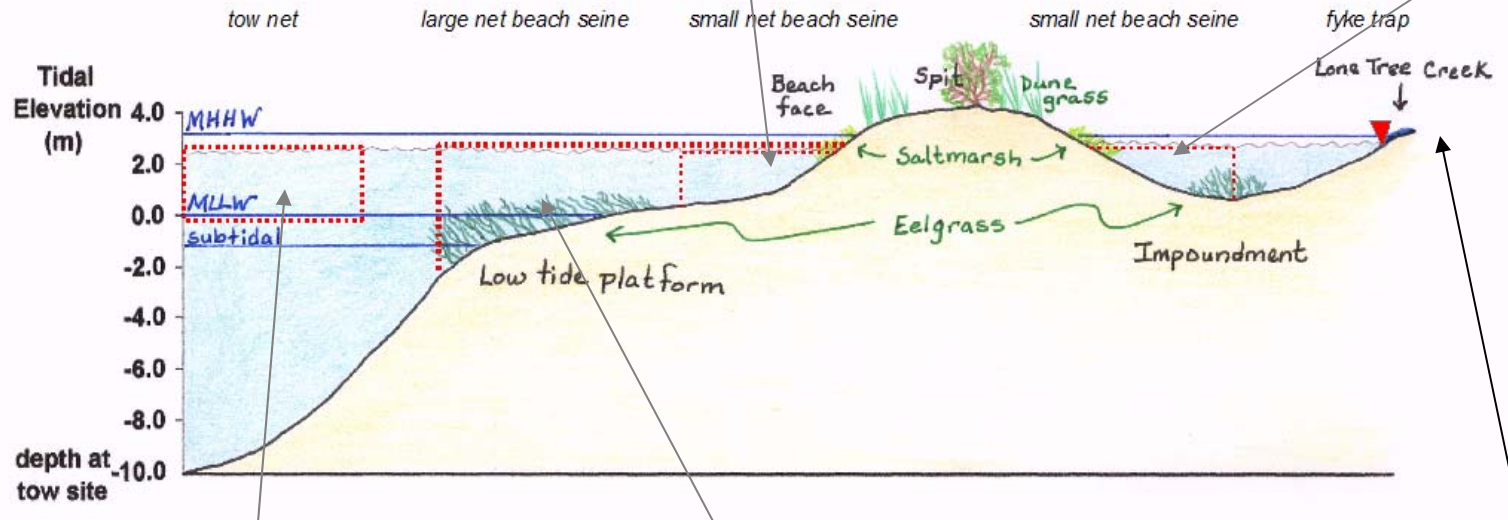
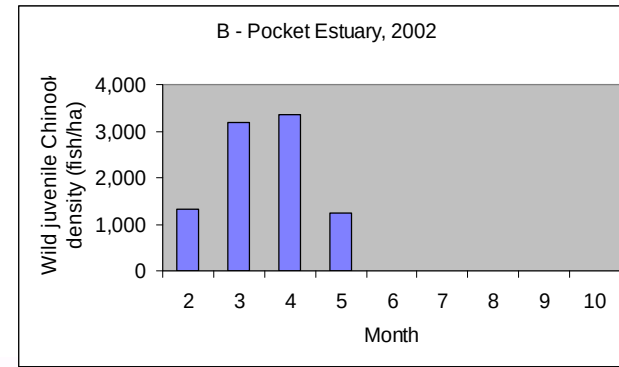
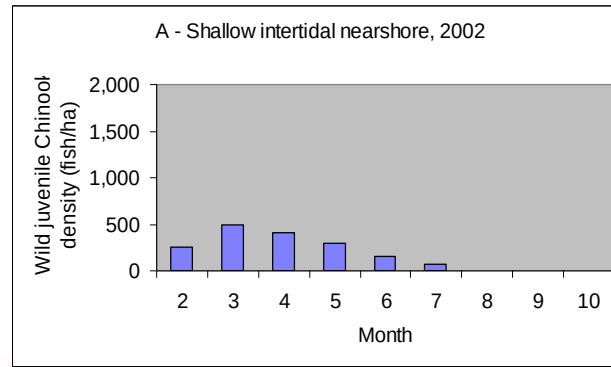
(up to 400,000 wild juvenile Chinook per year)

- **Snohomish River**

(usually < 1 million wild juvenile Chinook per year)

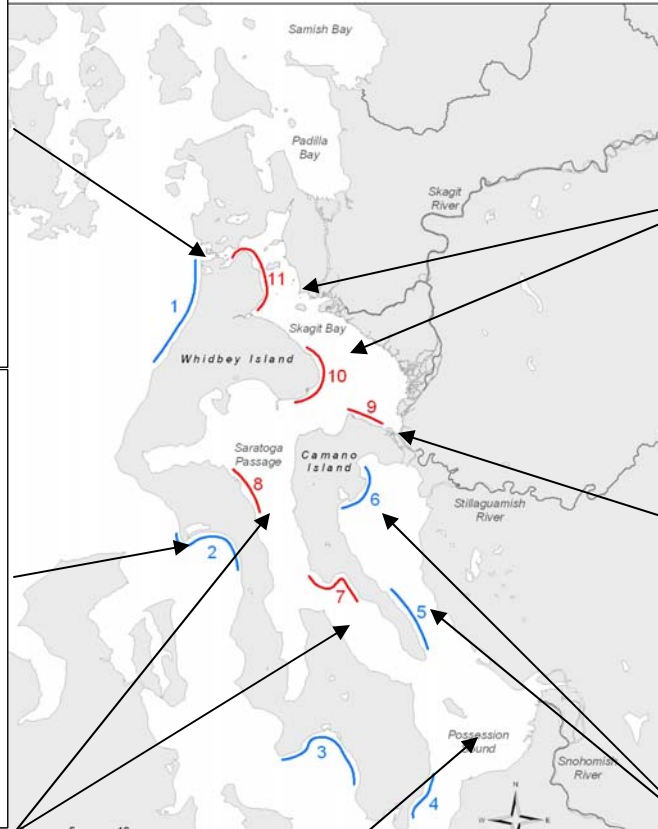
Stratify by Habitat Types

Seasonal pattern of wild juvenile Chinook salmon density by 4 habitat types

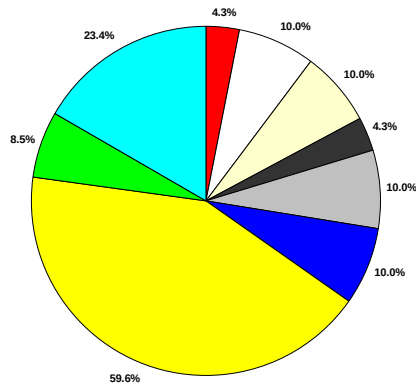


New type – small streams

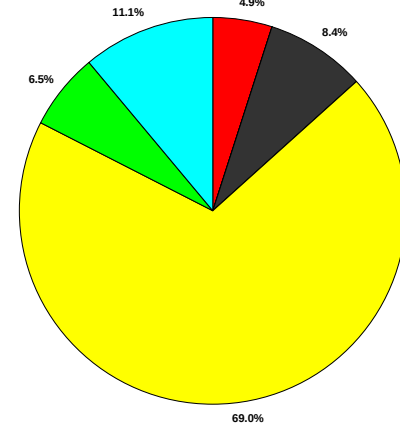
2008, All Beaches



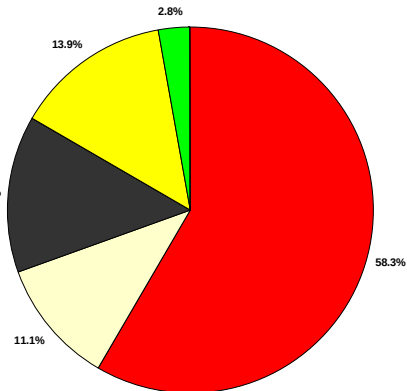
2008, Deception Pass, Beach



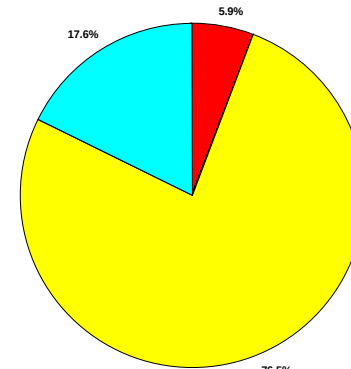
2008, Skagit Bay, Beach



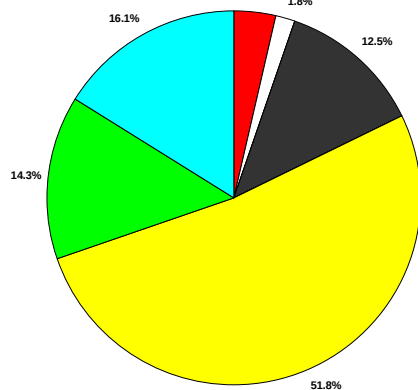
2008, West Whidbey - Central, Beach



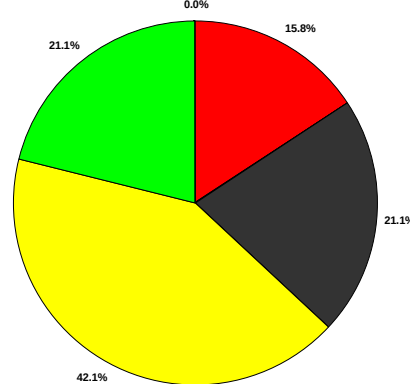
2008, West Pass/English Boom, Beach



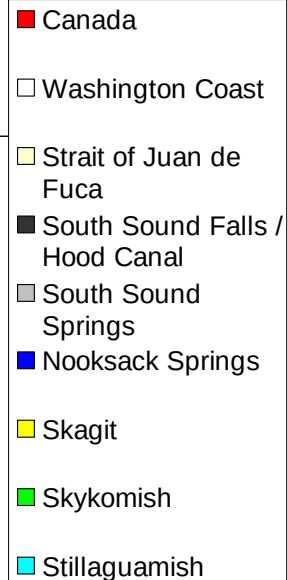
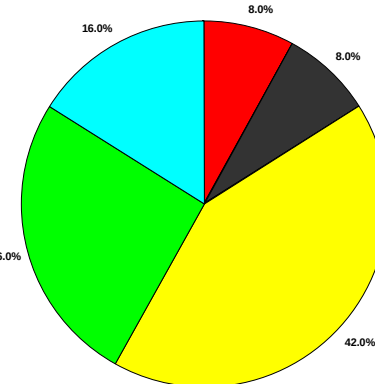
2008, Saratoga Passage, Beach



2008, Possession Sound, Beach

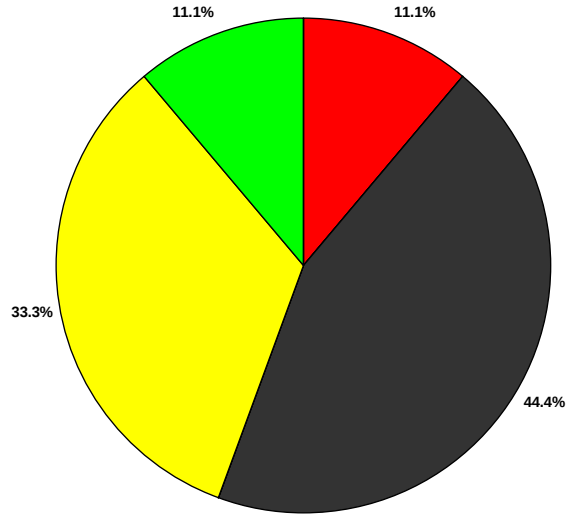


2008, Port Susan, Beach

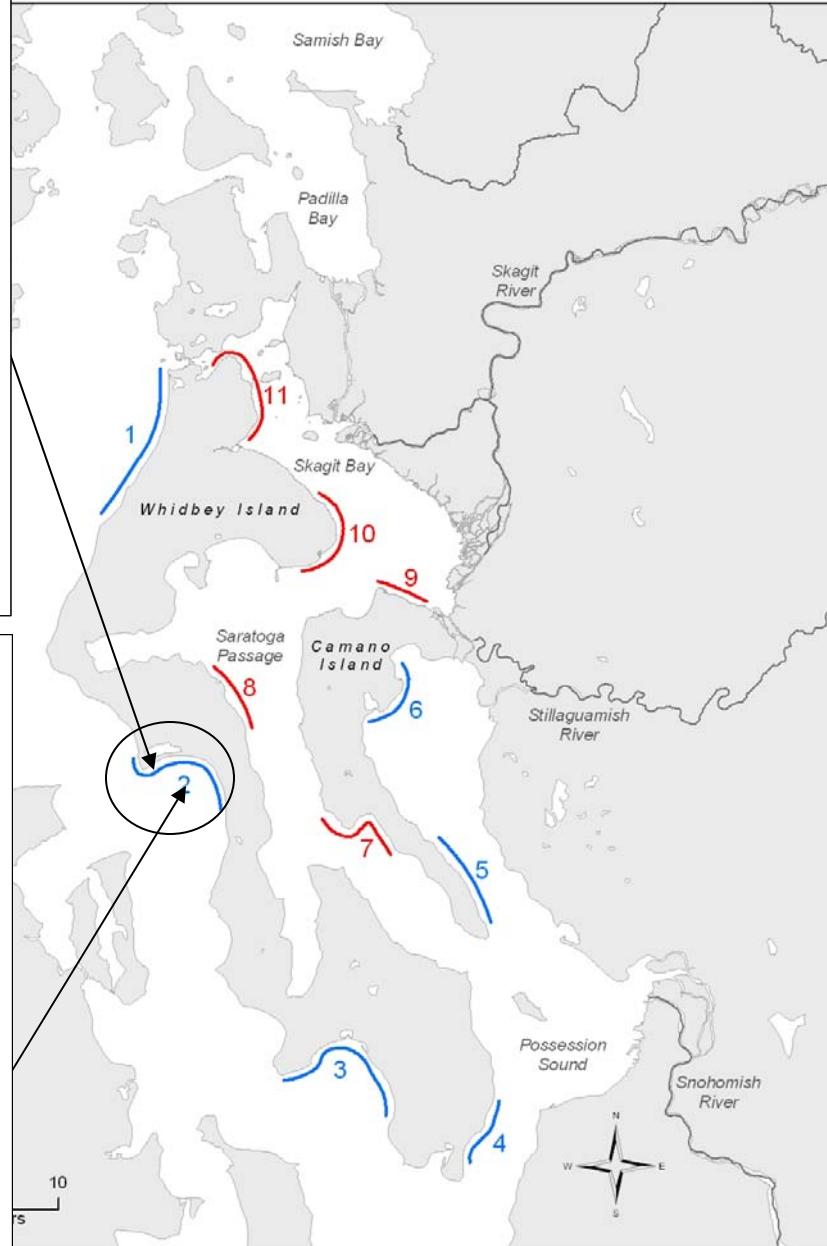
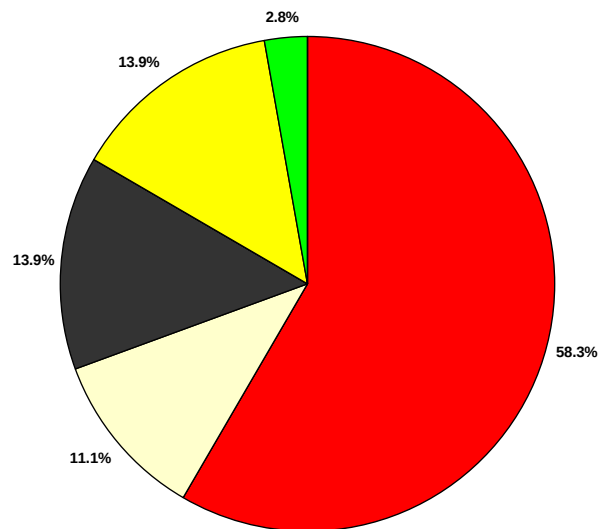


2008, Central W. Whidbey, Offshore v. Beach

2008, West Whidbey - Central, Offshore



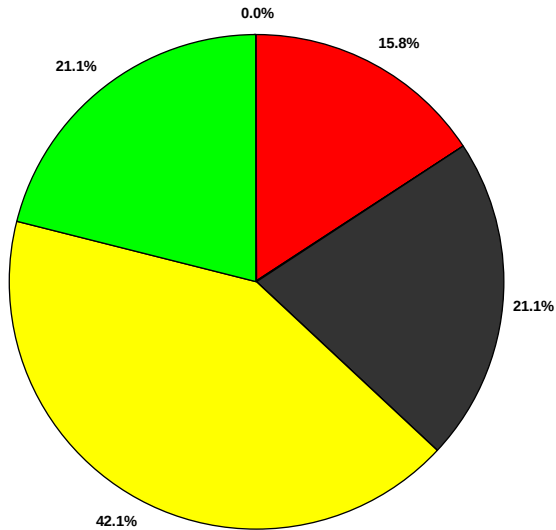
2008, West Whidbey - Central, Beach



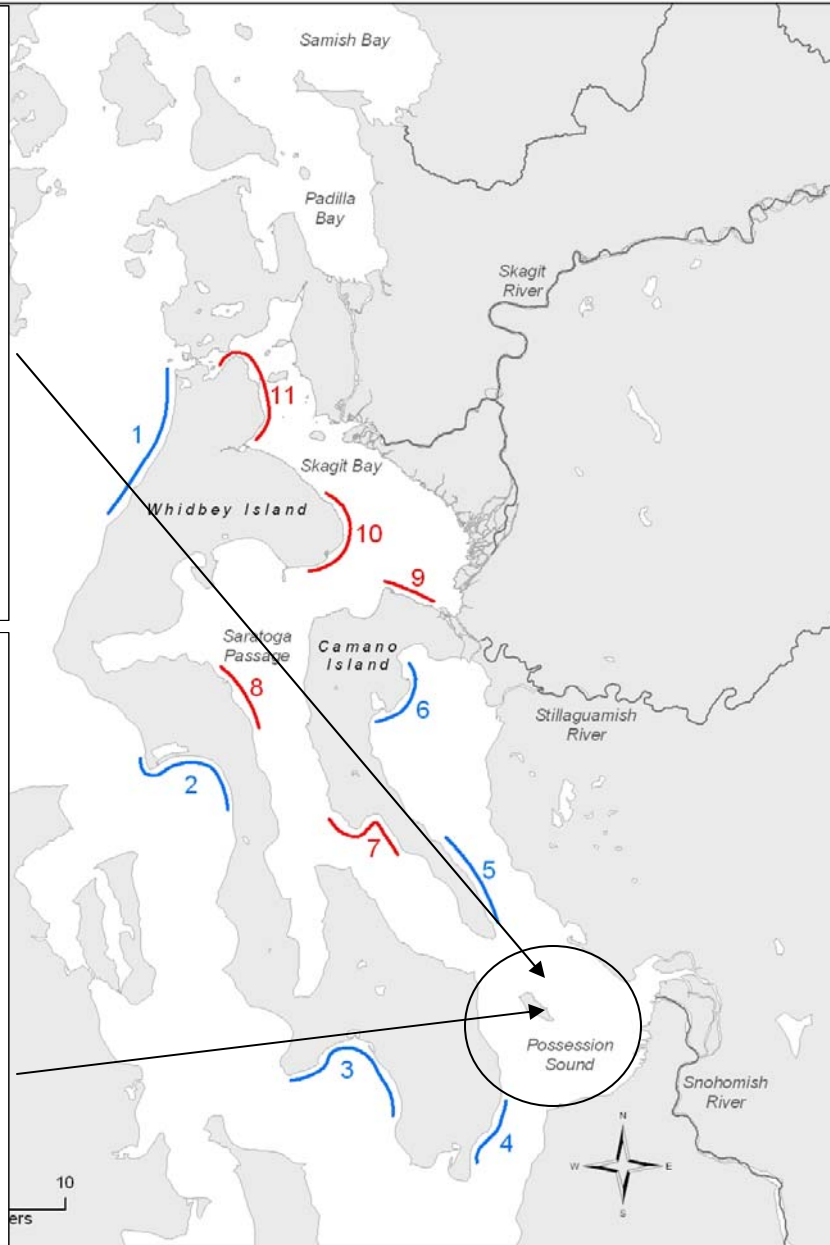
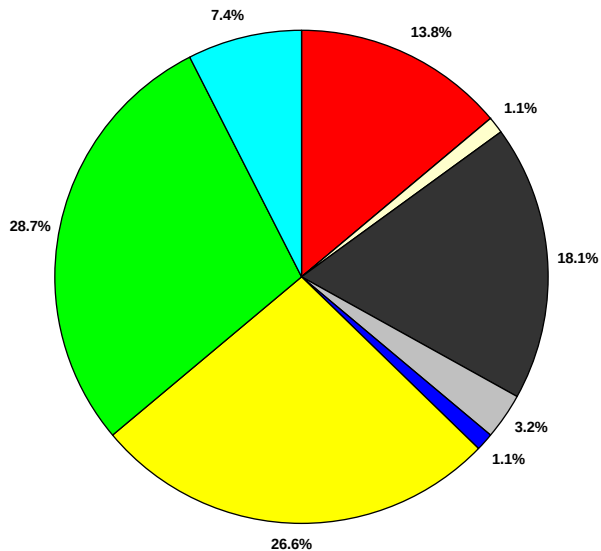
- Canada
- Washington Coast
- Strait of Juan de Fuca
- South Sound Falls / Hood Canal
- South Sound Springs
- Nooksack Springs
- Skagit
- Skykomish
- Stillaguamish

2008, Possession Sound, Offshore v. Beach

2008, Possession Sound, Beach



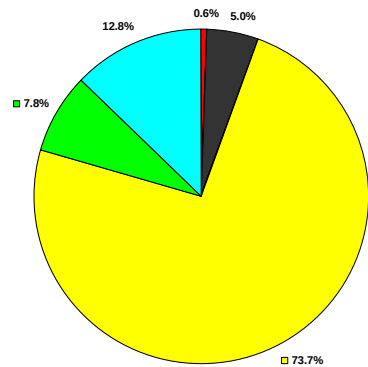
2008, Possession Sound, Offshore



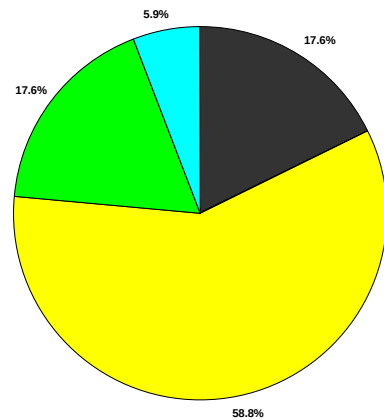
- Canada
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- Stillaguamish

2008, All Lagoon/tide channel

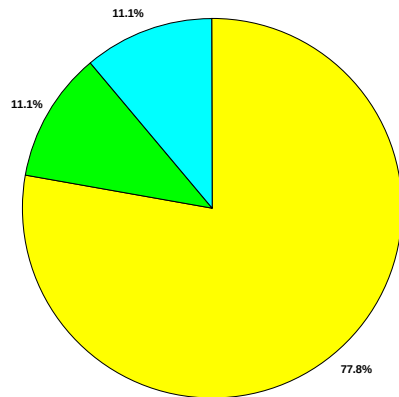
2008, Skagit Bay, Lagoon/tide channel



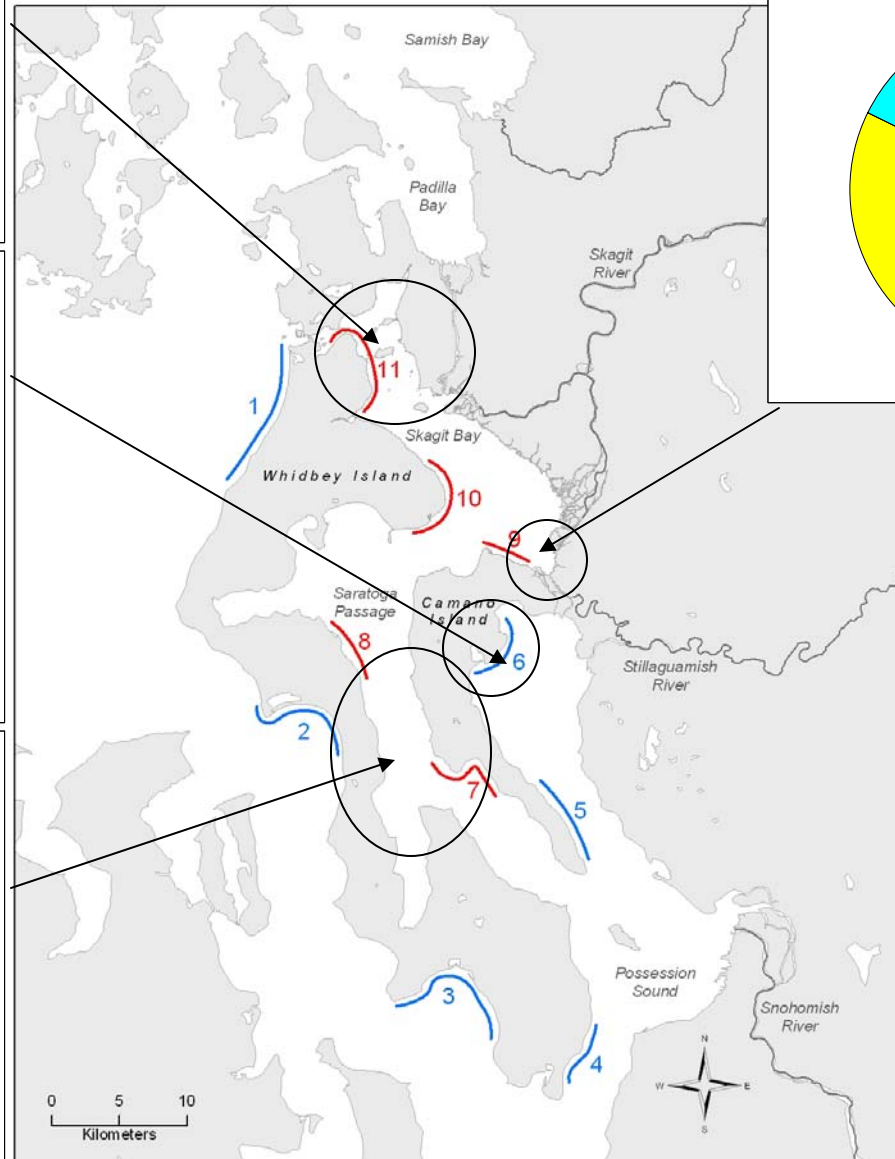
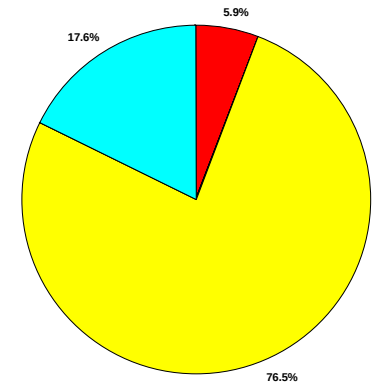
2008, Port Susan, Lagoon/tide channel



2008, Saratoga Passage, Lagoon/tide channel



2008, West Pass/English Boom, Beach

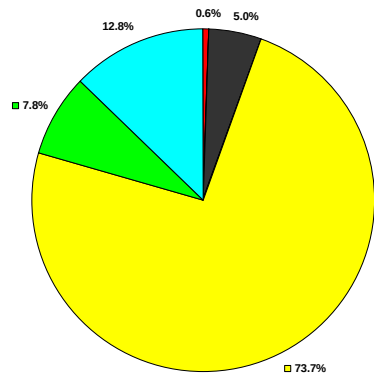


- Canada
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- South Sound Falls / Hood Canal
- South Sound Springs
- Nooksack Springs
- Skagit
- Skykomish
- Stillaguamish

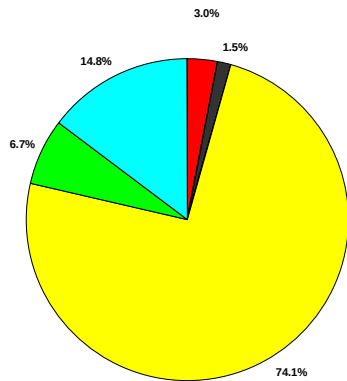
2008, Skagit Bay

All shoreline types

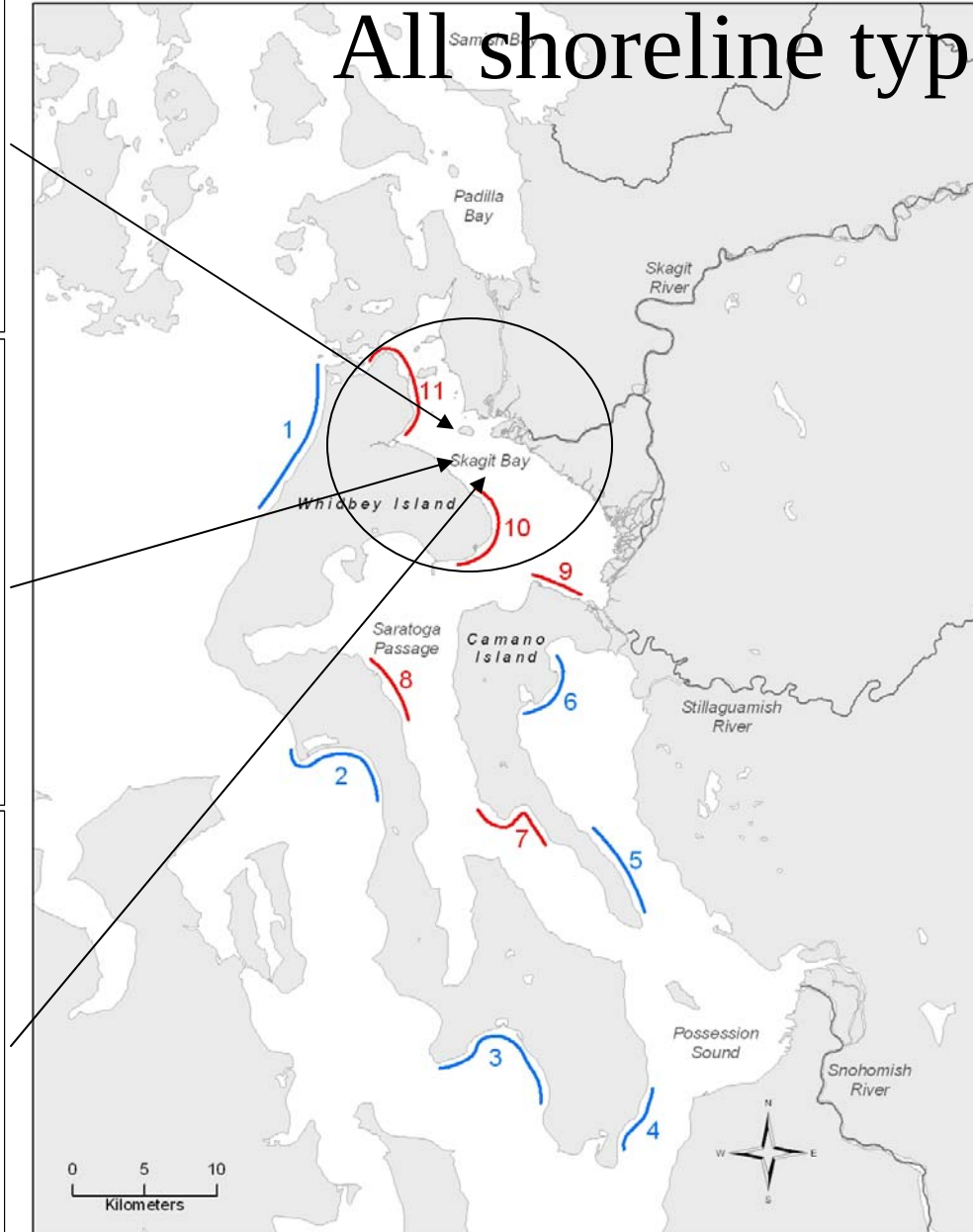
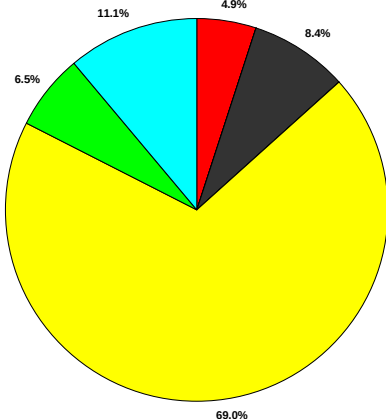
2008, Skagit Bay, Lagoon/tide channel



2008, Skagit Bay, small creeks



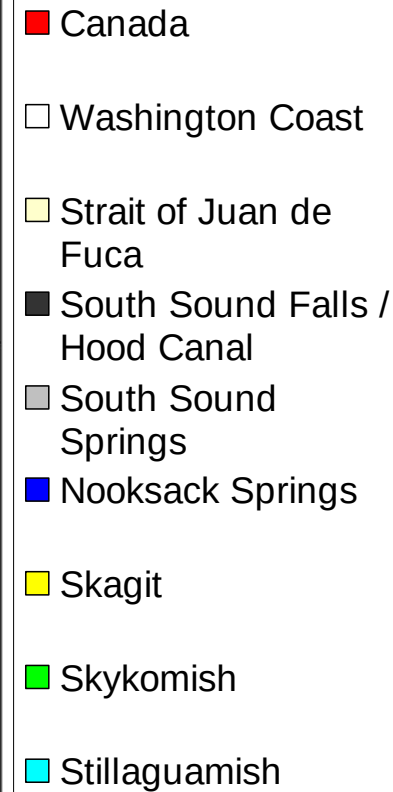
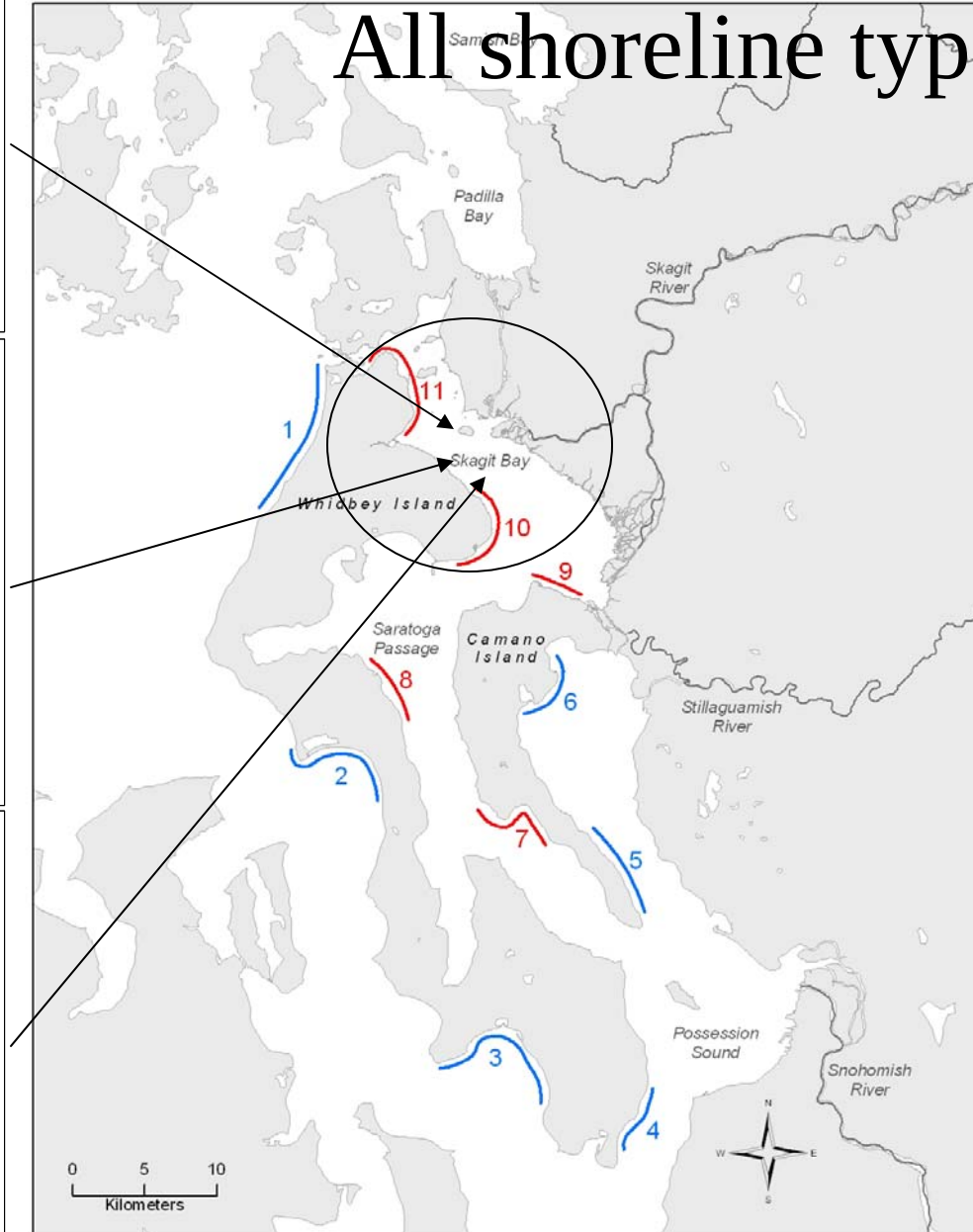
2008, Skagit Bay, Beach



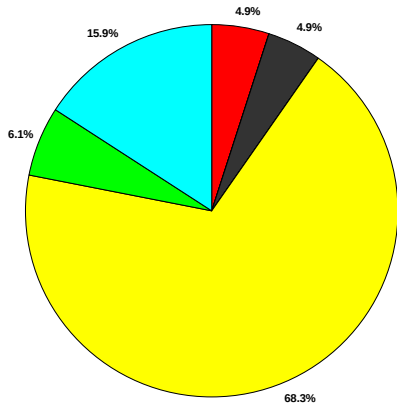
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- Stillaguamish

2009, Skagit Bay

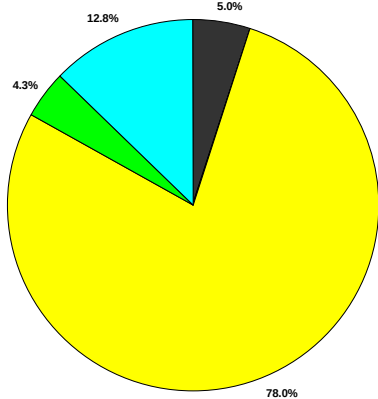
All shoreline types



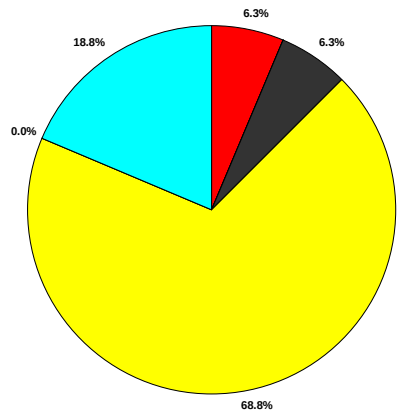
2009, Skagit Bay, Lagoon/tide channel



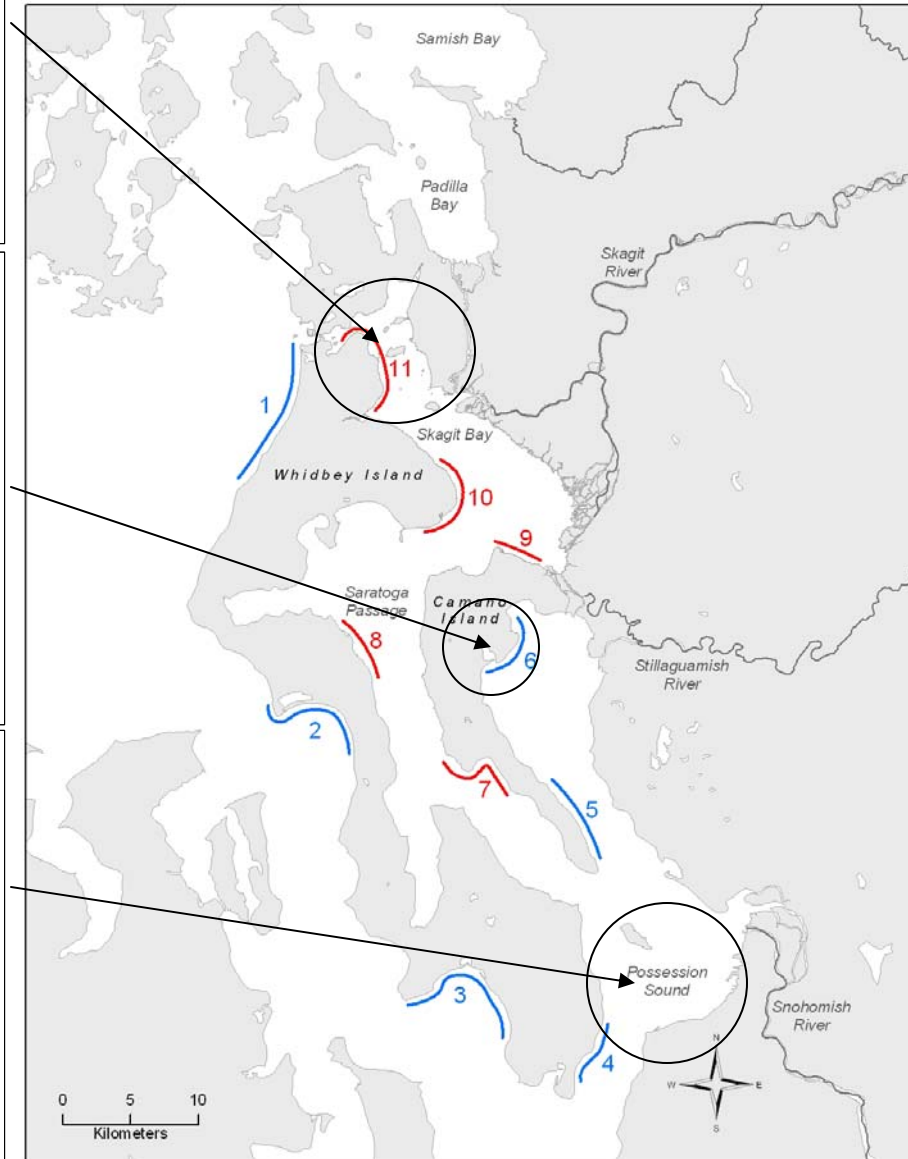
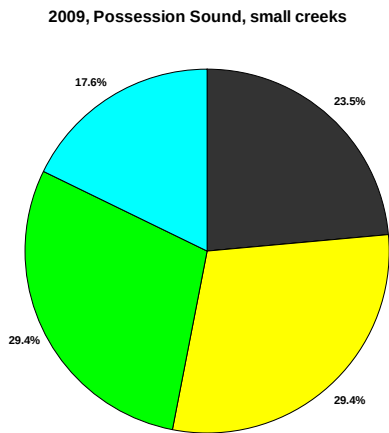
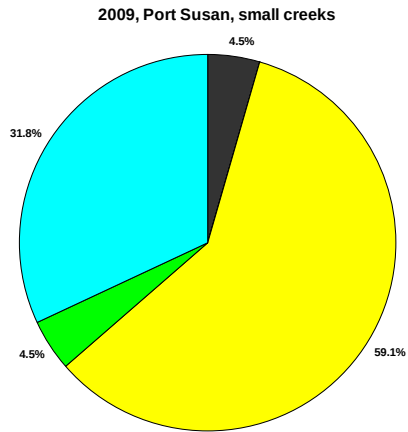
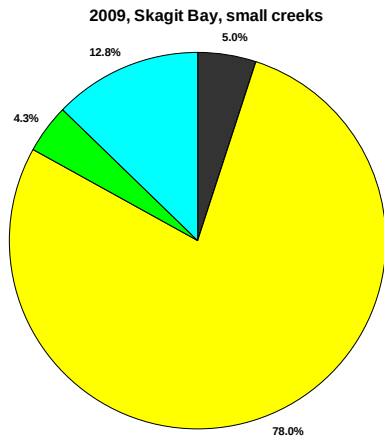
2009, Skagit Bay, small creeks



2009, Skagit Bay, Beach



2009, All Small Streams



- Canada
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- Strait of Juan de Fuca
- South Sound Falls / Hood Canal
- South Sound Springs
- Nooksack Springs
- Skagit
- Skykomish
- Stillaguamish

Acknowledgements

Funding Support

Salmon Recovery Funding Board
NOAA Fisheries
Skagit River System Cooperative

Fish Collection and Tissue Sampling

NOAA, SRSC, WFC, ICBW,
Tulalip, Stillaguamish

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Janine Supernault
John Candy

