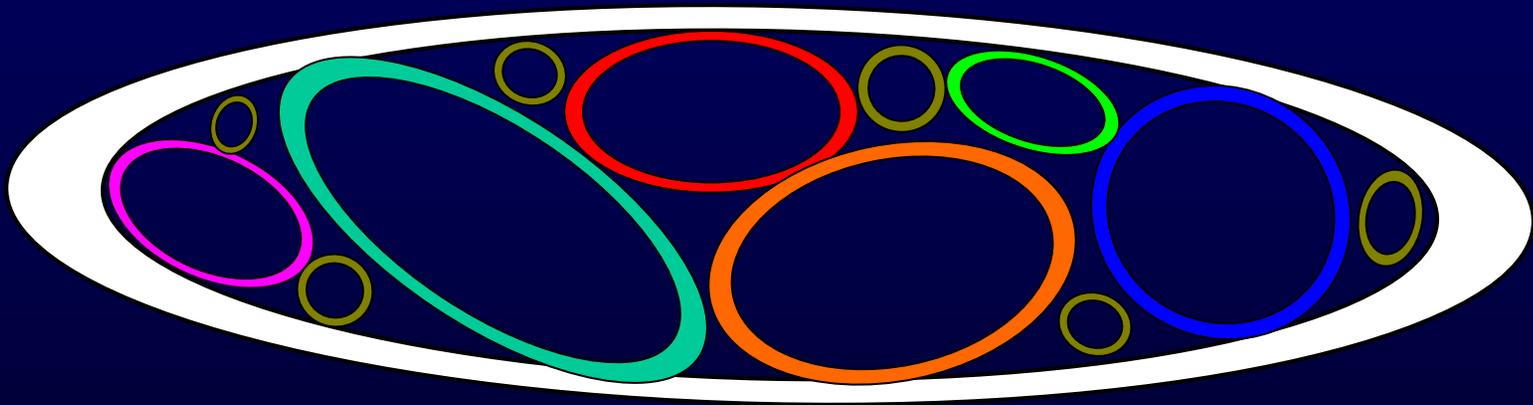


Drawing the circles: Defining distinct population segments in British Columbia



Allan B. Costello¹, Ted Down², Rick Taylor¹

1 – Native Fish Research Group, University of British Columbia

2 - British Columbia Ministry of Environment, Aquatic Ecosystem Science

Population size
and variability

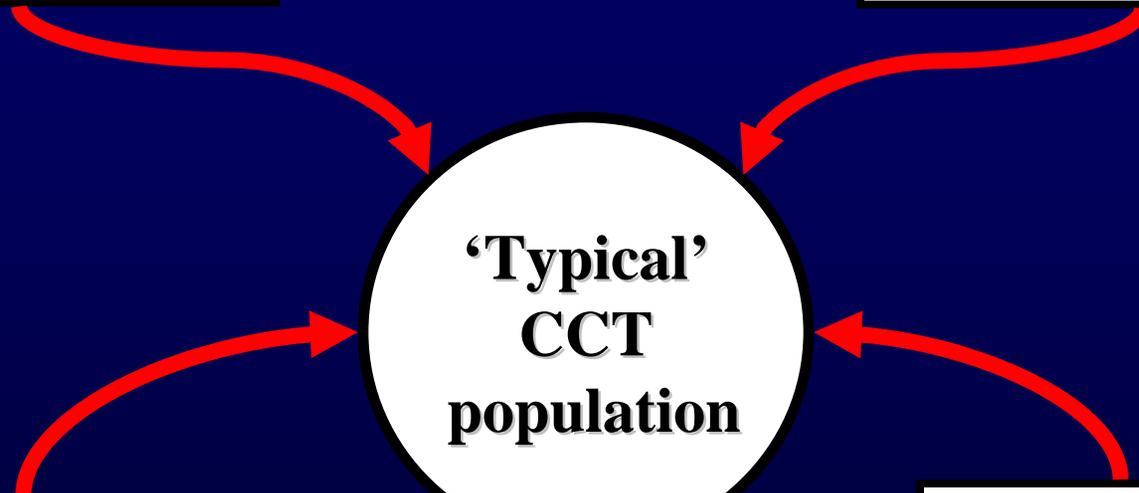
Defining a 'typical' population

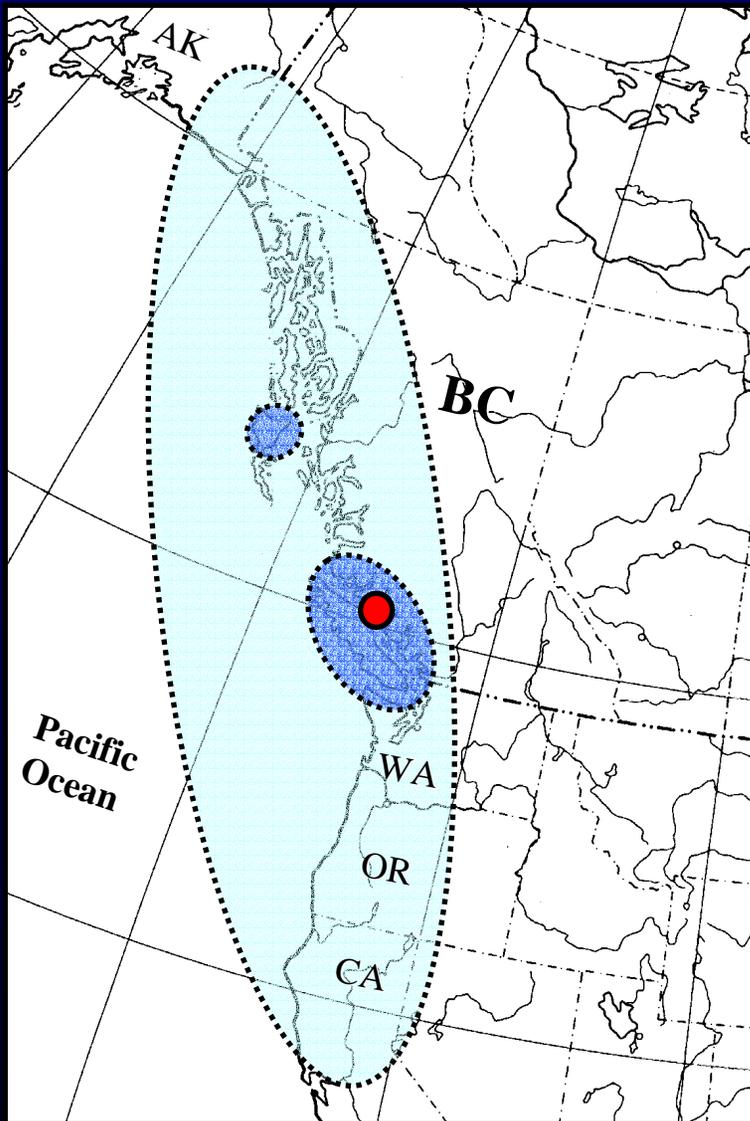
Interactions with
other populations

**'Typical'
CCT
population**

Number and
composition
of spawners

Relation to
range-wide
biodiversity

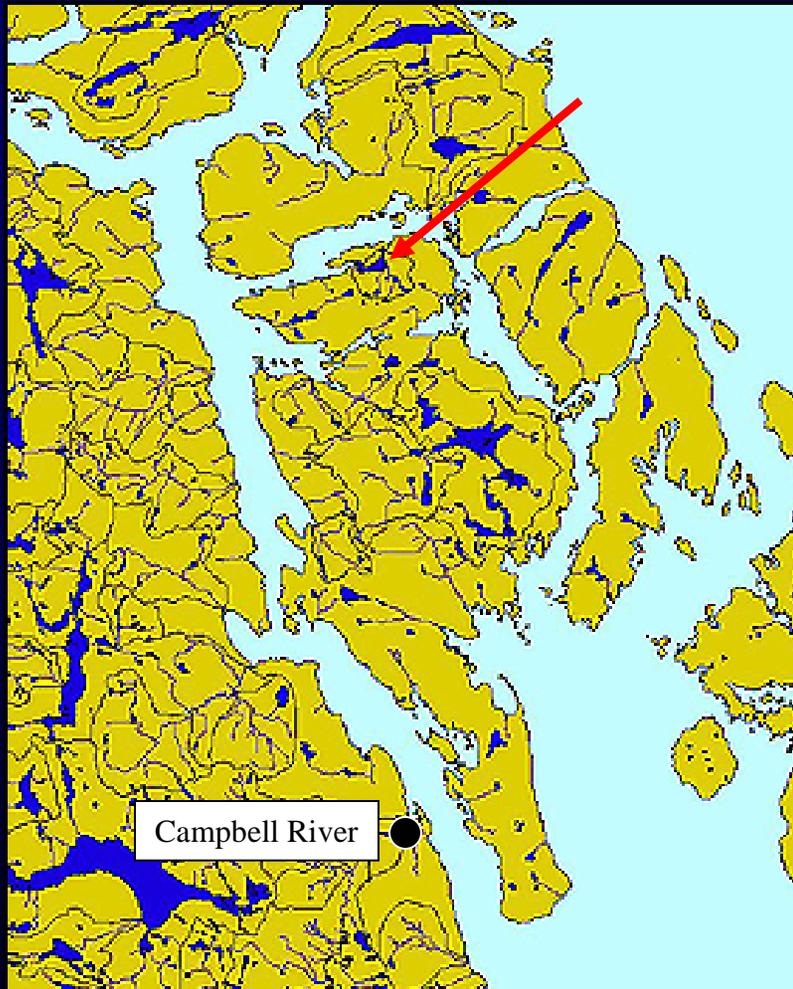




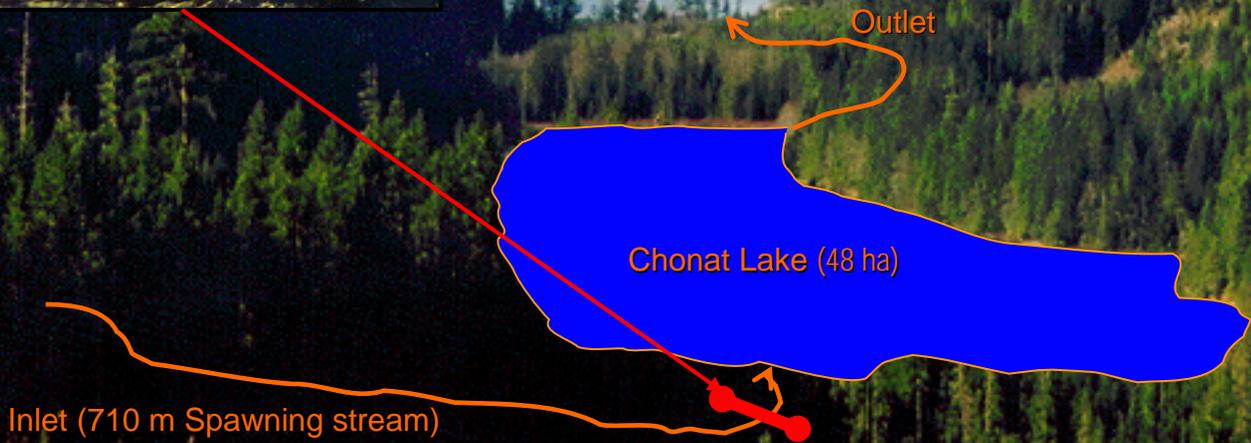
Nested Approach

1. Mating System
 - intensive study of single system
2. Population Structure
 - 48 adjacent streams in Georgia Basin, QCI
3. Range-wide Structure
 - Major lineages from AK to CA

1. Chonat Lake Mating Study



- What is the size of a typical spawning population and does it vary between years?
 - Chonat Lake, Quadra Island
 - Fish fence monitored during 2001, 2002 spawning seasons
 - 7 microsats used to perform parentage analysis of YOY fry



Chonot spawners

2001

24 Males

57 Females

81 Total

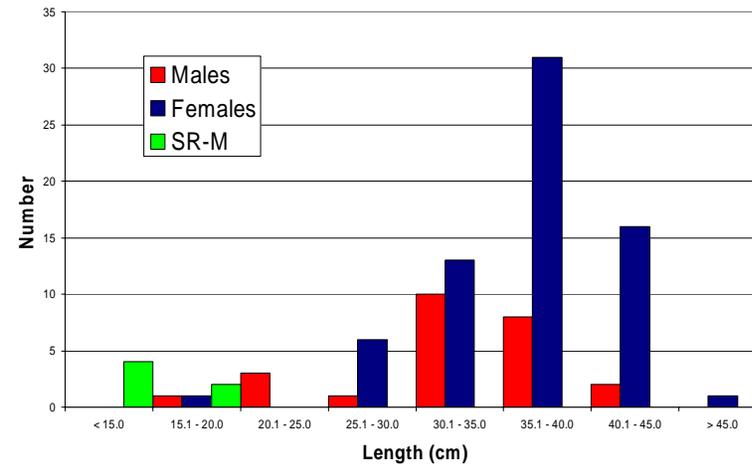
2002

23 Males

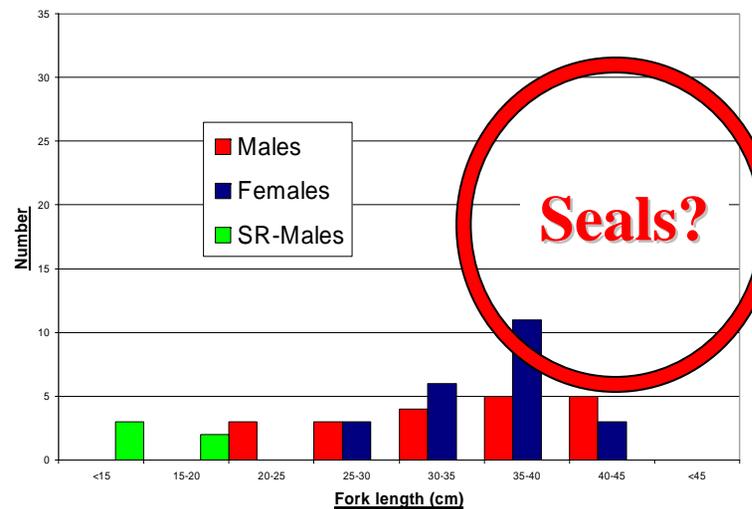
21 Females

44 Total

Length Frequency Distribution (2001 spawners)



Length Frequency Distribution (2002 spawners)



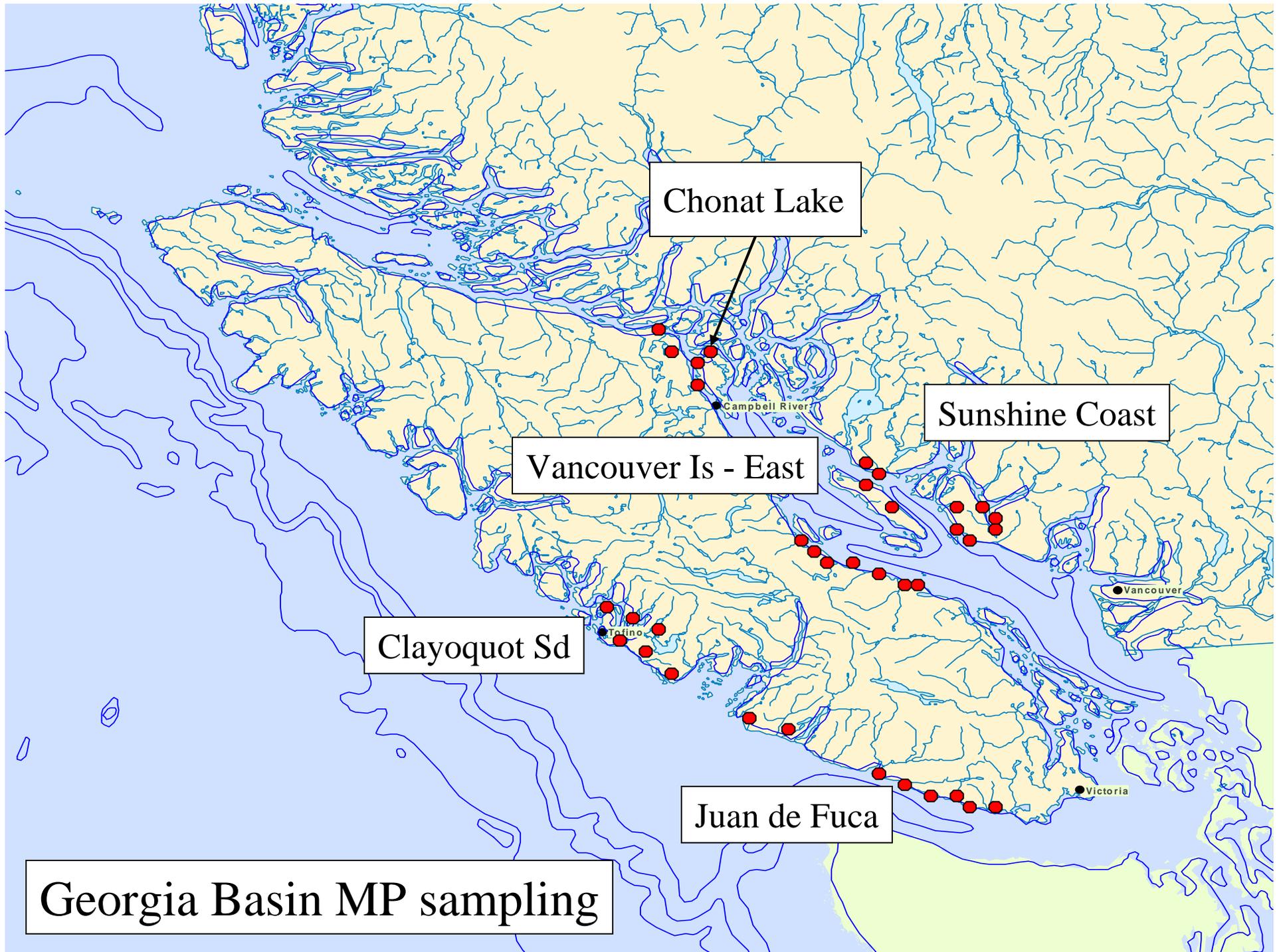
Parentage results

	2001		2002	
	Males	Females	Males	Females
Total spawners	24	57	23	21
Successful spawners	16 (67%)	31 (54%)	22 (96%)	20 (95%)
Variance (s^2)	3.32	2.29	6.97	11.79
N_b	64		36	
N_b / N	11%		8%	

2. Georgia Basin Population Structure



- 48 streams from Vancouver Island, Lower Mainland, and Gulf Islands
- QCI samples for comparison
- 6 microsats used to infer geneflow



Chonat Lake

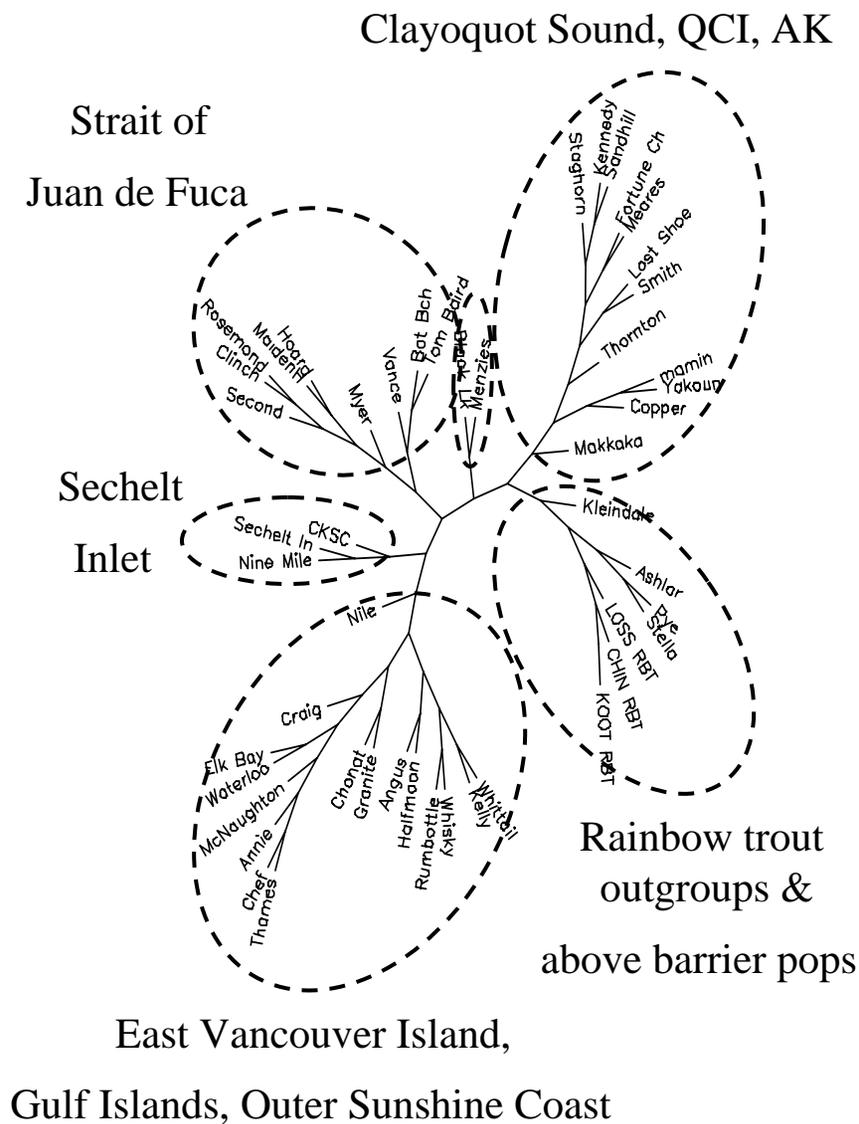
Sunshine Coast

Vancouver Is - East

Clayoquot Sd

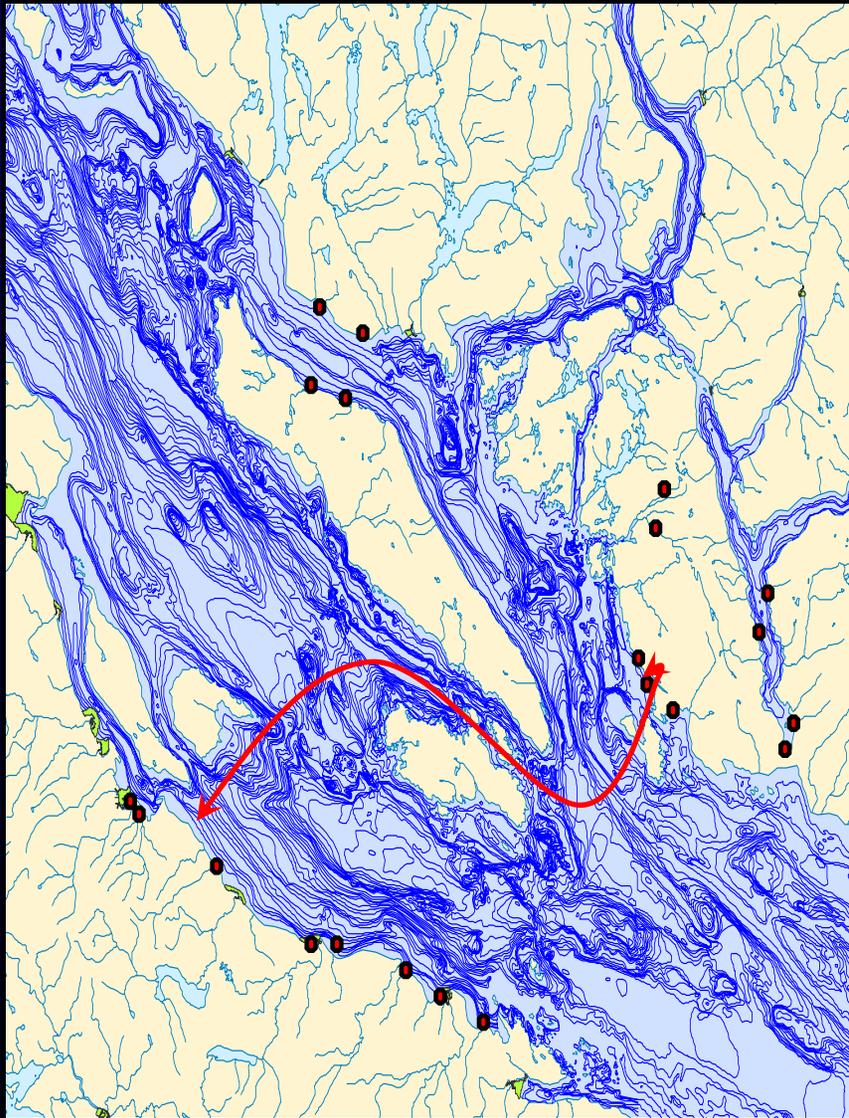
Juan de Fuca

Georgia Basin MP sampling



Population structure results

- Pops structured at stream level
- Metapopulation structure apparent at larger scales
- Not strictly based on proximity



Factors structuring diversity

- Deep water channels?
 - GIS least-cost path modelling
- Shoreline attributes?
 - Analysis of shoreline unit data (CCA)
- Generate predictive rules?

3. Range-wide biodiversity



- How is CCT biodiversity distributed over its entire range?
 - Distribution of major conservation units
 - DNA sequencing of nuclear (GH2), and mtDNA genes (ND1 and D-loop)
 - samples from CA to AK

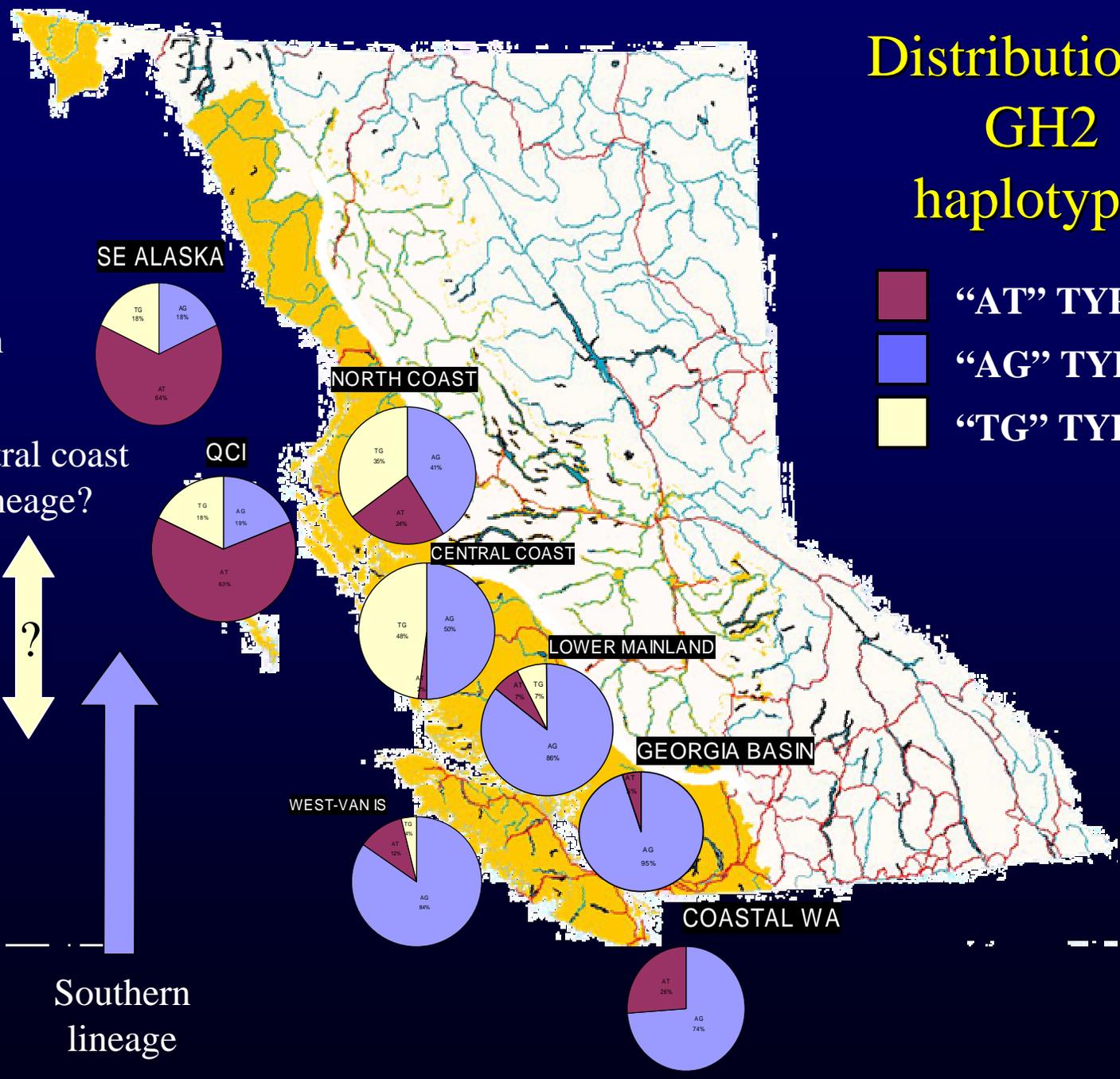
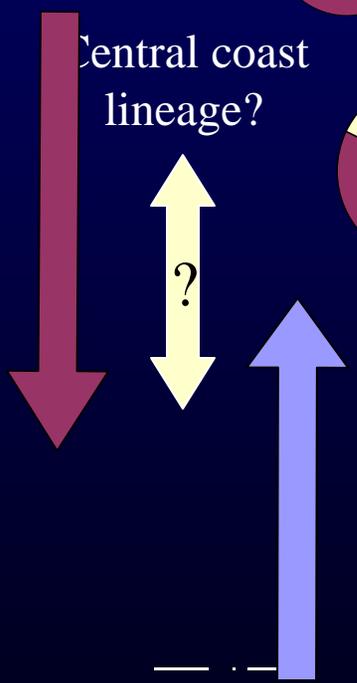
Distribution of GH2 haplotypes



Northern lineage

Central coast lineage?

Southern lineage



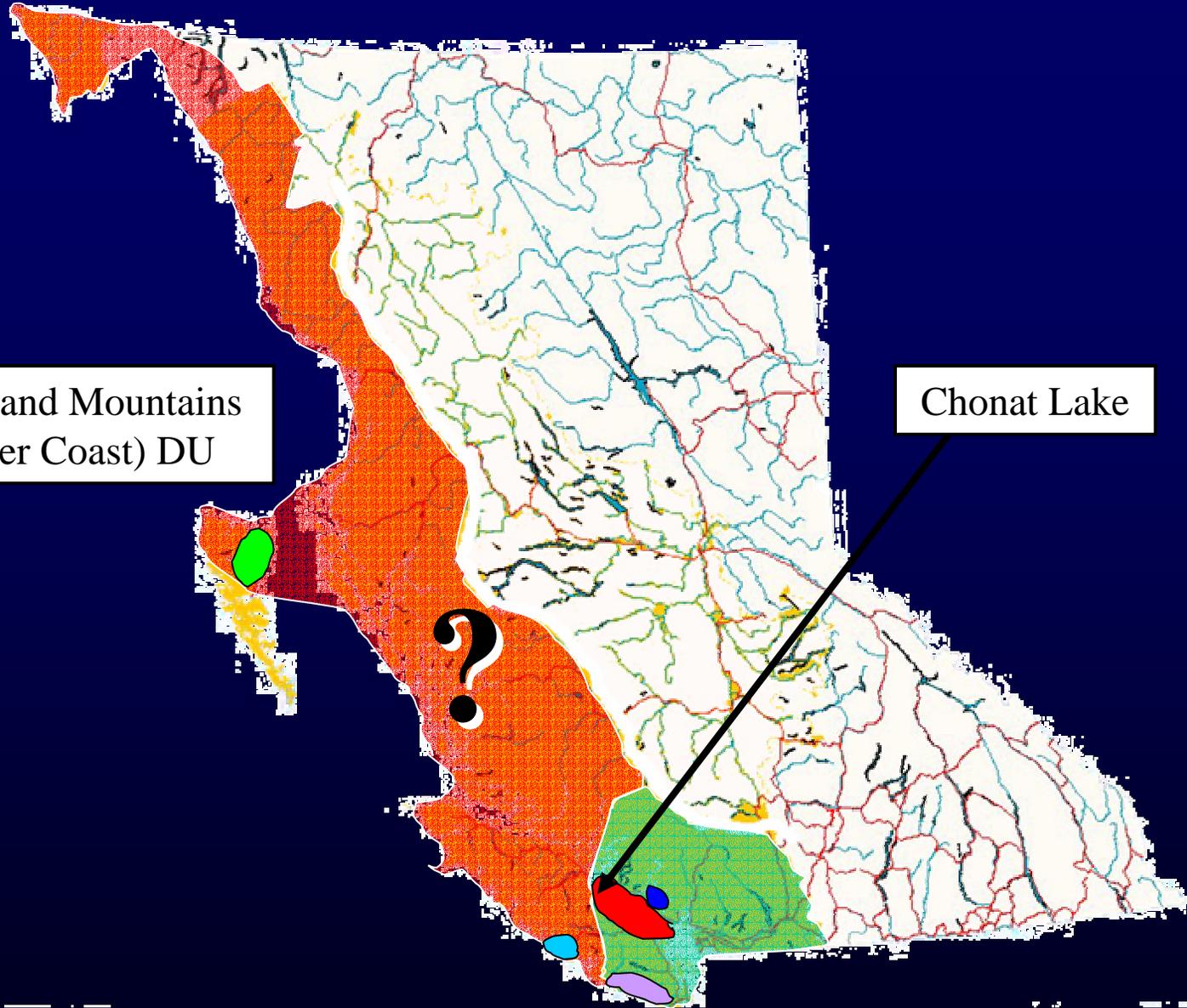
Phylogeography summary

- Complex phylogeography in BC
 - Multiple refugia likely
 - Mix of refugial races in most areas
- Requiring samples from periphery of range:
CA, OR, WA, AK

Coast and Mountains
(Outer Coast) DU

Chonot Lake

Georgia Depression DU



So, what is a CCT population?

- Variable, supported by few spawners
- Reproductively isolated over small scales
- Structured into loose regional groups
- A product of numerous historical and contemporary factors
- It's complicated!

Acknowledgments

- BC Habitat Conservation Trust Fund (HCTF)
- BC Ministry of Environment, regional biologists
- Grant B. Culley, Jr. Foundation
- Pacific States Marine Fish Commission and US Fish and Wildlife Service (Travel Assistance)

Ptolemy-Ramsay photo



I like cutthroat!