A Circulation Model for the Broughton Archipelago
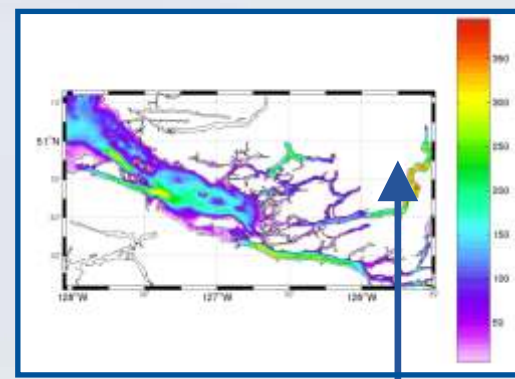
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1. PROJECT OBJECTIVES

Simulate circulation and transport near salmon farms to help address issues such as
- waste deposition
- spreading of viruses & sea lice to wild salmon
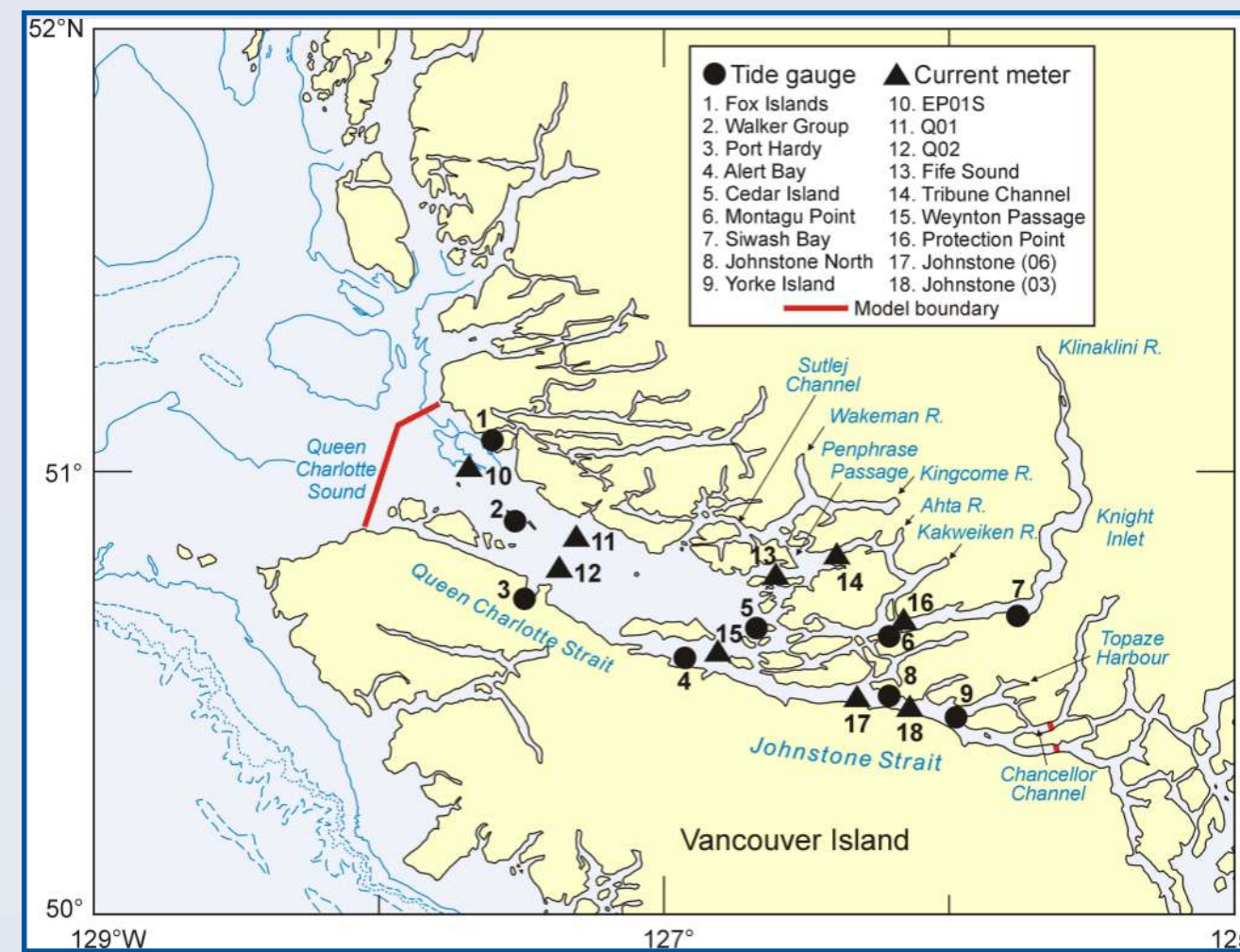- oxygen depletion

3. ROMS APPLICATION

- 250 m horizontal resolution, 726 by 386
- 10 S-coordinates (more later)
- OPEN-MP on IBM PS570 32 processor machine
- Δt=36 sec, NDTFAST=50
- BCs : nudging, OBCFAC=45
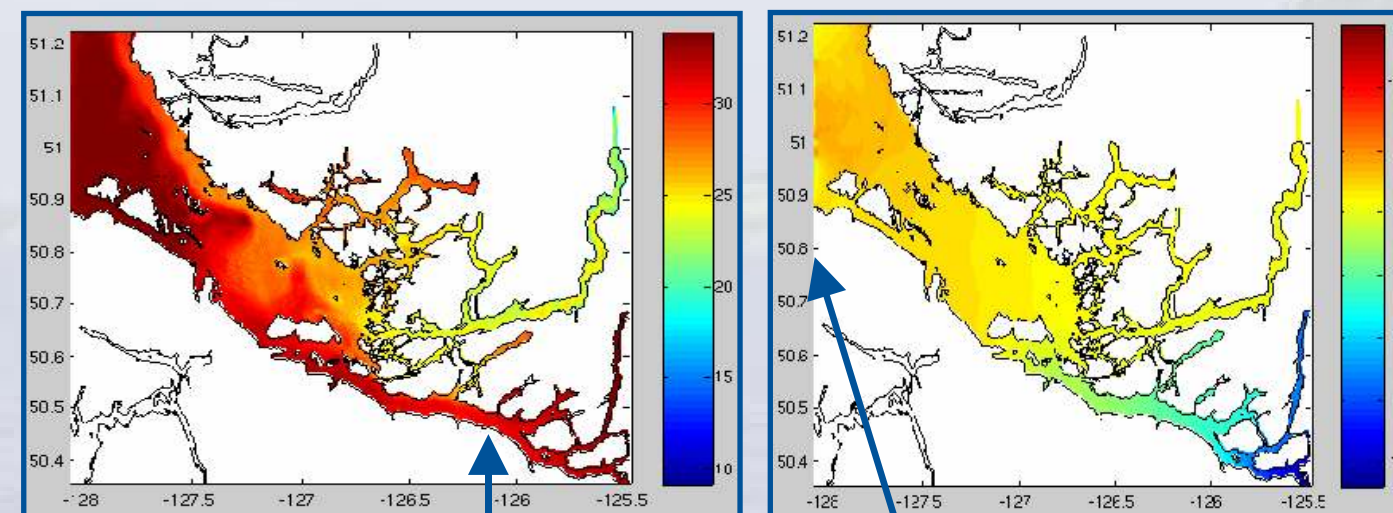- Run for 60 days (river discharge) or until unstable (tides)

4. INITIAL CONDITIONS & FORCING
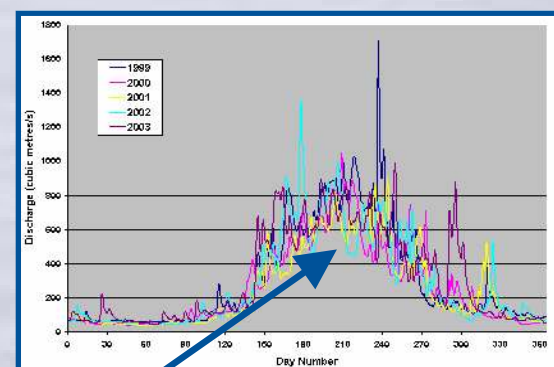
- Initial temperature & salinity: profiles
- Average summer discharge from Klinaklini River
- M_2 & K_1 tides from larger domain model
- No wind (for now)

2. REGIONAL OCEANOGRAPHY

- Complicated geography
- Steep bathymetry, narrow channels
- Strong tidal currents
  - Knight Inlet = favourite lab for internal tide studies
- Estuarine flows everywhere
- Density fronts
- Tough application for any model
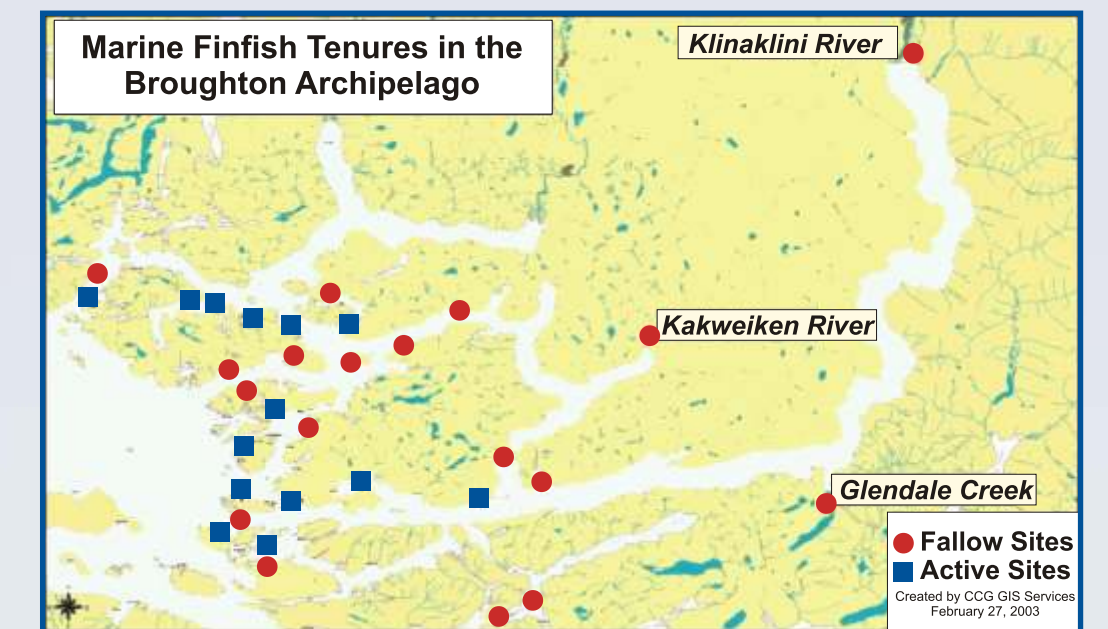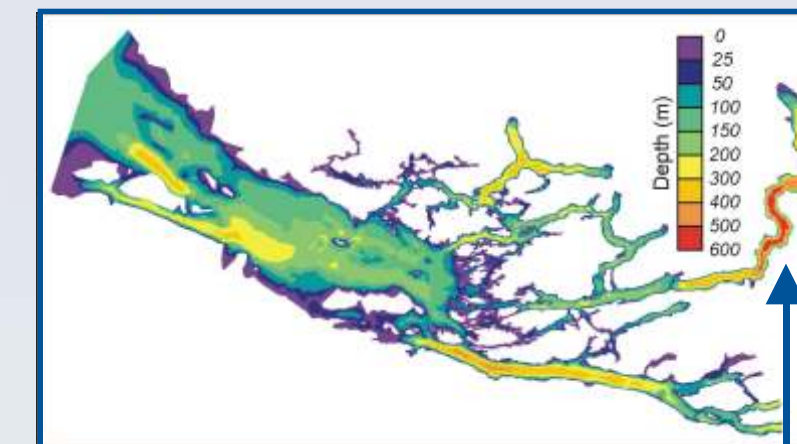
5. PRELIMINARY RESULTS

- River discharge only:
  - Surface salinity
  - Boundary outflow works well
  - Estuarine flow too shallow
  - Needs tidal mixing
- Unstable with tides (M_2 & K_1)
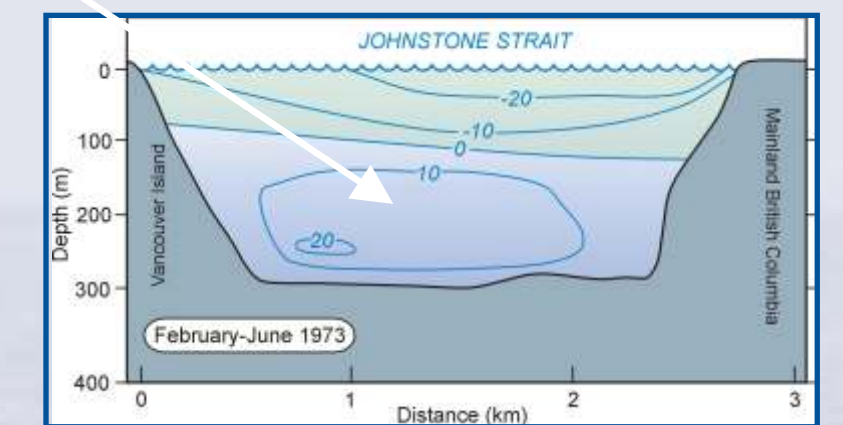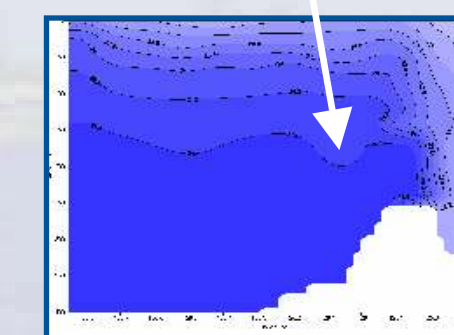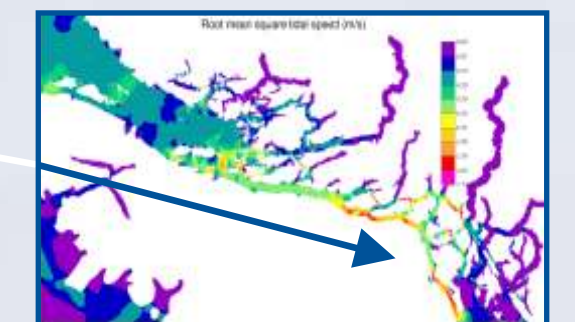 - Problem with elevations at western boundary

6. SUMMARY & FUTURE WORK

- Broughton circulation
  - Tough problem - narrow channels, steep bathymetry, strong flows, at least 3 important forcing mechanisms
  - Many model features still need improvement (e.g., BCs)
- Future work:
  - More current, CTD, & wind observations this summer
  - Initial conditions from climatology
  - Wind
  - *Maybe assimilation*

7. ACKNOWLEDGMENTS

ACRDP for partial financial support

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