THREATS TO BIVALVE AQUACULTURE AND FISHERIES: THE INFLUENCE OF EMERGING DISEASES AND ENVIRONMENTAL CHANGE

Problem / Issues

* Global Warming / Ocean Acidification
* Local upwelling
* Larvae Mortality

Research Objectives

* characterize the interrelationship of altered environmental conditions, pathogen, and oyster response under controlled conditions.
* identify factors in Pacific Northwest hatcheries and in the wild that are associated with poor oyster larvae survival.

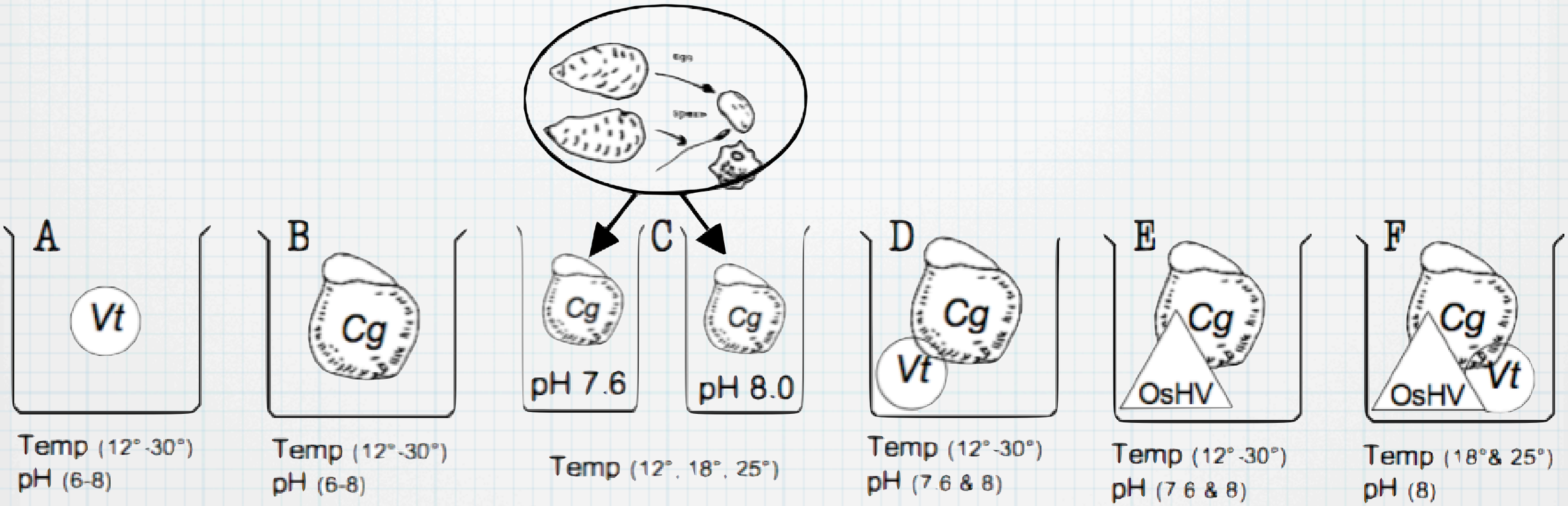
Game Plan

* Examine multiple abiotic / biotic factors' impact on oyster larvae

* Characterize abundance of oysters and others in Willapa, Dabob, and Netarts

    * + environmental parameters

Trials


A
Vt
Temp (12°-30°)
pH (6-8)
B
Cg
Temp (12°-30°)
pH (6-8)
C
Cg
pH 7.6
Cg
pH 8.0
Temp (12°, 18°, 25°)
D
Cg
Vt
Temp (12°-30°)
pH (7.6 & 8)
E
Cg
OsHV
Temp (12°-30°)
pH (7.6 & 8)
F
Cg
OsHV
Vt
Temp (18°& 25°)
pH (8)

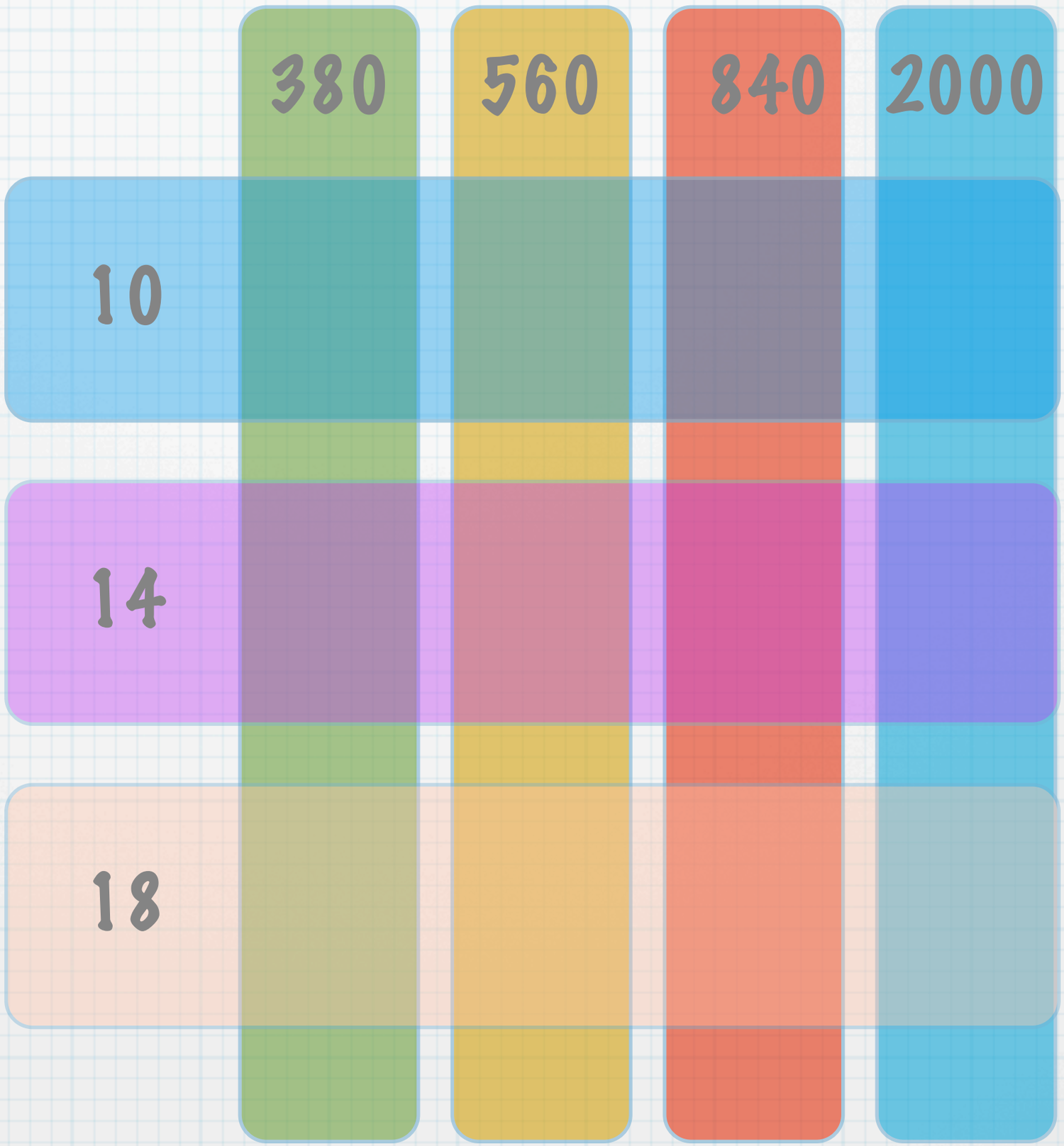
Trials

Using controlled experiments to test environmental stressors on the survival, growth and physiology of pathogen and host

Parameters

- pCO_2 levels: 380, 560, 840 and ~2000 ppm
- Temperatures 10, 14, 18° C
- Time Points. 13 time points from 0 - 72 hrs
- Additional measurements Salinity, DIC, TA

Trials



13 time points
0-72 hr

Trials

Vt

Cg

Spawned Cg

Cg & Vt

Cg & OsHV

Cg & Vt & OsHV

13 time points
0-72 hr

	380	560	840	2000
10				
14				
18				

Trials

Vt

Cg

Spawned Cg

Cg & Vt

Cg & OsHV

Cg & Vt & OsHV

10

14

18

380

560

840

2000

Q: dose of pathogen

Q: reps?

Q:

13 time points
0-72 hr

Hatcheries

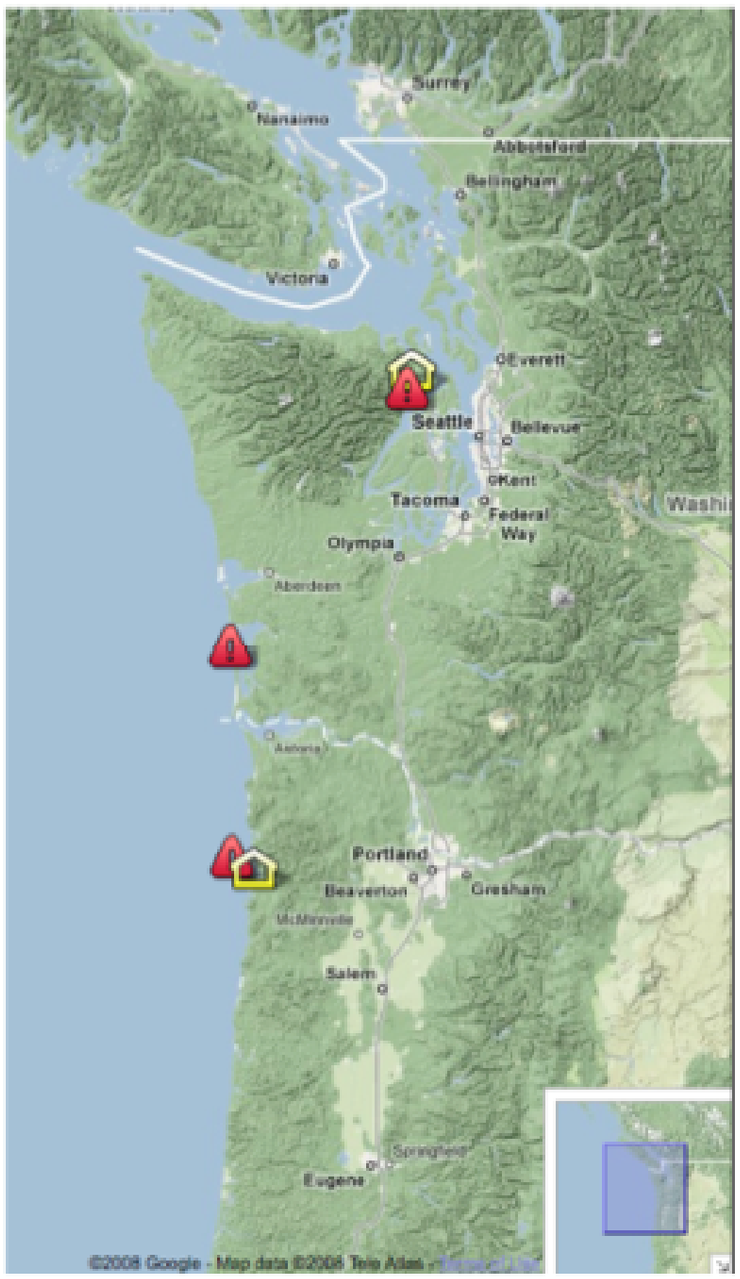


Figure 8. Map of study area showing two shellfish hatcheries (building icons) and three field sites (triangles).

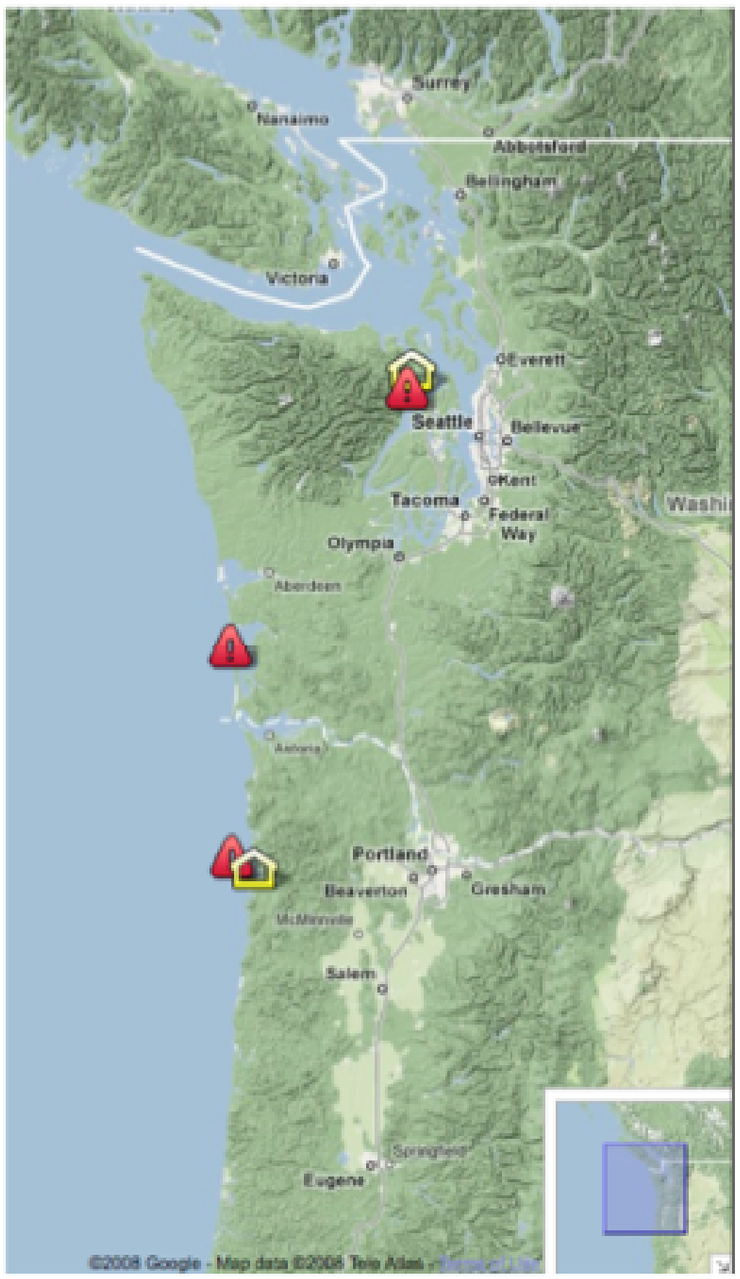
* 2 hatcheries; sampling early spring / summer over two years
* Feb-Aug
* Temp, pH, DO, salinity, chloro a, alkalinity, dis POM, calcium
* PCR Vt and OsHV

Hatcheries

Figure 8. Map of study area showing two shellfish hatcheries (building icons) and three field sites (triangles).

* Each season, 2 spawning events sampled
* Trochs, D veligers, mid vel, pediveliger (gene exp)
* Samples to Elston
* UW water quality analysis
* Vt virulence - gene exp

Wild Sampling



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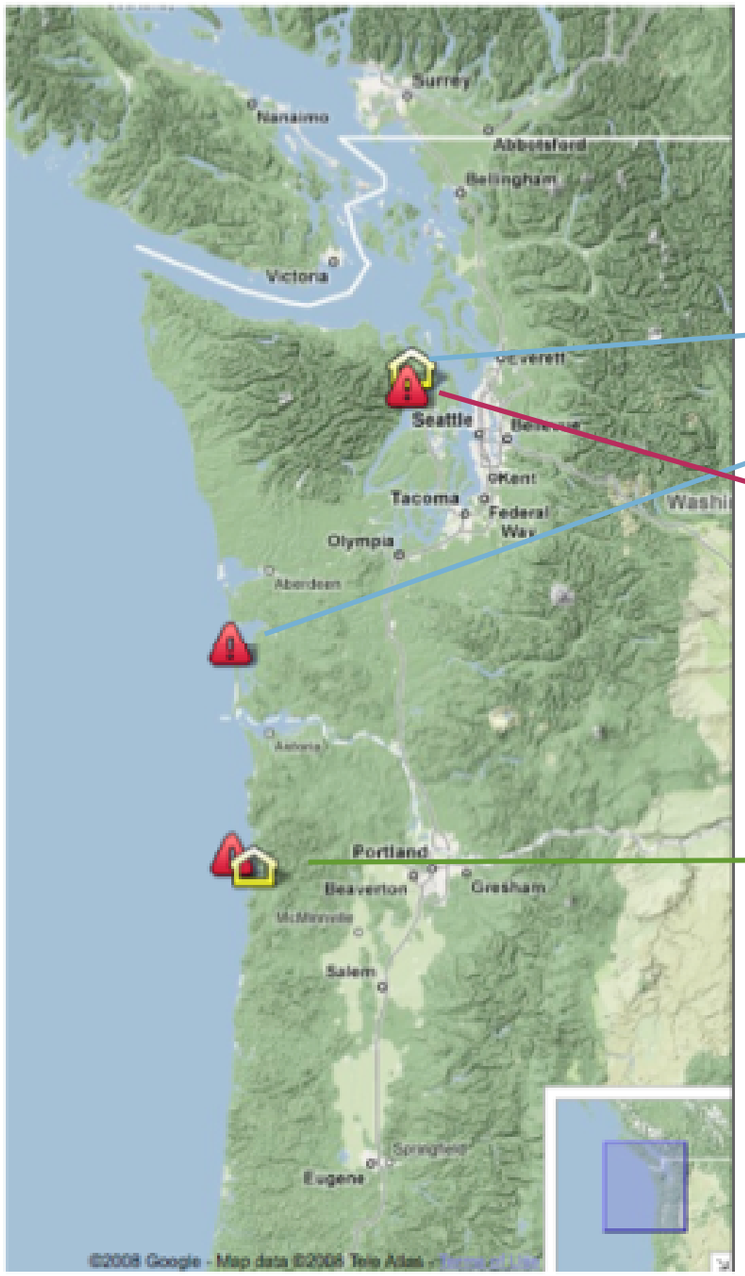
Sampling Coordinators



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Quilcene & Willapa - ELSTON

Dabob - WDFW - ROGERS

Whiskey Creek Oyster

Products

* Mortality
* Oyster gene expression assay (~12 gene)
* Physiological Response Vt - gene exp
* Characterizing Wild Pops

Products

Vt diag

Cg assay

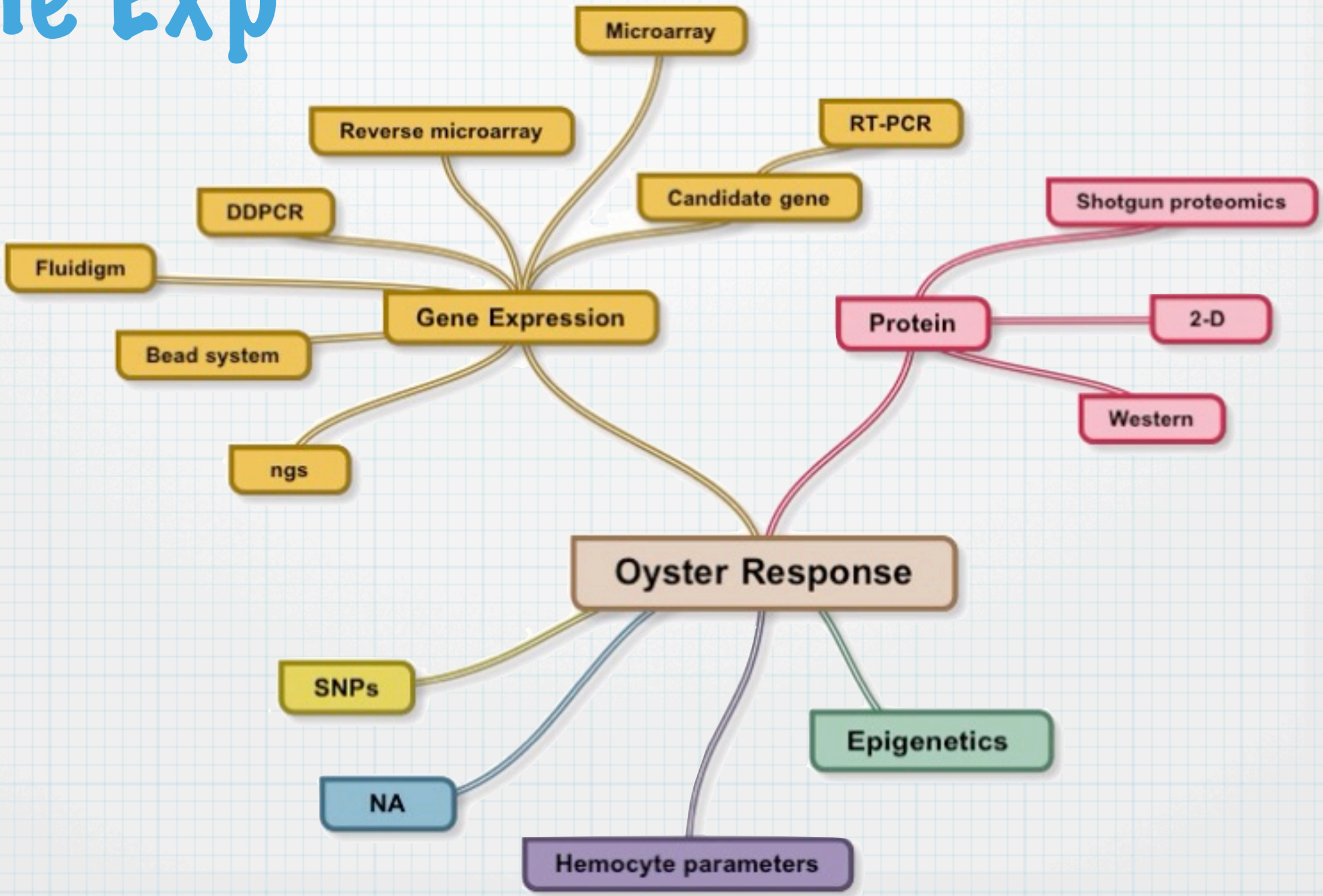
Vt physio

water quality

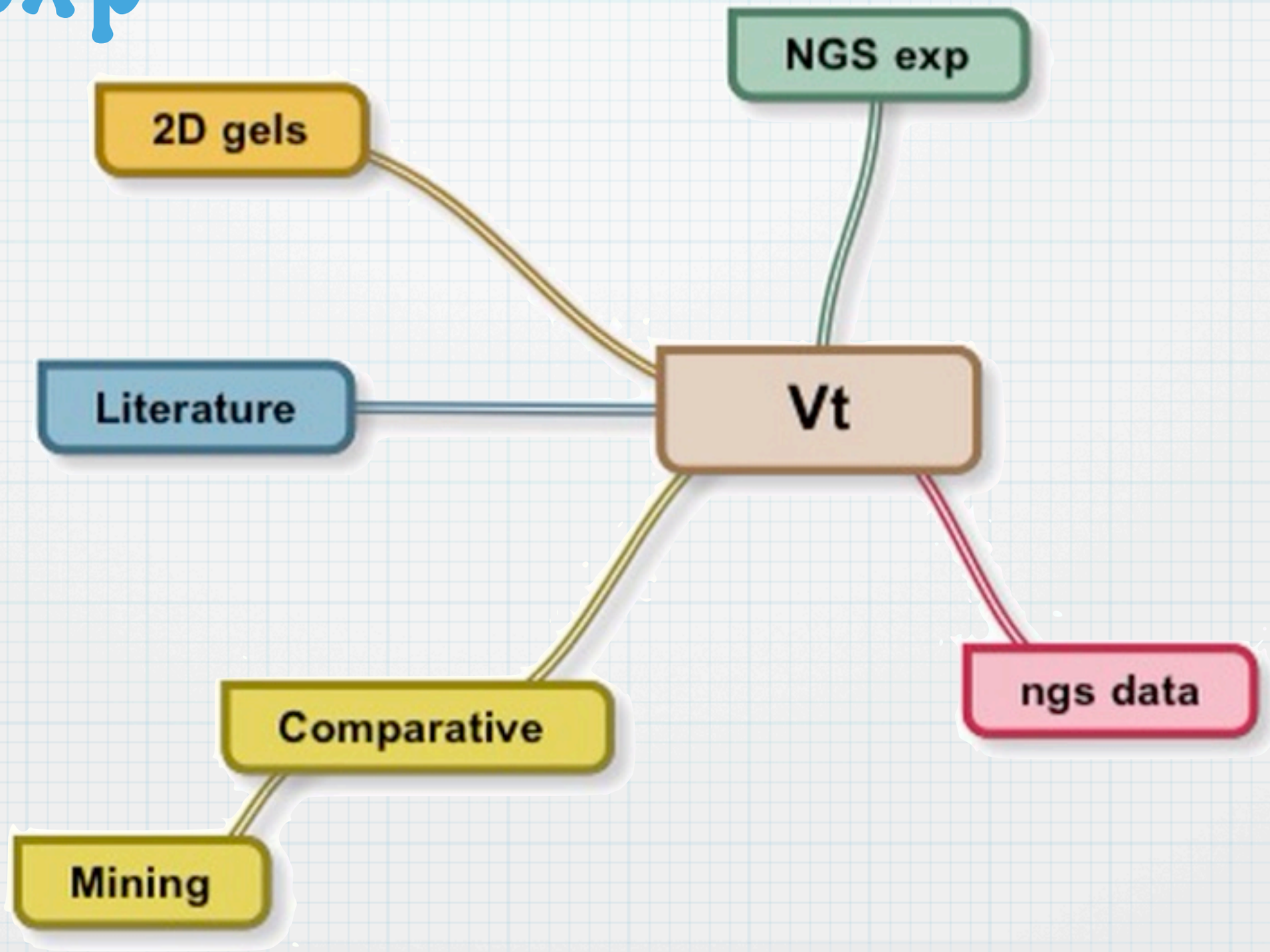
field snap

?

Oyster Gene Exp



Vt Phys / gene exp



Things to consider now..

* Starting collecting easy data at 3 sites
* Vt diagnostics
* Cg assays

Timeline

S O N D J F M A M J J A S O N D J F M A M J J A

Hatchery

Wild

Hatchery

Wild

Vt Diag

Draft Cv assay

Cv candidates