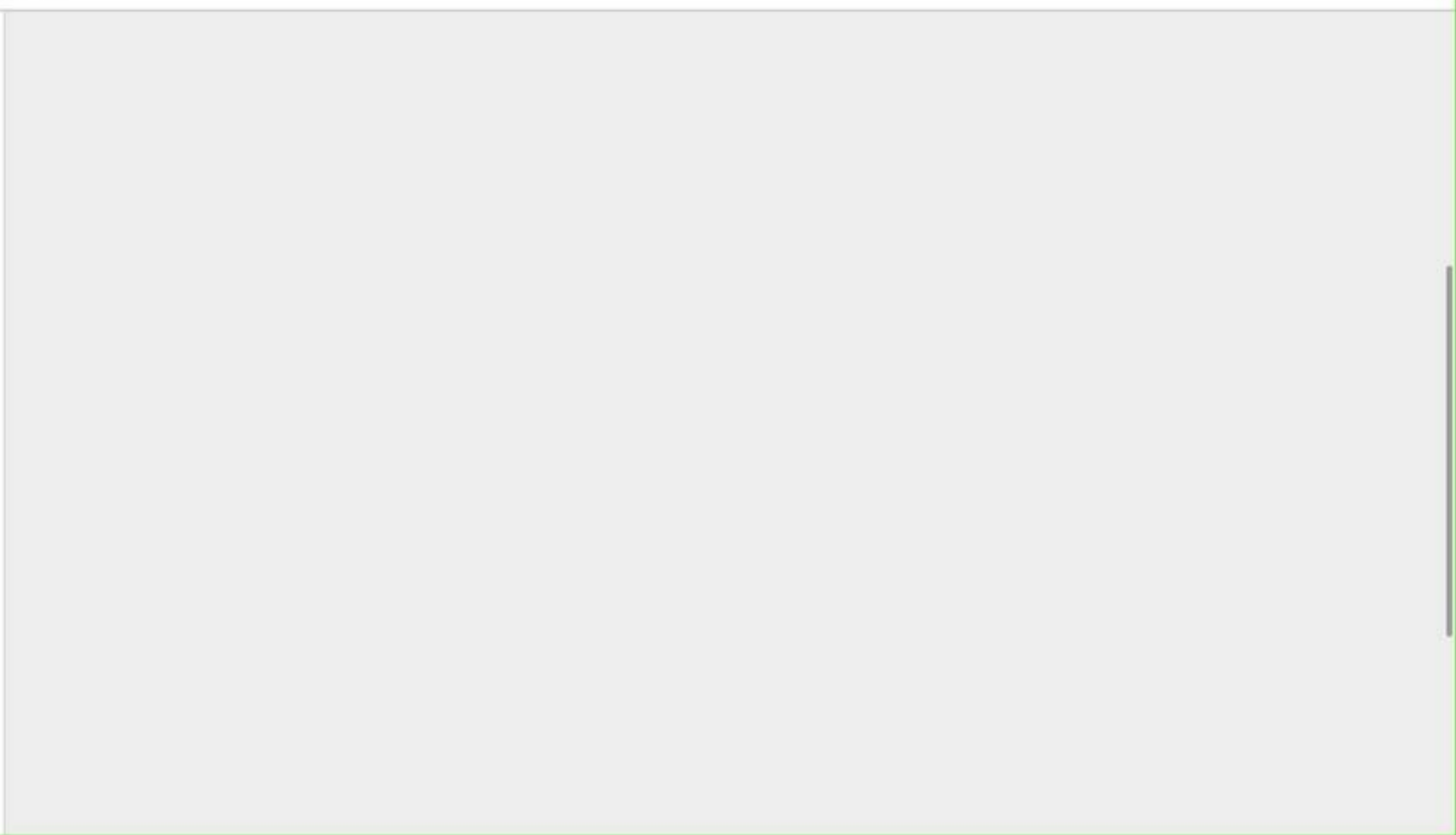


Filtered by Taxa Sub Category Sort

- side) of the shell is a mottled, dark...
- PHOTOS
- LAST MODIFIED 2/16/2022
- TAXA CATEGORY Invertebrates
- TAXA SUB CATEGORY Crustaceans
- AQUATIC V. TERRESTRIAL Marine and/or Estuarine Aquatic
- PATHWAYS OF CONCERN Aquaculture Maritime Transport &
- STATE REGULATING PROGRAM Marine Resources Program (ODFW)
- CAUSES DISEASE No
- HUMAN HEALTH IMPACTS
- ECONOMIC IMPACTS ✓
- ECOREGION SUITABILITY Marine & Estuarine
- ECOLOGICAL IMPACTS ✓
- STATEWIDE ESTABLISHMENT LEVEL Established - widespread
- SUITABLE HABITAT (NATURAL AND NON...) Bays Estuaries



Filtered by Taxa Sub Category Sort



Green crab, Carcinus maenas

SPECIES NAME

*Carcinus maenas*

ACTIVE ALERT

COMMON NAME(S)

Green crab

SPECIES DESCRIPTION

The Green Crab is a small shore crab. Adults measure about 3 inches across. The color of the dorsal (top side) of the shell is a mottled, dark...

PHOTOS



LAST MODIFIED

2/16/2022

TAXA CATEGORY

Invertebrates

TAXA SUB CATEGORY

Crustaceans

AQUATIC V. TERRESTRIAL

Filtered by Active Alert Sort ...

In this view, show records





Where Active Alert is  🔒 ||

+ Add condition + Add condition group



All records are filtered from this view

Filter Sort

			
<b>Water primroses, Ludwigi...</b>	<b>Flowering rush, Butomus ...</b>	<b>New Zealand mud snail, ...</b>	<b>Spongy moth, Lymantria ...</b>
<small>SPECIES NAME</small> <i>Ludwigia peploides, L. hexapetala</i>	<small>SPECIES NAME</small> <i>Butomus umbellatus</i>	<small>SPECIES NAME</small> <i>Potamopyrgus antipodarum</i>	<small>SPECIES NAME</small> <i>Lymantria dispar asiatica &amp; Lymantria dispar dispar</i>
<small>ACTIVE ALERT</small>	<small>ACTIVE ALERT</small>	<small>ACTIVE ALERT</small>	<small>ACTIVE ALERT</small>
<small>COMMON NAME(S)</small> Water primroses	<small>COMMON NAME(S)</small> Flowering rush	<small>COMMON NAME(S)</small> New Zealand mud snail	<small>COMMON NAME(S)</small> Spongy moth
<small>SPECIES DESCRIPTION</small>	<small>SPECIES DESCRIPTION</small>	<small>SPECIES DESCRIPTION</small>	<small>SPECIES DESCRIPTION</small>

Airtable [Download CSV](#) [View larger version](#)

[CLICK HERE TO VIEW THE FULL PUBLISHED DATABASE IN A TABLE FORMAT](#)

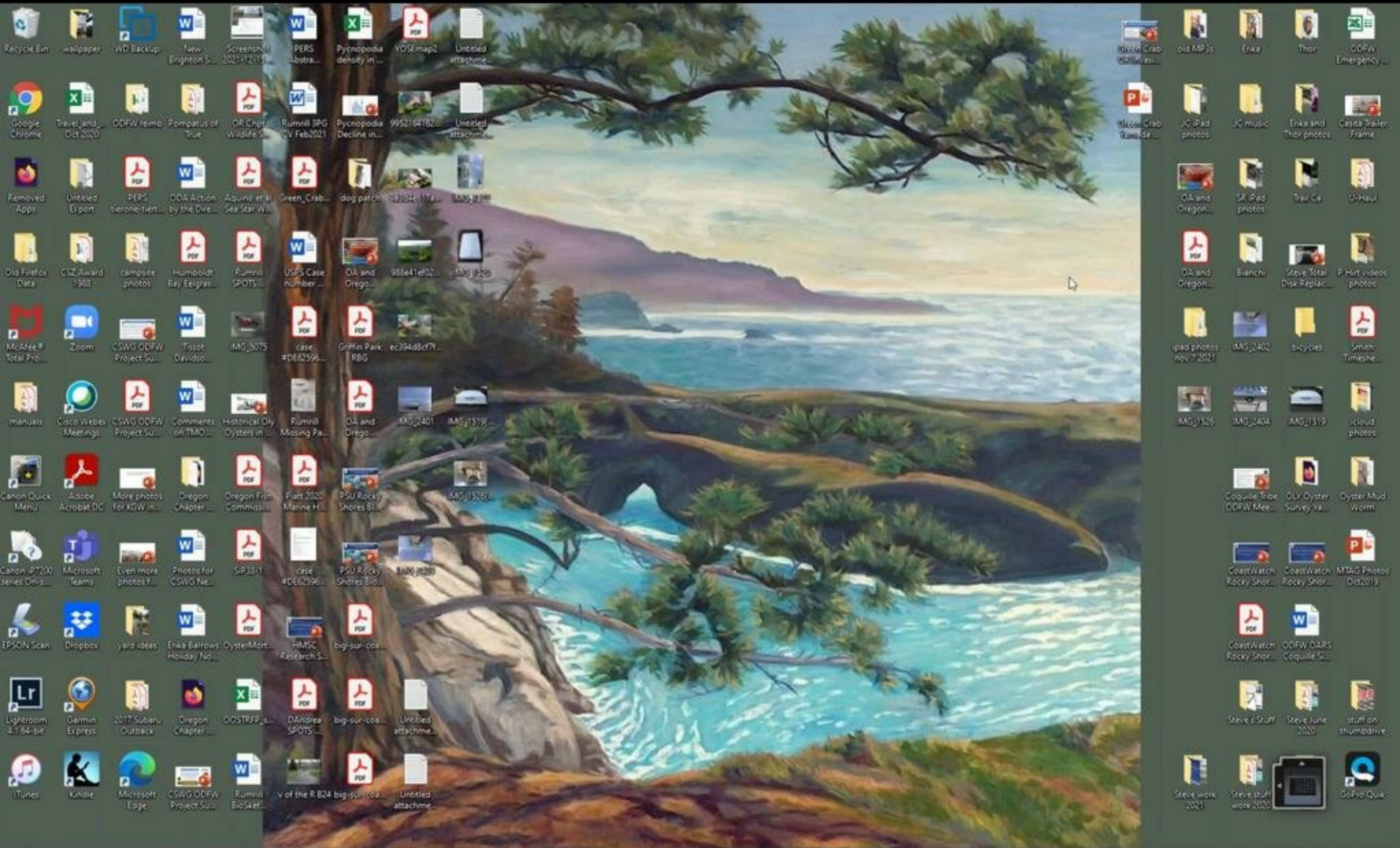
[CLICK HERE TO VIEW THE LIST OF SPECIES PROFILES CURRENTLY UNDER DEVELOPMENT](#)

[CONTACT THE OISC](#)

[CALENDAR](#)

[NEWS CHANNEL \(BLOG\)](#)







Marine  
Resources

# Management of European Green Crab in Oregon

**ODFW OAR 635-056-0070 / Controlled Species; 635-056-0075 / Controlled Fish**

## (3) Controlled Crustaceans

- (a) Green crabs (*Carcinus maenas*) may be harvested recreationally pursuant to OAR 635-039. Once harvested, it is unlawful to return green crab to state waters. It is unlawful to take green crab for commercial purposes.



**Note: recreational crabbers must keep all green crab, regardless of size or gender**



Marine  
Resources

## Recreational Fisheries

**Issue.** increase daily catch limit  
for European green crab

### **Analysis:**

- Existing ODFW rules allow take of 10 crab per person per day
- Public interest in increased catch
- Recreational take is likely insufficient to control growing population

### **Recommendation to OFWC:**

- Increase recreational daily catch limit to 35 crab per person per day



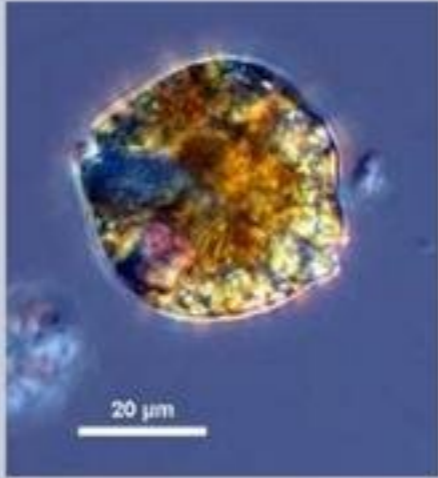
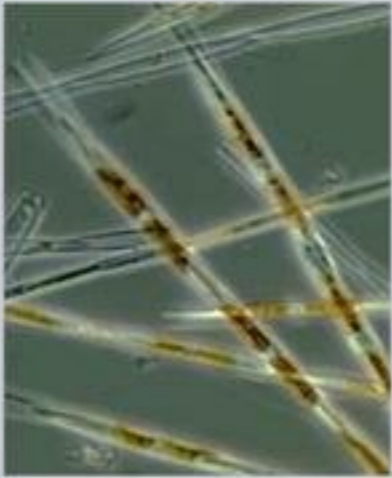

### **Notes:**

- Limit of 3 rings, lines, pots, traps, snares, etc. applies to all crab, including European green crab
- CA daily limit = 35



Marine Resources

# Harmful Algal Blooms and Oregon's Shellfish Fisheries

Biotoxin Type:	Paralytic Shellfish Poisoning (PSP)	Amnesic Shellfish Poisoning (ASP)	Diarrhetic Shellfish Poisoning (DSP)
Microscopic Phytoplankton:  <i>"Harmful Algal Bloom"</i>			
Caused by:	Dinoflagellate <i>Alexandrium</i> spp.	Diatom <i>Pseudo-nitzschia</i> spp.	Dinoflagellate <i>Dinophysis</i> spp.
Toxin Produced:	Saxitoxin (Neurotoxin)	Domoic Acid (Neurotoxin)	Okadaic Acid (Cytotoxin)
Alert Action Level:	≥ 80 µg/100g tissue	≥ 20 ppm in tissue	≥ 16 µg/100g tissue

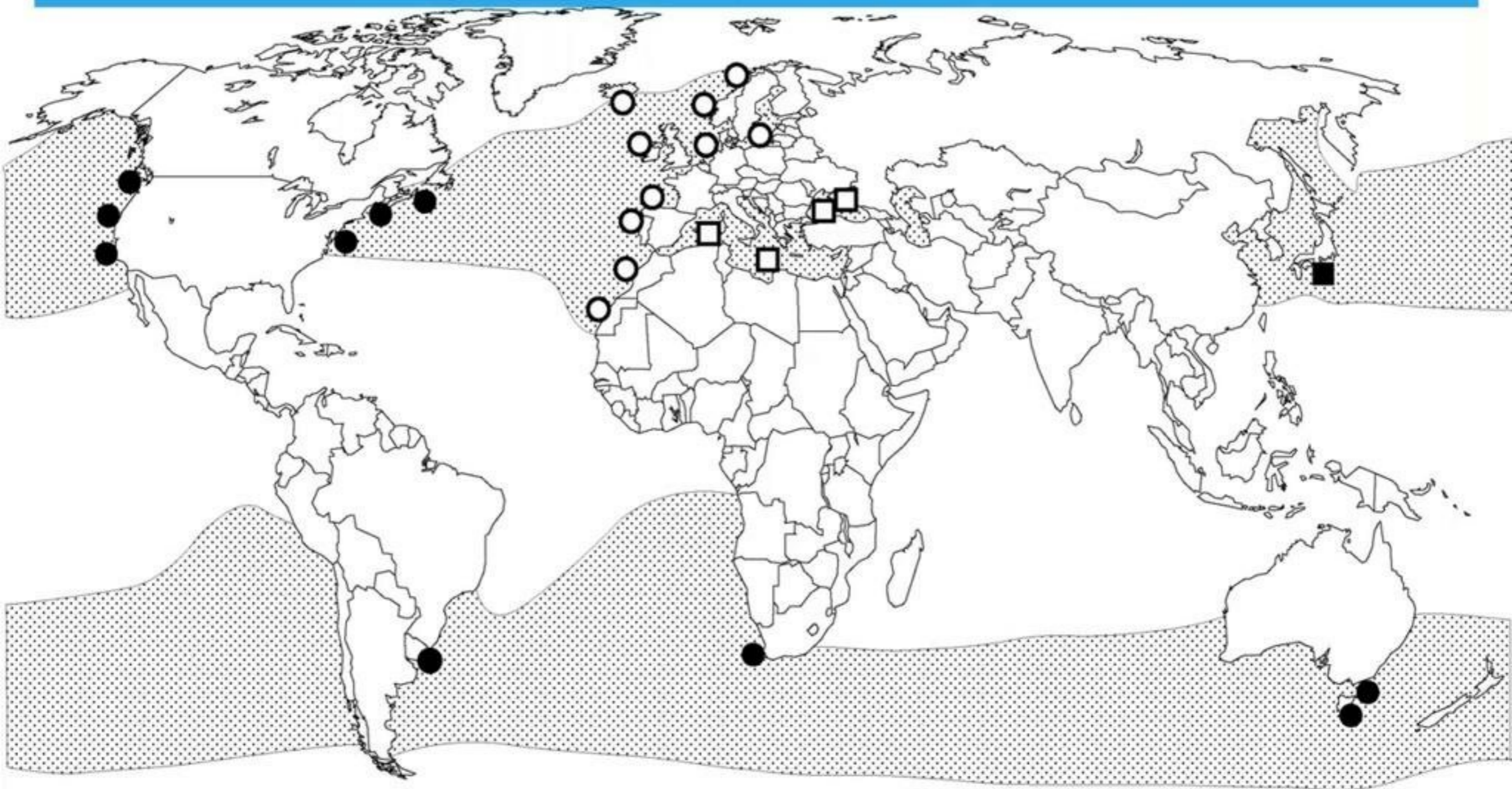


# European Green Crabs *are they here to stay?*



Sylvia Yamada, Integrative Biology, OSU  
Shon Schooler, South Slough NERR

# *Native range and global introductions*



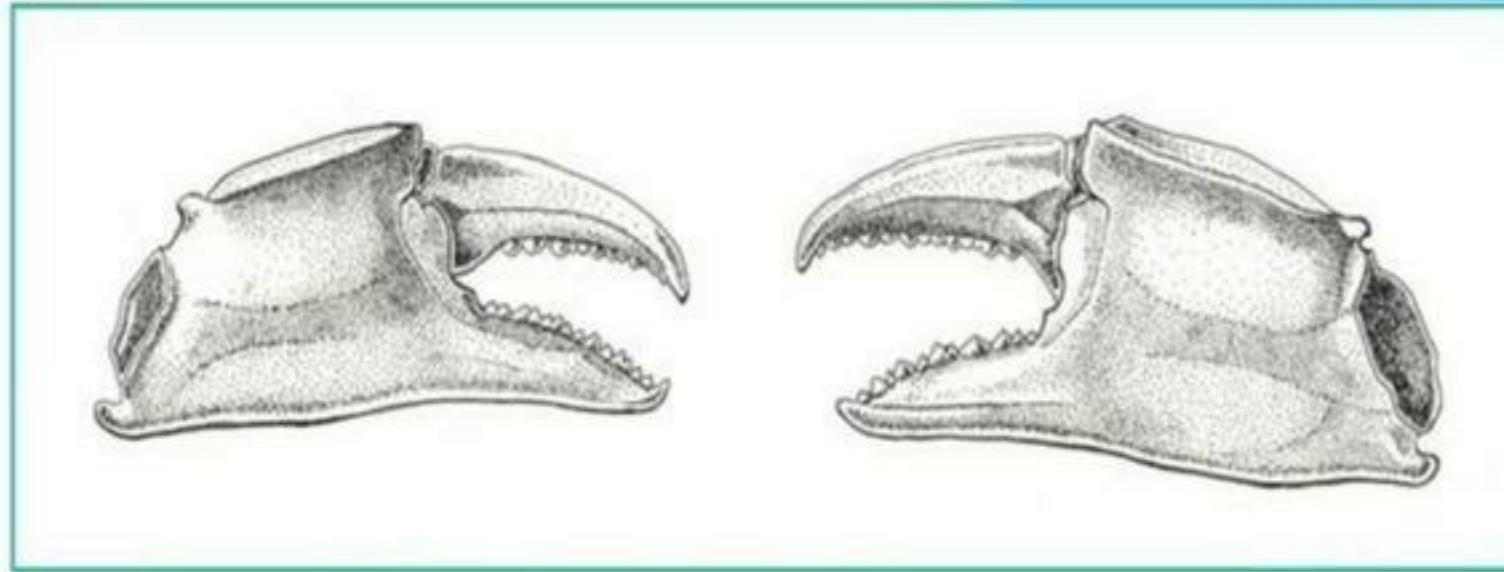
10° C and 18° C isotherms

# Break

Returning at 2:15 p.m.

# Why should we care?

## Predators and Ecological Engineers

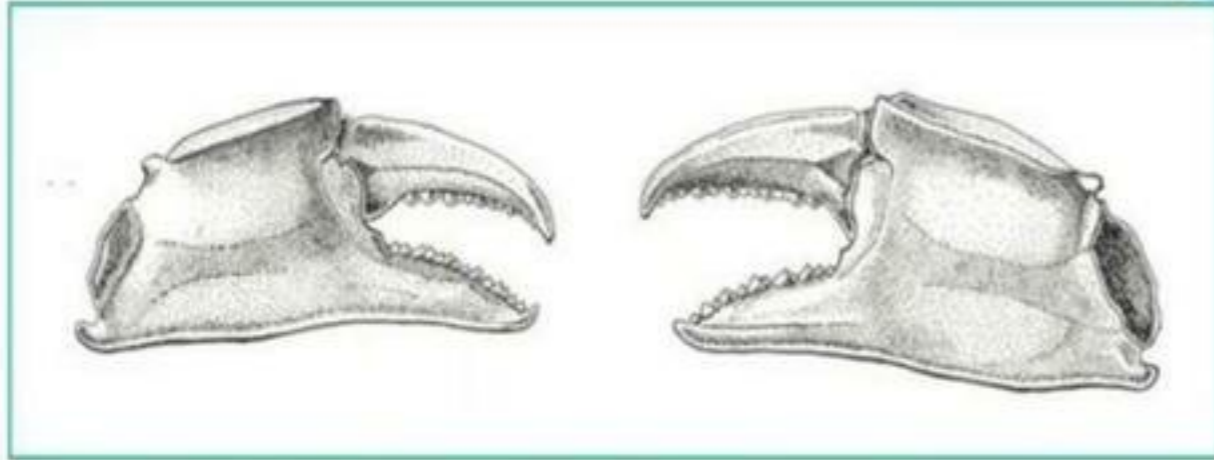


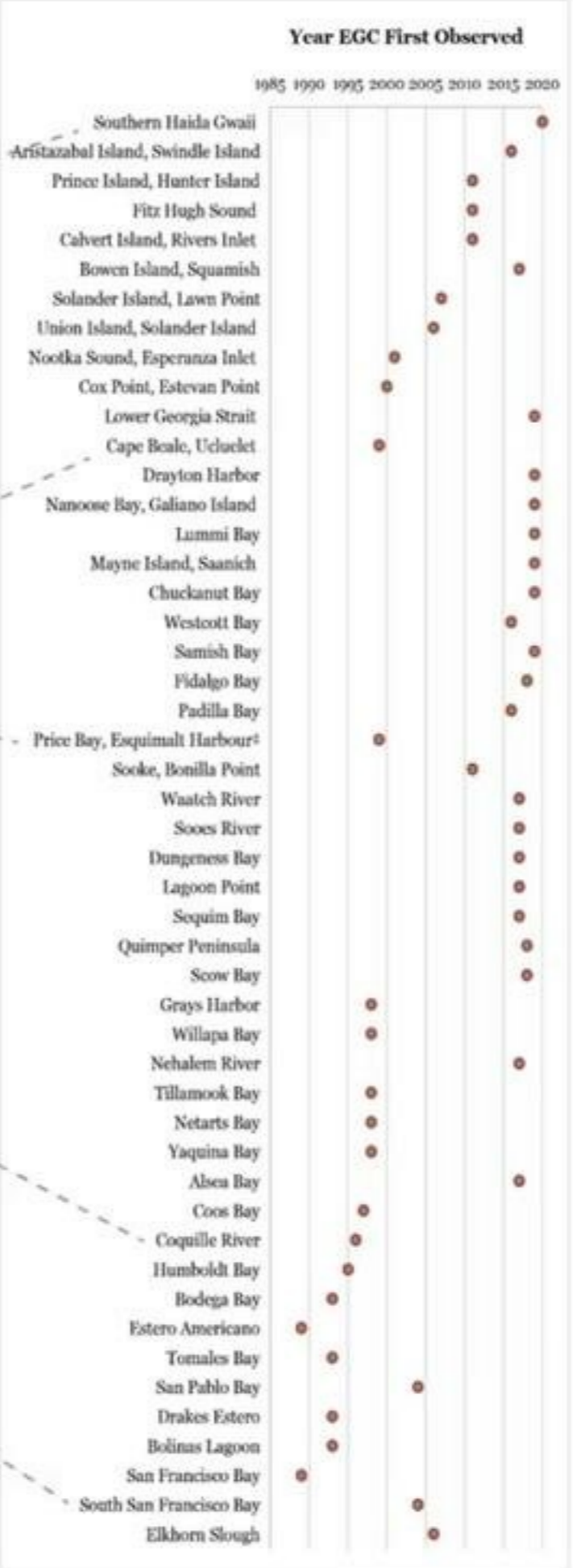
- \*cockles, mussels, urchins, worms
- \*soft-shelled clam decline in 1950's  
14 million lbs. → 2.3 million lbs.



# Why should we care?

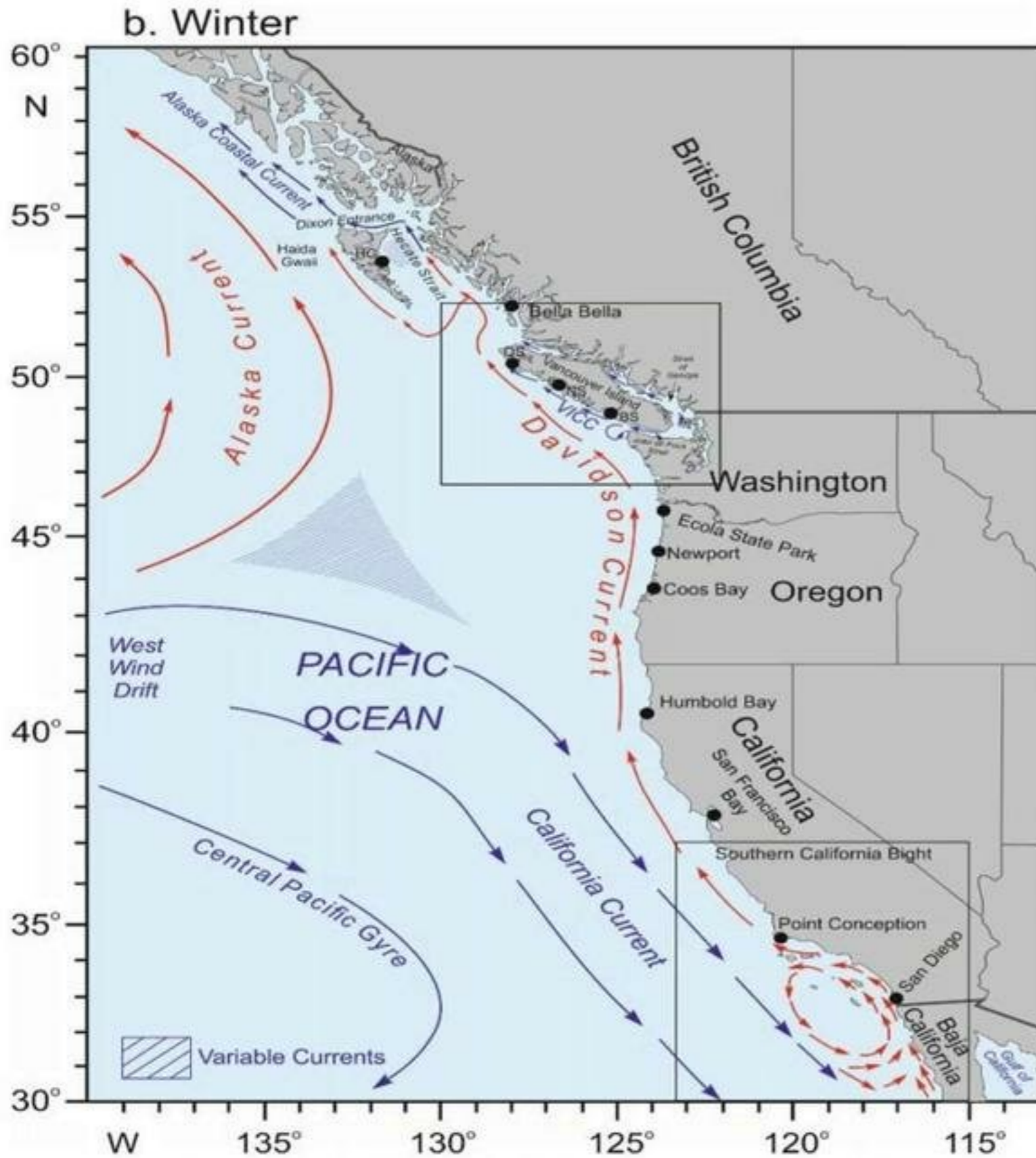
## Predators and Ecological Engineers





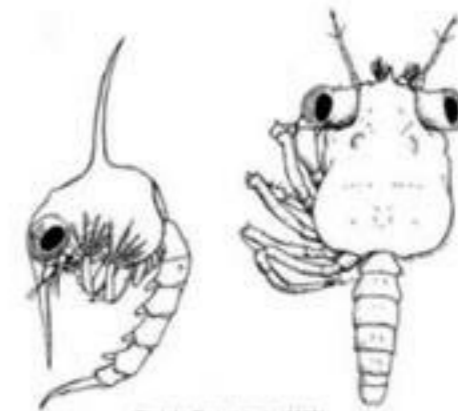
Kate Sherman





**Davidson Current**  
is like a giant  
conveyor belt

Larval recruitment  
from  
established populations in  
San Francisco Bay,  
California

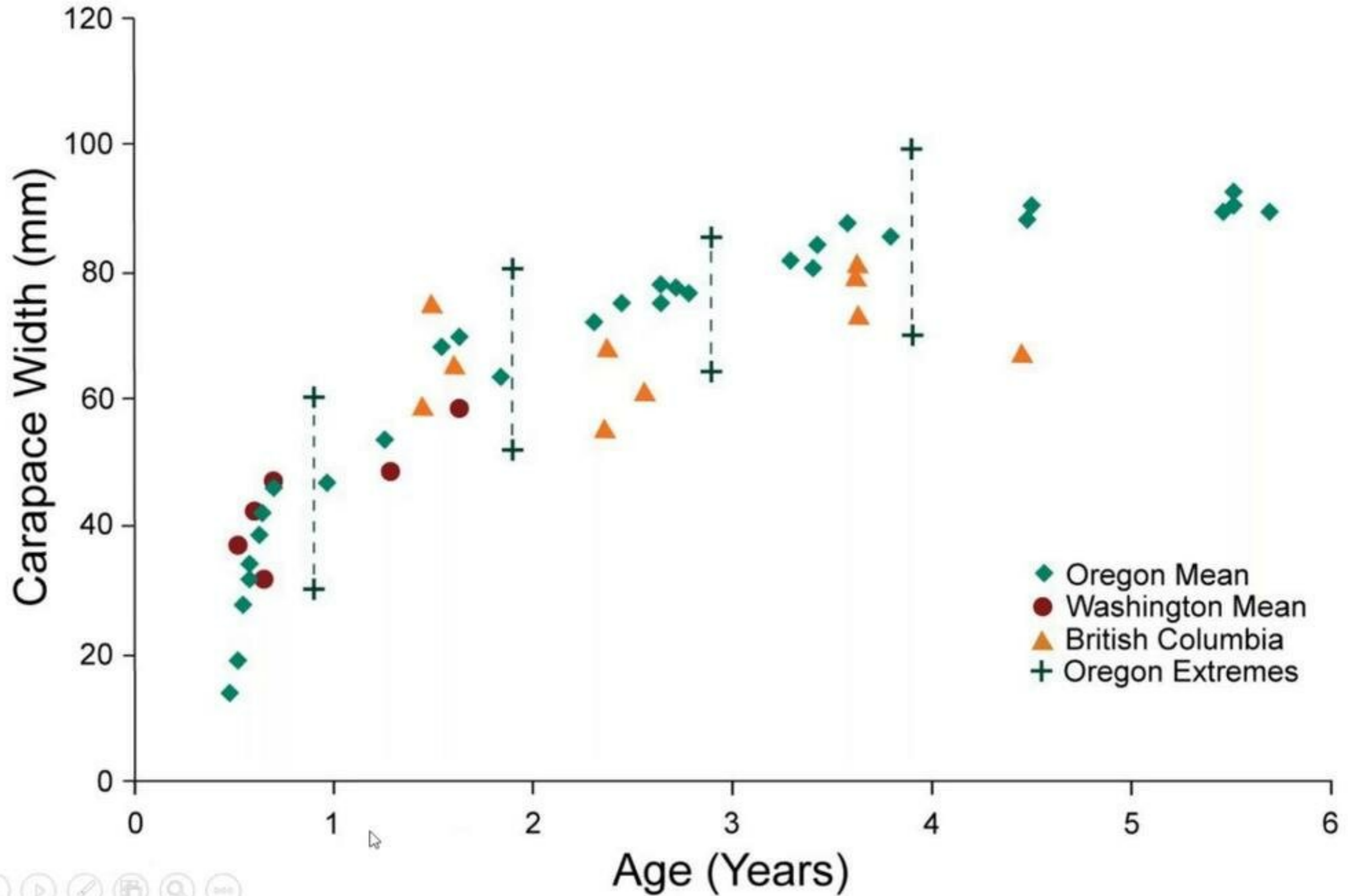


D'après Rice et Ingle (1978)

Larve zoé III

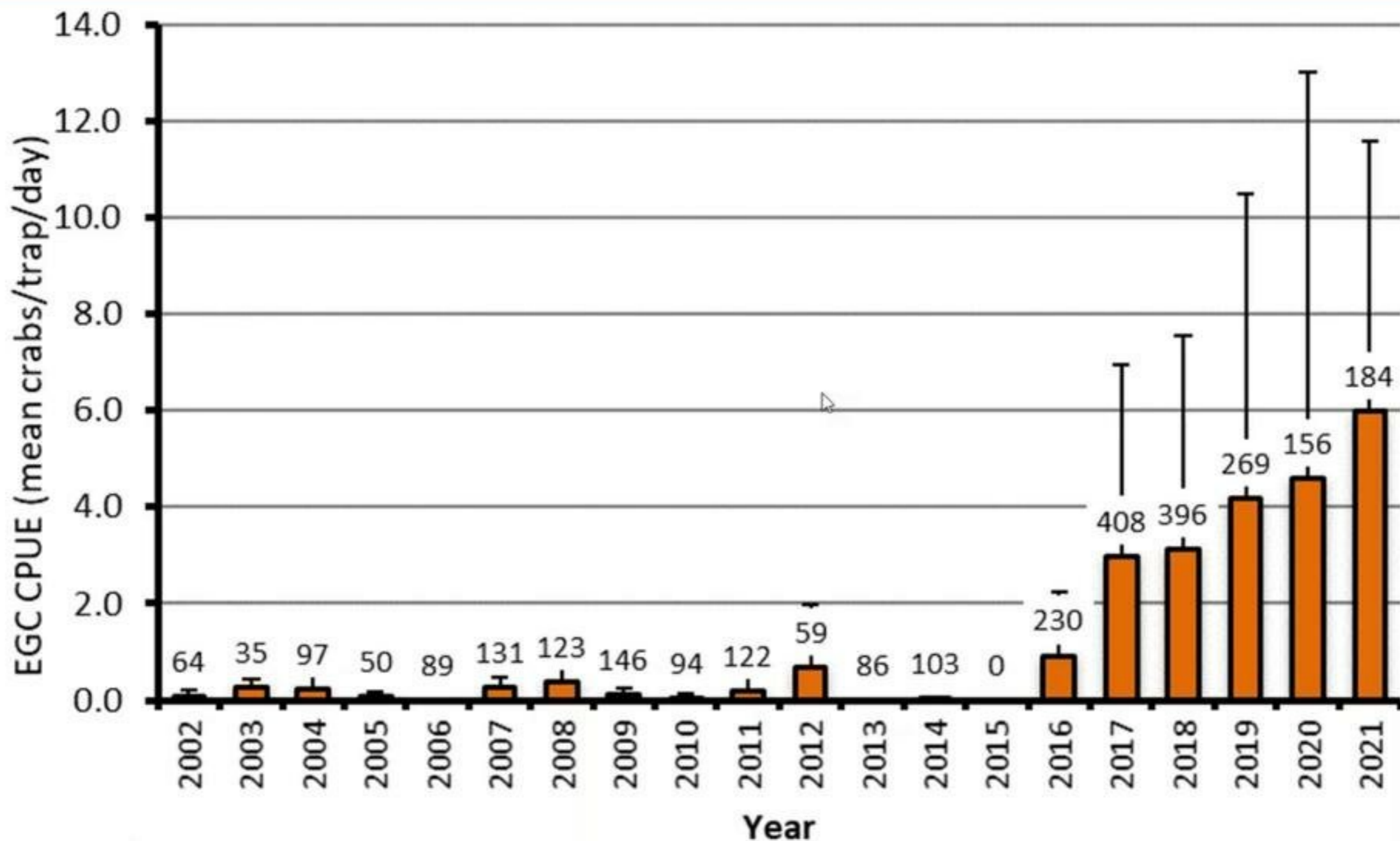
Larve mégalope  
(= post-larve)

# Growth of the 1998 Year Class of *Carcinus maenas*

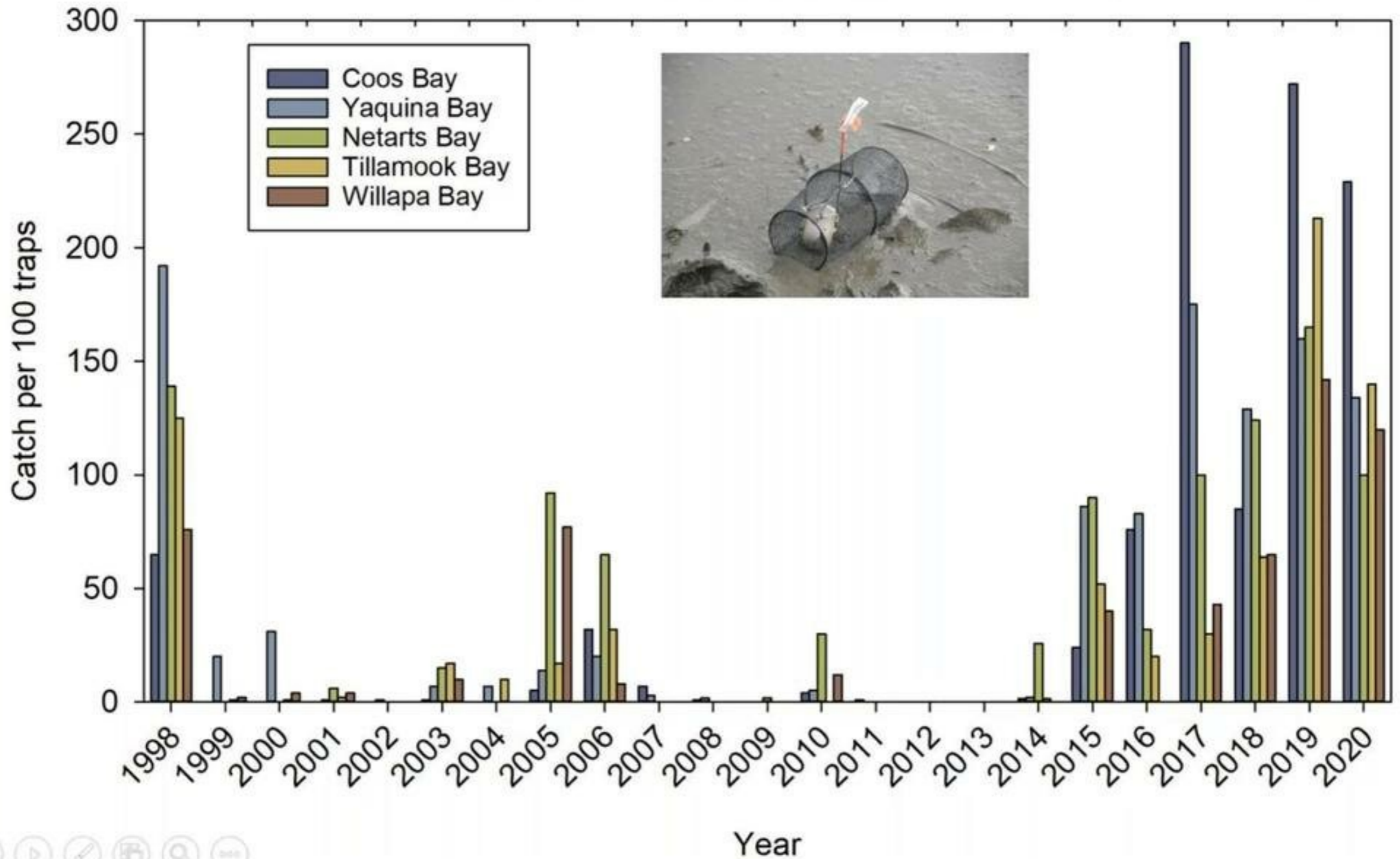




# Average catches of Adult Green Crabs in Coos Bay



# Recruitment of young Green Crabs



## **Multiple Larval Sources**

**North** – self-maintaining populations from BC and WA  
*Carolyn Tepolt, WHOI*

**Local** – “self-seeding” Oregon populations  
*Alan Shanks, OIMB*

**South** - self-maintaining populations from California



Makah

Willapa

Tillamook  
Netarts

Coos Bay

# Cooperative Management



## Main Action Areas

- Cooperative management
- Assessment & longer-term removal



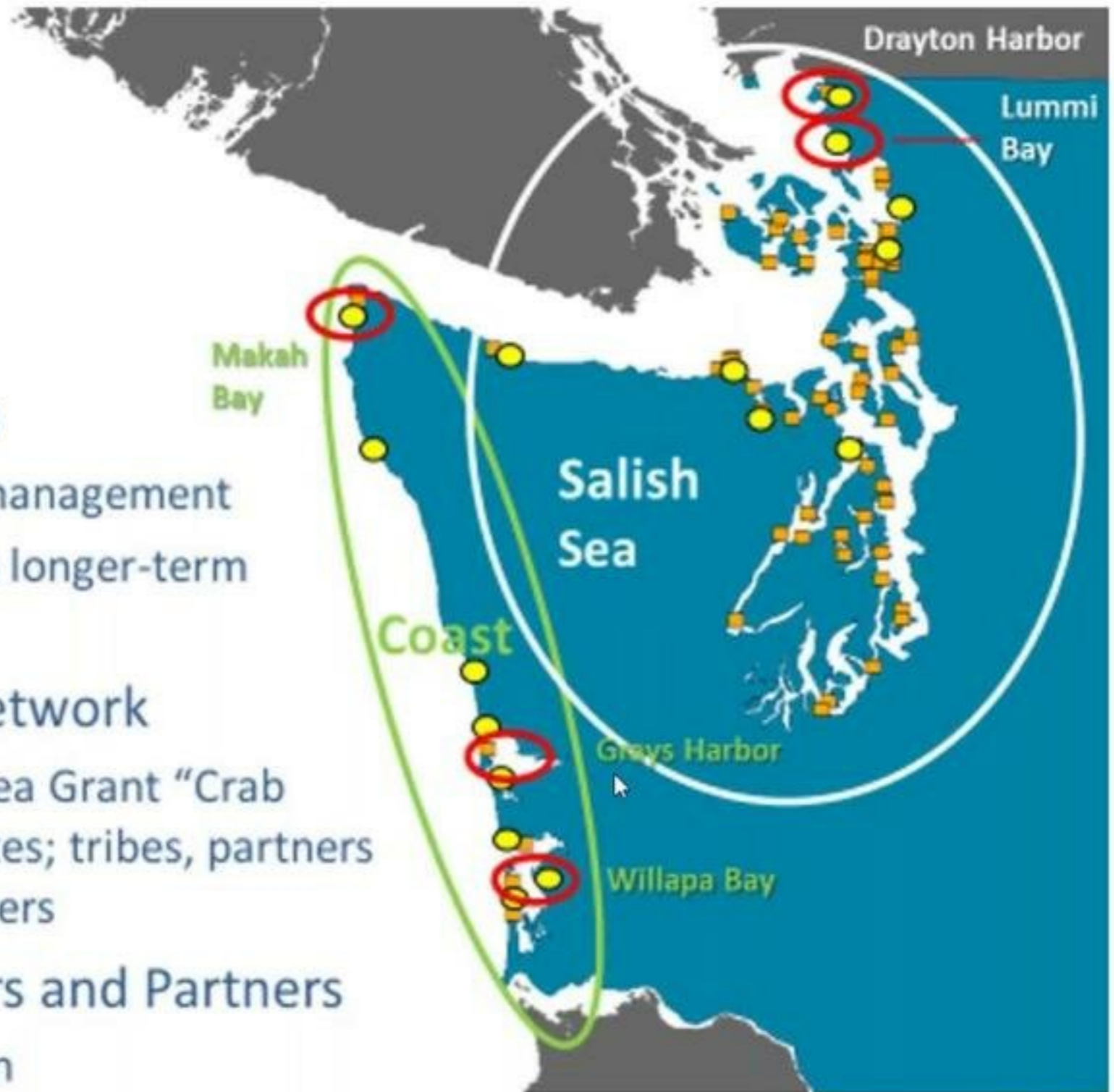
## Early Detection Network

- Washington Sea Grant "Crab Team" – 55 sites; tribes, partners & 160 volunteers

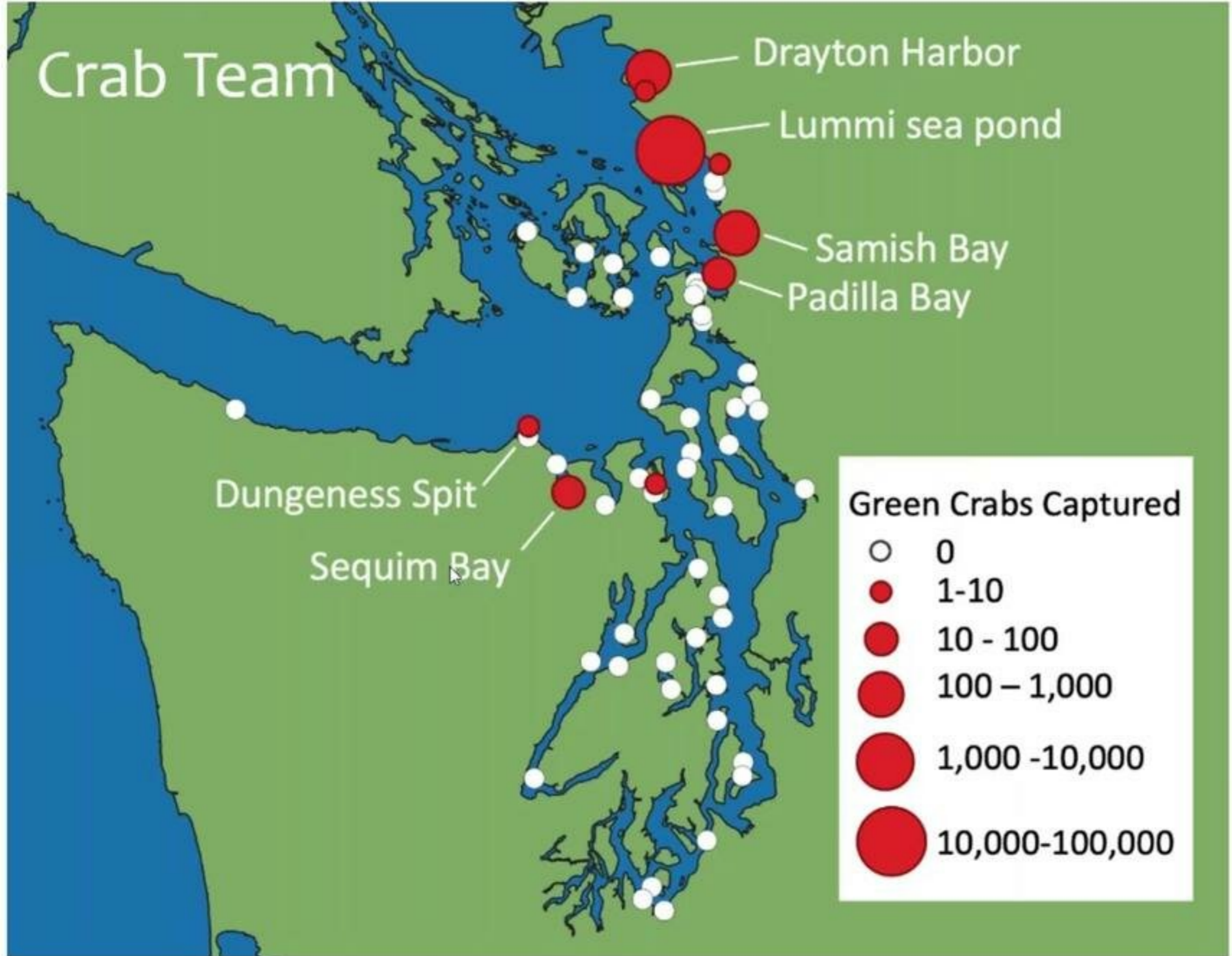


## Tribal Co-Managers and Partners

- Early detection
- Rapid response
- Removal trapping



# Crab Team



Drayton Harbor

Lummi sea pond

Samish Bay

Padilla Bay

Dungeness Spit

Sequim Bay

## Green Crabs Captured

- 0
- 1-10
- 10 - 100
- 100 - 1,000
- 1,000 - 10,000
- 10,000 - 100,000

# Success Stories



## drayton harbor

blaine, washington

48°58'59.36"N 122°47'3.07"W



## Dungeness Spit National Wildlife Refuge

> 11,000 traps set

from 0.05 → 0.01 crabs per/trap

## Drayton Harbor

from 0.08 → 0.03 per trap

# Trapping Success due to:

- Early detections
- Very small populations, < 0.10 crabs per trap
- Small sites, < 4 square miles
- Distribution restricted mainly to edges
- High effort 3-5K traps annually
- Relative low larval pressure from outside locations due to climate patterns or due to geographic location

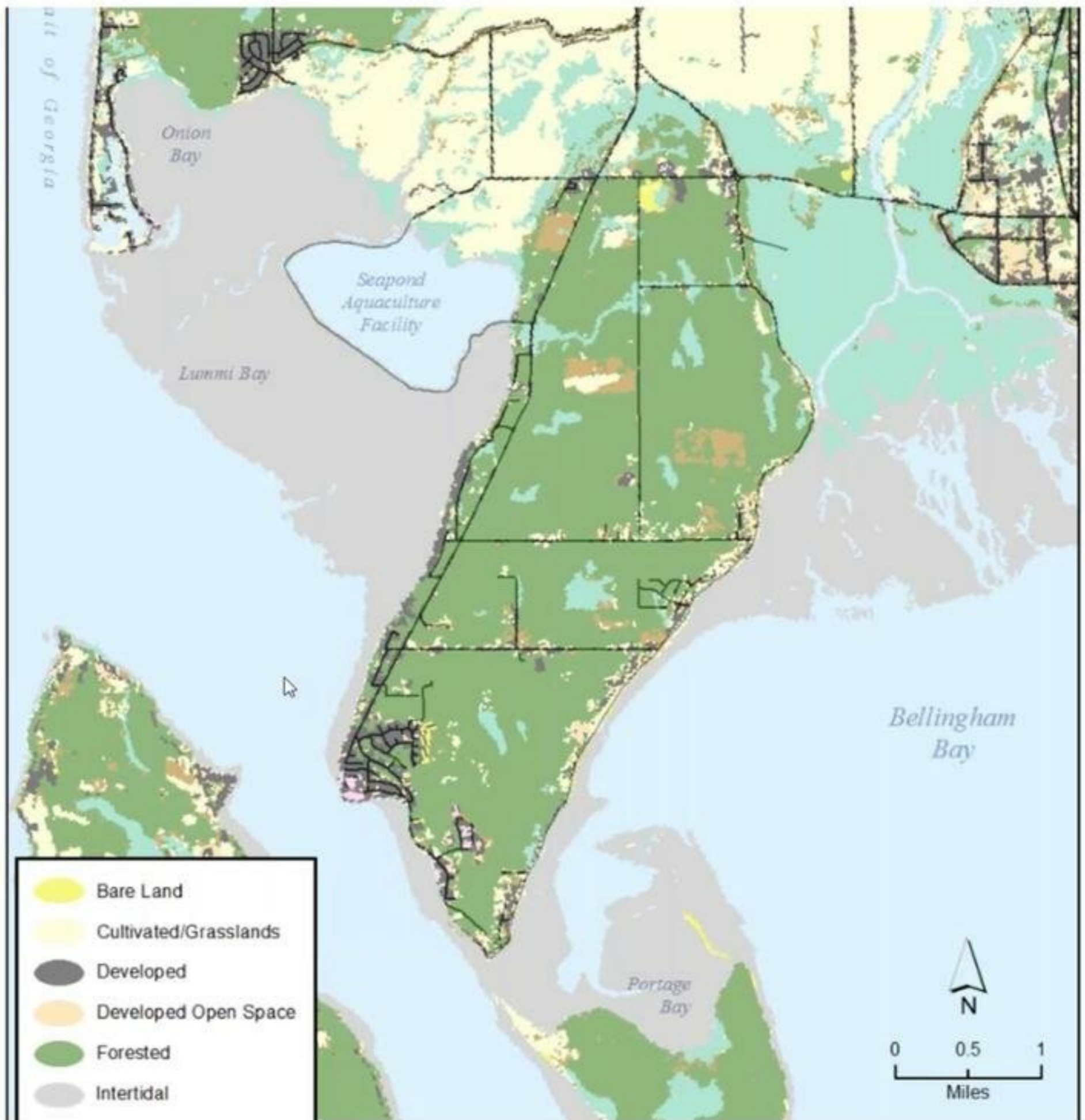
*Slide courtesy of Emily Grason, Washington Sea Grant*



# Lummi Nation Sea Pond

750 acres  
shellfish and salmon  
aquaculture pond

shallow  
warmer water  
EGC larvae are retained  
(incubator for EGC)





## 2021 Average CPUE (# crabs/trap/day)

Water Body	EGC Total	# Traps	CPUE
Dungeness Spit	12	947	0.01
Drayton Harbor	146	5,493	0.03
Lummi Sea Pond	86,028	16,591	4.16
Willapa Bay	10,335	2,460	3.44
Yaquina Bay	162	28	5.78
Coos Bay	1,164	184	6.33

# Maximum Abundance of the European green crab (for “ballpark” comparison only)

- \* Aveiro Lagoon, Portugal >100/trap/hour
- \* East Coast, North America ~500 /trap/day
- \* Tasmania, Australia ~300 /trap/day
- \* Bolinas Lagoon, CA ~200 /trap/day
- \* Pipestem Inlet, BC ~200 /trap/day
- \* Yaquina Bay, OR ~25 /trap/day
- \* Coos Bay, Or ~35 /trap/day

# Governor Jay Inslee's Emergency Proclamation

- \* Expansion of the EGC infestation poses imminent danger to Washington State's marine environment, marine-based economy, and the cultural well-being of both tribal and non-tribal residents.
- \* The costs of a delay counteracting the infestation are unacceptably high.
- \* I order WDFW to begin implementation of emergency measures as necessary to effect the eradication of or the prevent the permanent establishment and expansion of EGC. (**\$8.5 million**)

# Next Steps

*Slide courtesy of Allen Pleus, WDFW*

This is an ongoing emergency, rapidly evolving, and will require long-term management. We are still in early stages of this EGC invasion. Next steps include:

1. Short-term funding – state and federal funding requests in process
2. Setting up statewide and transboundary management structure
3. Implementing collaborative management actions to reduce EGC populations to below sustainable or impact levels
4. Long-term federal funding – TBD for Pacific States and Tribes
5. Long-term - Transition to greater local management



## Recreational Fisheries

Issue. increase daily catch limit for European green crab



Top 100 World's  
Worst Invasive  
Species

### European green crab (*Carcinus maenas*)

- Mid-sized (3-4" adult) shore crab inhabit mid-region of estuaries
- Variable coloration (green, brown, yellow, red, blue)
- High likelihood for mis-identification with native crab
- Predators that consume bivalves, oysters, worms, other crab



Marine Resources

## Harmful Algal Blooms and Oregon's Shellfish Fisheries

### Importance of HABS to Human Consumption of Shellfish:



**Cooking does not destroy marine biotoxins!**

**ODFW / Shellfish: Monitoring of HABS in surf-zone marine waters**

**ODA / Food Safety: Routine testing for Domoic acid in shellfish tissues:**

- ✓ Dungeness crab (ocean)
- ✓ Razor clams (beaches)
- ✓ Mussels (rocky shores)

**No routine DA testing for bays / estuaries:**

- |                 |               |
|-----------------|---------------|
| Dungeness crab  | Red rock crab |
| Green crab      | Bay clams     |
| Softshell clams |               |





Marine  
Resources

# Regional Management in the Pacific Northwest

Grosholz & Ruiz, 2002. Management Plan for the European Green Crab (US Aquatic Nuisance Species Task Force)

- evaluate the feasibility of management options for prevention, eradication, and control (2003-2015)
- coordinate the activities of scientists and agencies, and develop a plan for information sharing and data management
- phased implementation plan with timetables and costs for priority tasks, and entities responsible for implementation



➤ **Effective plan for early phase of EGC spread / update is urgently needed**

*European Green Crab Work Group / April 2022*

# Regional Management in the Pacific Northwest

U.S. Environmental Protection Agency, 2008. Ecological and Economic Impacts and Invasion Management Strategies for the European Green Crab

Ecology and Dispersal	Overview of Ecological Impacts
Modeling Economic Impacts to Commercial Shellfish	Economic Impacts to Recreational Shellfish
Damages to Eelgrass	Invasion Management and Control Strategies

Conclusions: total losses estimated at \$19 - \$23M per year due to damage to commercial and recreational shellfish and eelgrass



Prevention & Containment

Detection & Forecasting

Eradication, Control, & Mitigation





# Management of European Green Crab in Oregon

## Management Actions for OR:

- Risk Assessment
- Prevention and Containment
- Monitoring, Detection and Forecasting
- Eradication and Control
- Mitigation of Impacts
- Awareness, Education and Outreach
- Scientific Research

## Strategies for Eradication, Control and Mitigation:

- Population small with no local recruitment / Eradiation
- Population established with local recruitment / Control and Containment (selective harvest, biological, chemical, genetic control)
- Population well established / Mitigation of Impacts

**Urgent: Risk Assessment required for 2022-2035**



Marine  
Resources

# Management of European Green Crab in Oregon

## Recommendation:

### *Risk Assessment for European Green Crab in Oregon Waters*

- History, threats, and ecological impacts
- Risk assessment for Oregon
- Monitoring and observations
- Control actions
- Research and evaluation
- Regional coordination and management



**Urgent: Risk Assessment required for new phase of European green crab invasion (2022-2035)**

## Questions and Discussion:

