Comparing fish and crab use of the aquaculture/eelgrass (*Zostera marina*) boundary for two different methods of Pacific oyster (*Crassostrea gigas*) aquaculture

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What you need to know

- Commercial shellfish harvest has occurred in Willapa Bay since the 1850s – 23% of tidelands currently cultured
- Eelgrass was recently designated as “essential fish habitat”, legislating conservation and protection
- Spatial overlap between eelgrass and aquaculture about is 35% in Willapa Bay
- Important to understand how aquaculture functions within the estuarine habitat matrix
- Trend towards longline aquaculture and away from traditional on-bottom techniques begs the question about differences

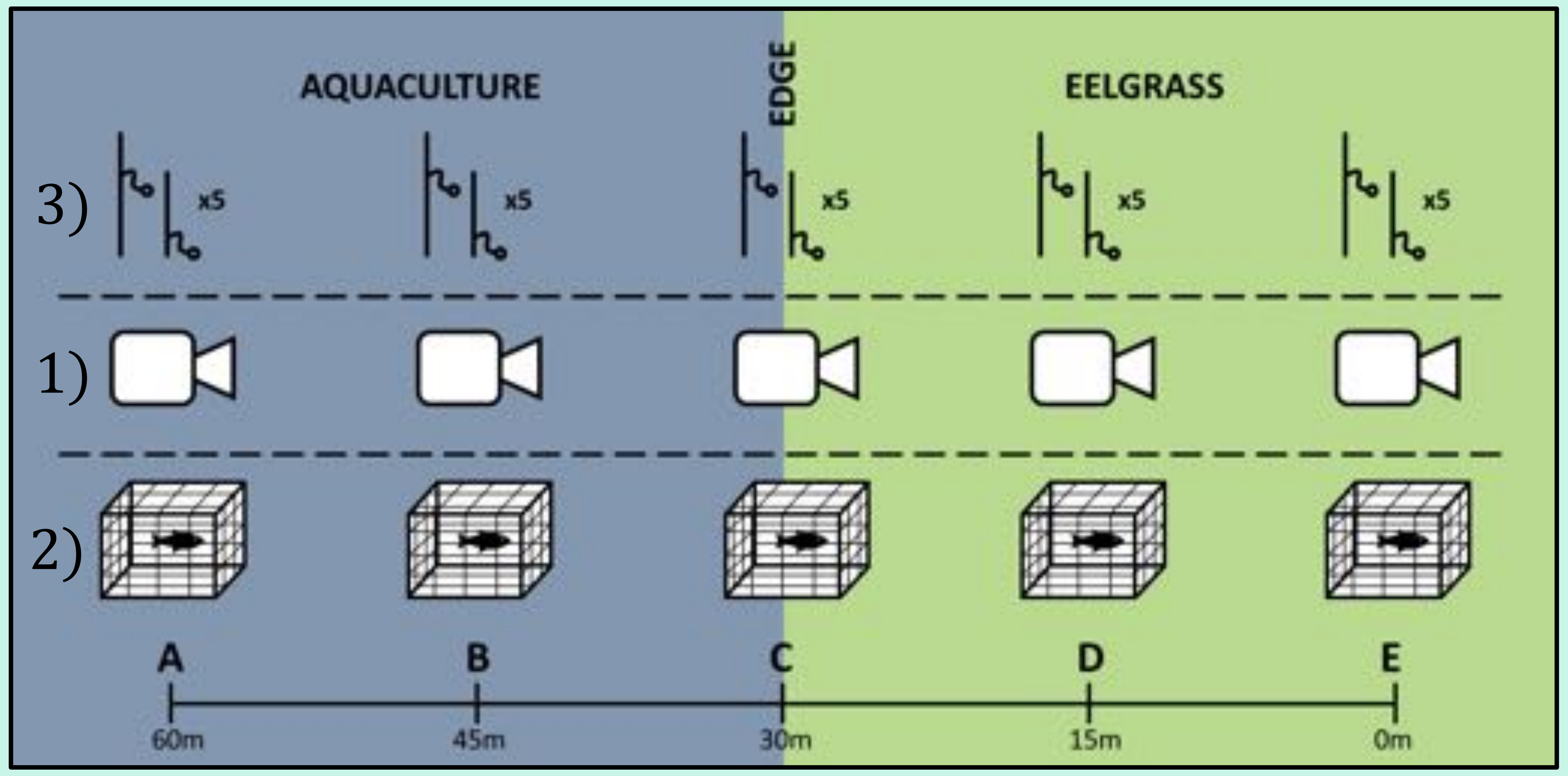

Figure 1. Diagram of sampling array along a 60m transect from eelgrass into aquaculture.

Sampling Techniques

- Three sites within Willapa Bay, WA
- Five main points along the 60m transect: A (aquaculture) through E (eelgrass)
- Methods: the more the merrier
  1) Underwater digital video (currently being analyzed)
  2) Minnow traps
  3) Predation tethering units (PTUs)
  4) Eelgrass samples for epiphyte load
  5) Eelgrass structural metrics (every 3m)

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Questions

1. Is there a distinct difference between habitat use in the interior versus at the edge for the two habitats?
   - Can we detect any edge effects?
2. Are the strength or presence of the edge effects different between on-bottom and longline aquaculture?

Potential Results

- Scenario 1:
  - Relatively small dataset may not represent the complete ecological picture
  - Fish and crabs use aquaculture and eelgrass habitats similarly, regardless of aquaculture type
- Scenario 2:
  - Fish and crabs recognize habitat differences between eelgrass and aquaculture but aquaculture type does not impact presence/behavior
- Scenario 3:
  - Fish and crab presence/behavior is altered by the edge between habitats and that effect depends on aquaculture type
  - Edge effects could be species dependent

	Scenario 1	Scenario 2	Scenario 3
Question 1)	✗	✓	✓
Question 2)	✗	✗	✓

Figure 2. Table of possible results based on hypothesis questions.

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Preliminary clues from the data

- Less habitat structure provided in on-bottom aquaculture as compared to longlines
- More of a difference in eelgrass shoot density between A and E in on-bottom than in longlines (sharper edge)
- These and other factors could lead to a difference in edge effects

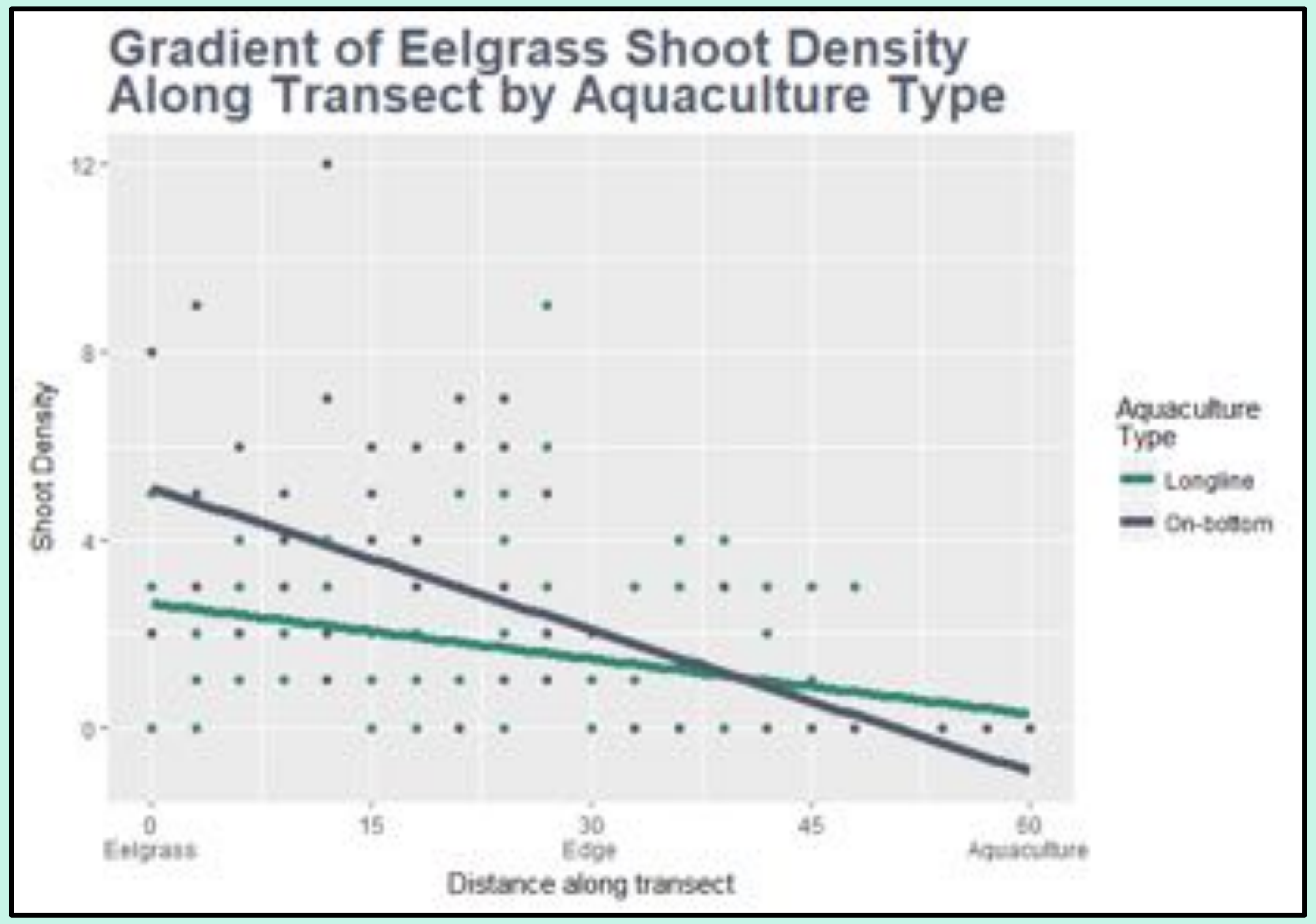

Figure 3. Graph of eelgrass shoot density along the sampling transect for both aquaculture types

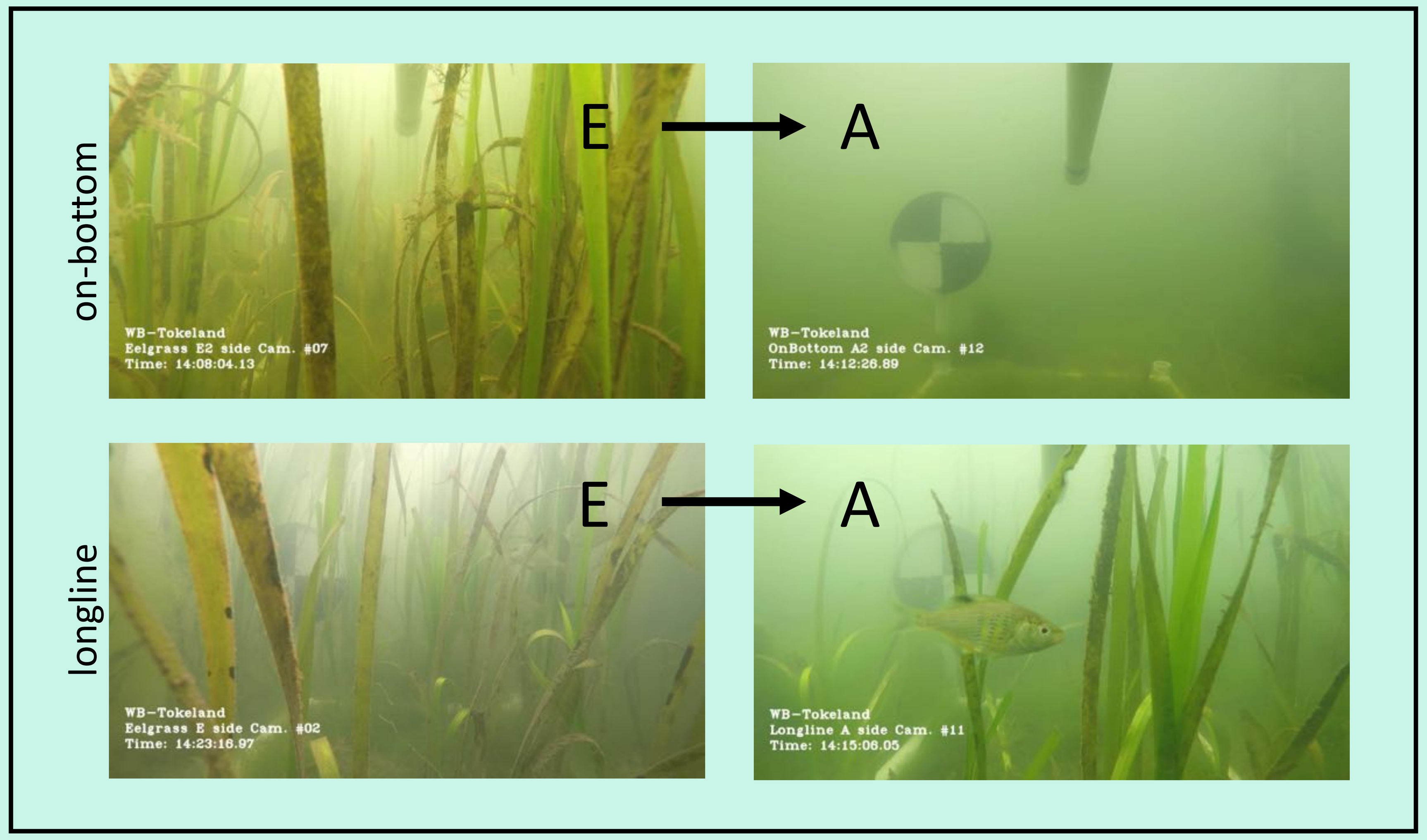

Figure 4. Examples of images contrasting quality between eelgrass and aquaculture cameras.

References

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