

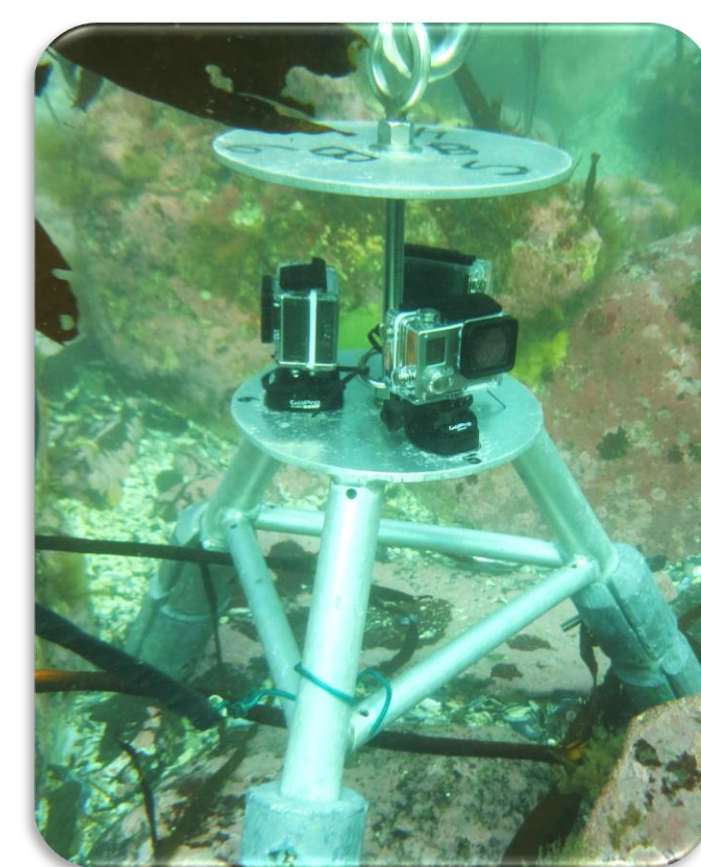


THE LIVING BENTHOS: A New Method for Quantifying Living Structure from Underwater Video

Kelly Lawrence, Jessica Watson, Brittany Huntington – Oregon Department of Fish and Wildlife, Marine Reserves Program

What is the Living Benthos?

The living benthos refers to sessile organisms that live on the seafloor. Together with geologic substrate, the living benthos creates structure and complexity, providing essential habitat for fish and invertebrates. This project sought to quantify this biogenic habitat from underwater video data.



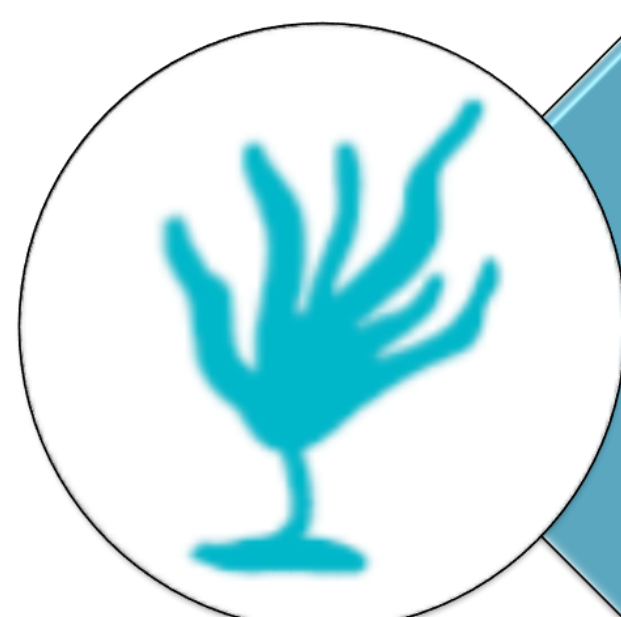
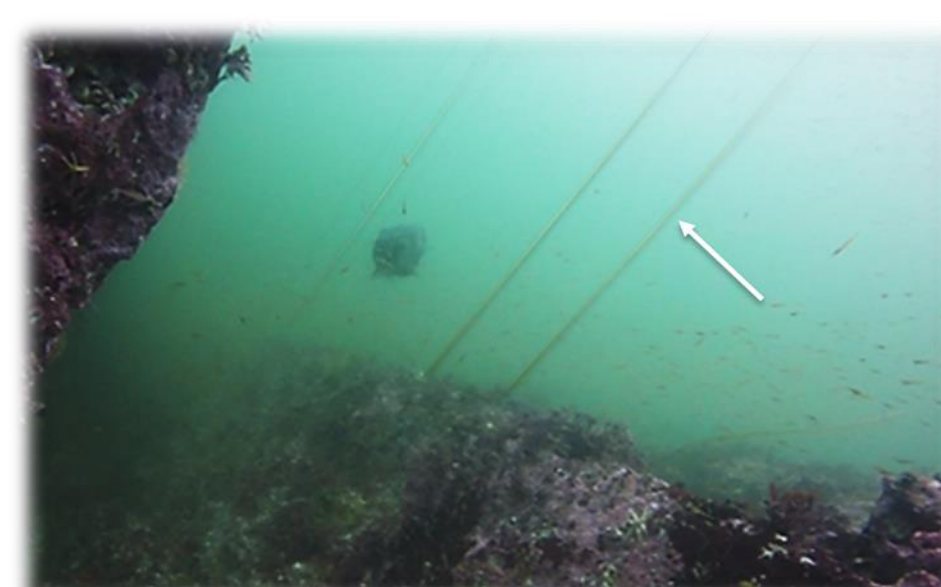
Developing a New Protocol

Group biogenic habitat into 5 habitat classes



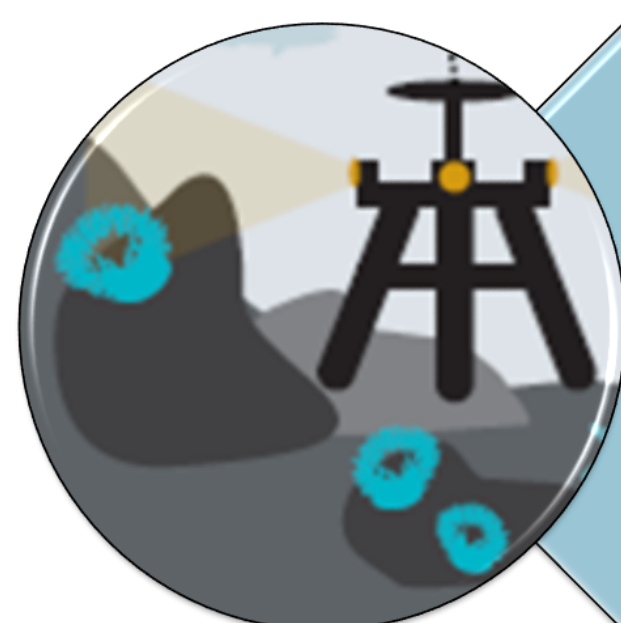
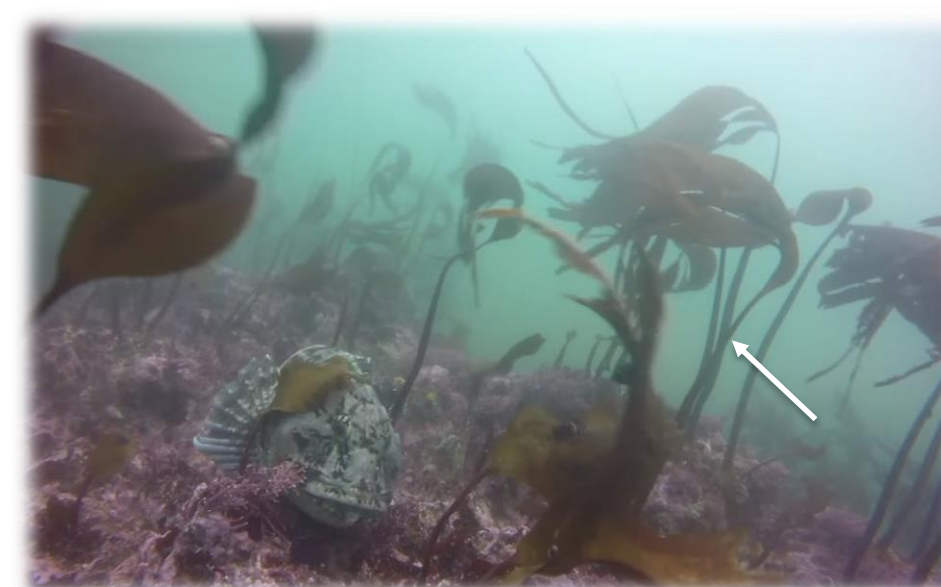
Canopy

Canopy-forming; typically only stipes and holdfasts in view



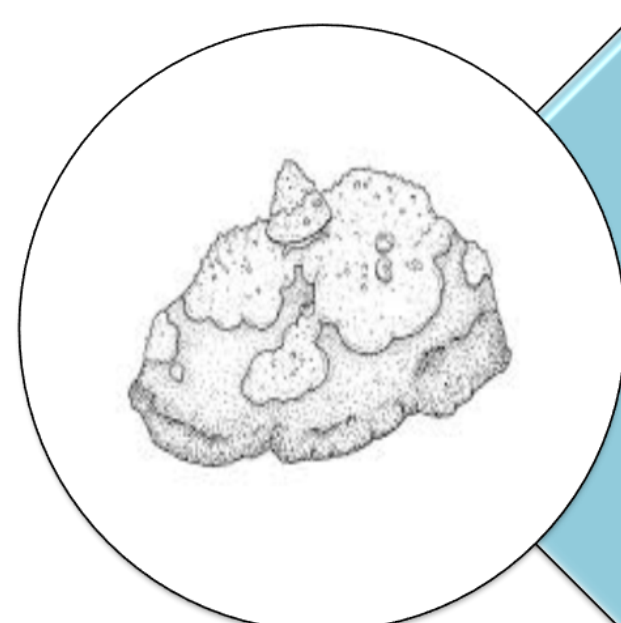
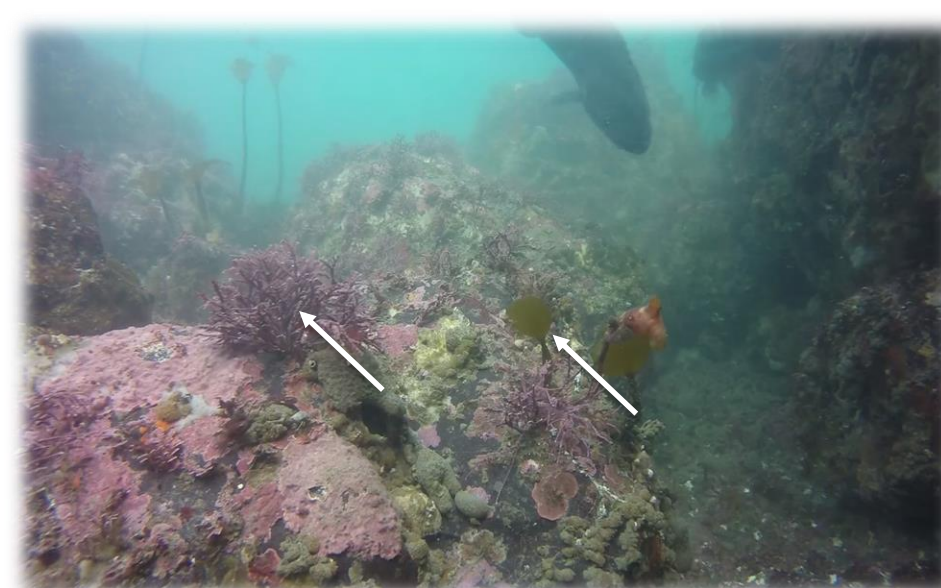
Midstory

Structure >25cm in height; typically kelps; blades in view



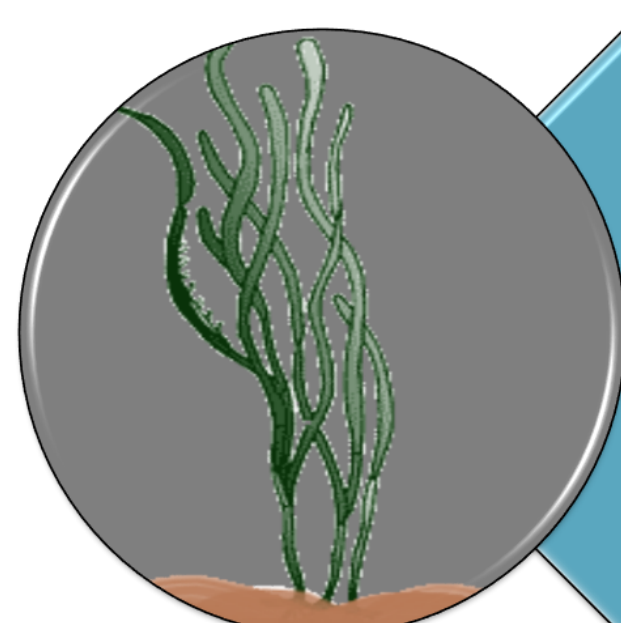
Understory

5-25cm in height; small kelps and sessile inverts (Metridium, tunicates)



Turf/Crust

<5cm in height; encrusting inverts (coralline algae, sponges)



Seagrass

Flowering plants in the order Alismatales



Score % cover of each class into one of 6 index scores

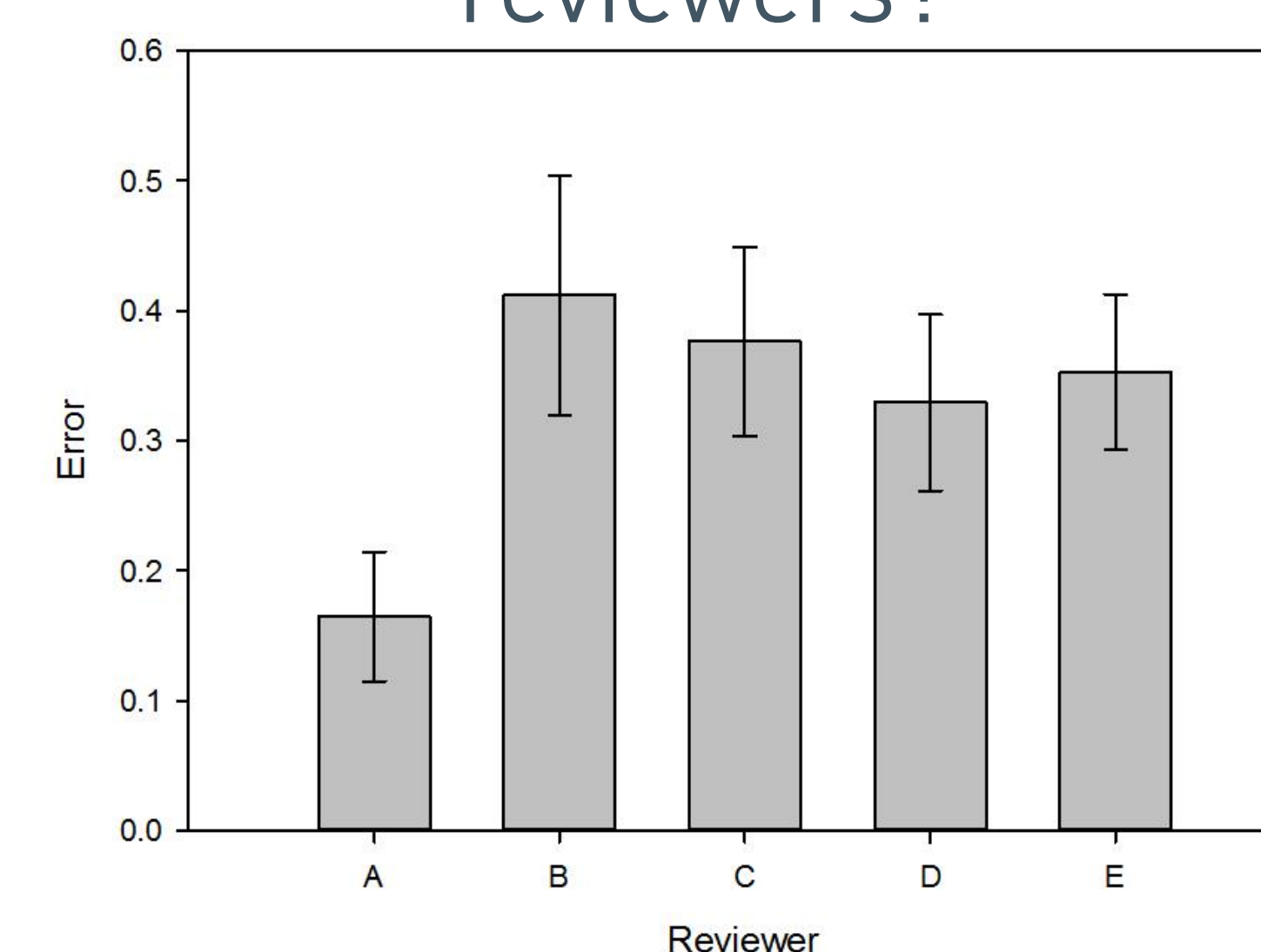
Score	Definition
0	None
1	< 5% of cover
2	5 – 25 %
3	26 – 50 %
4	51 – 75 %
5	76 – 100 %

Why not ID to species?

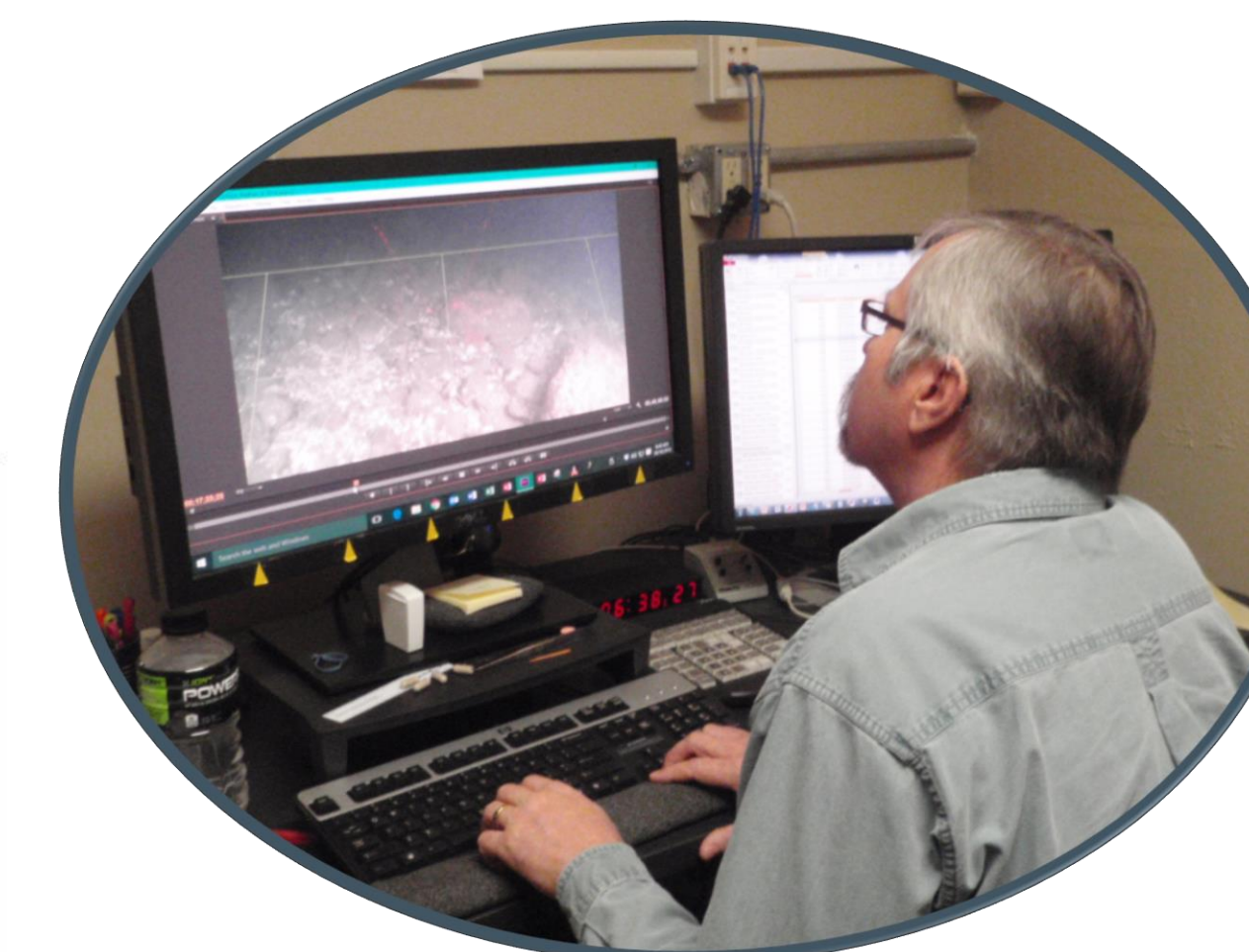
Poor visibility; low taxonomic distinctness

Testing Protocol in the Lab

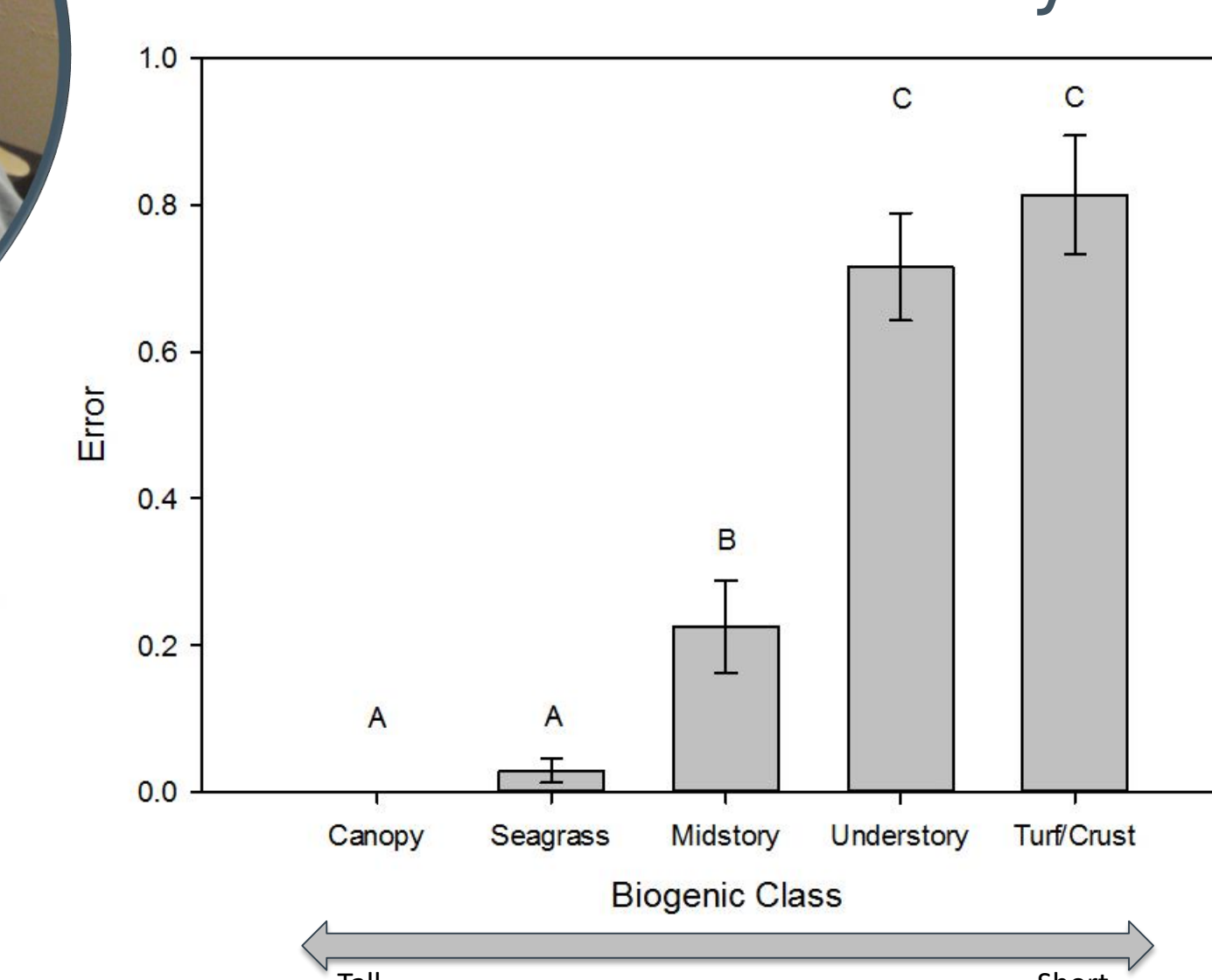
Q1: Are scores consistent among multiple video reviewers?



All reviewers were statistically similar. All reviewers had mean error values within one index score of the true value (<0.5).

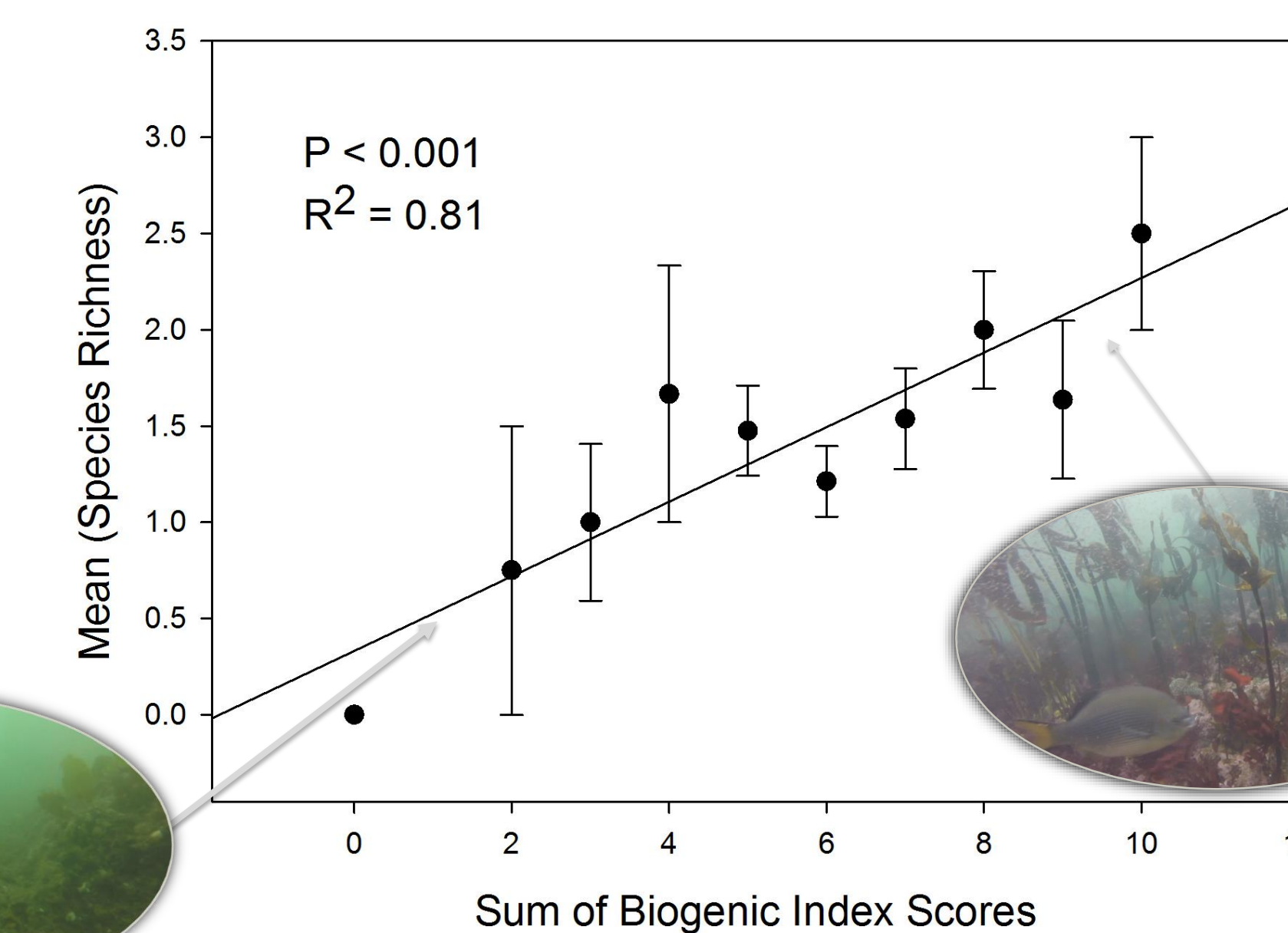
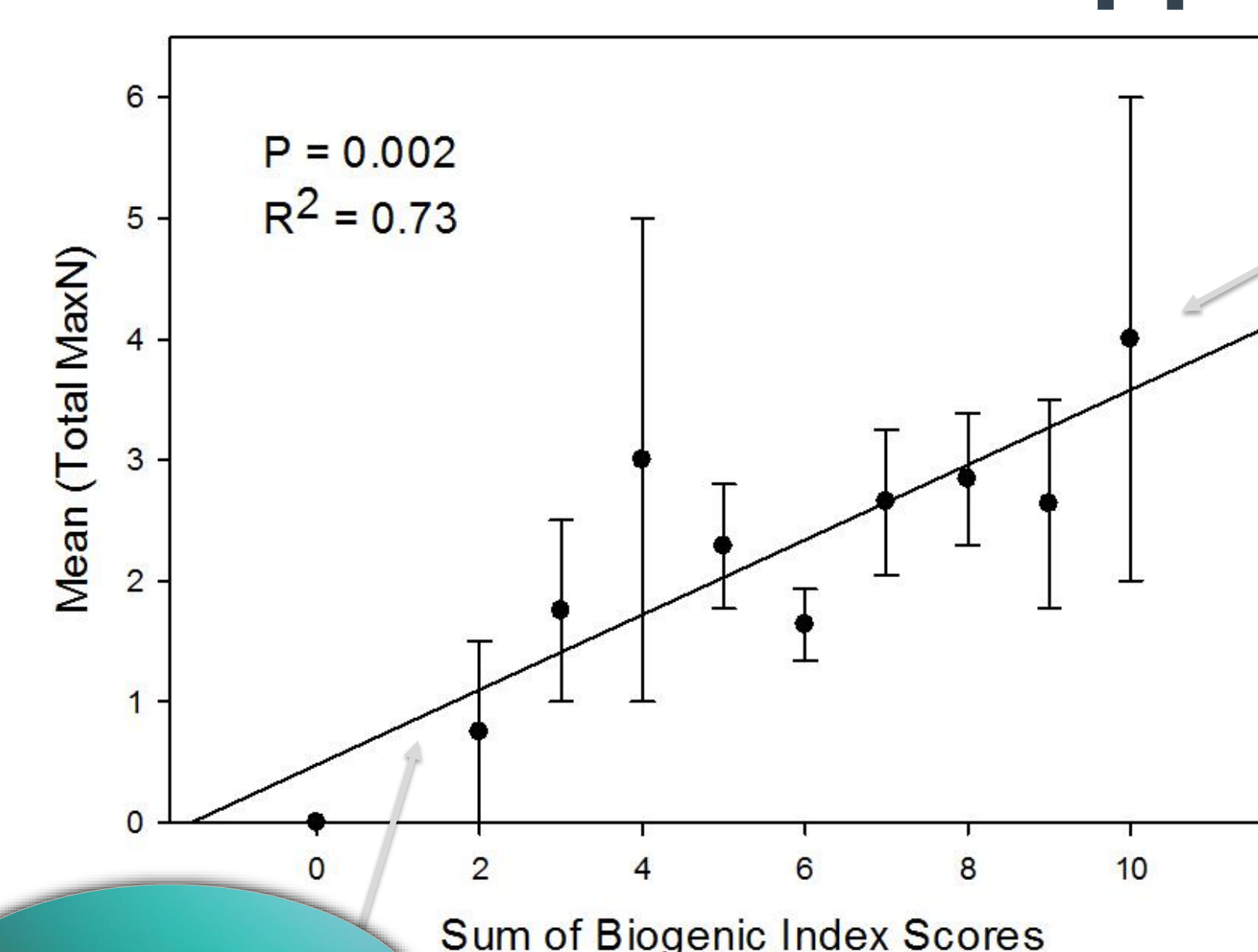


Q2: Can each biogenic class be scored correctly?



As habitat height decreases, reviewer error increases.

Applying the Protocol



Greater biogenic abundance and complexity correlates with higher fish abundance (MaxN) and species richness.

Lessons Learned and Next Steps

- This protocol was applied to habitats where biogenic structure falls within the established categories (i.e. shallow rocky reefs), but can be adapted to other systems.
- Though video landers were explicitly evaluated here, this approach could be applied to a variety of video platforms (e.g. ROV).
- This project demonstrates the utility of using video to quantify both geologic and biogenic habitat structure to generate species-habitat associations.
- Moving forward, we will investigate biogenic structure's role in influencing species composition and occurrence across an array of diverse habitats.

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