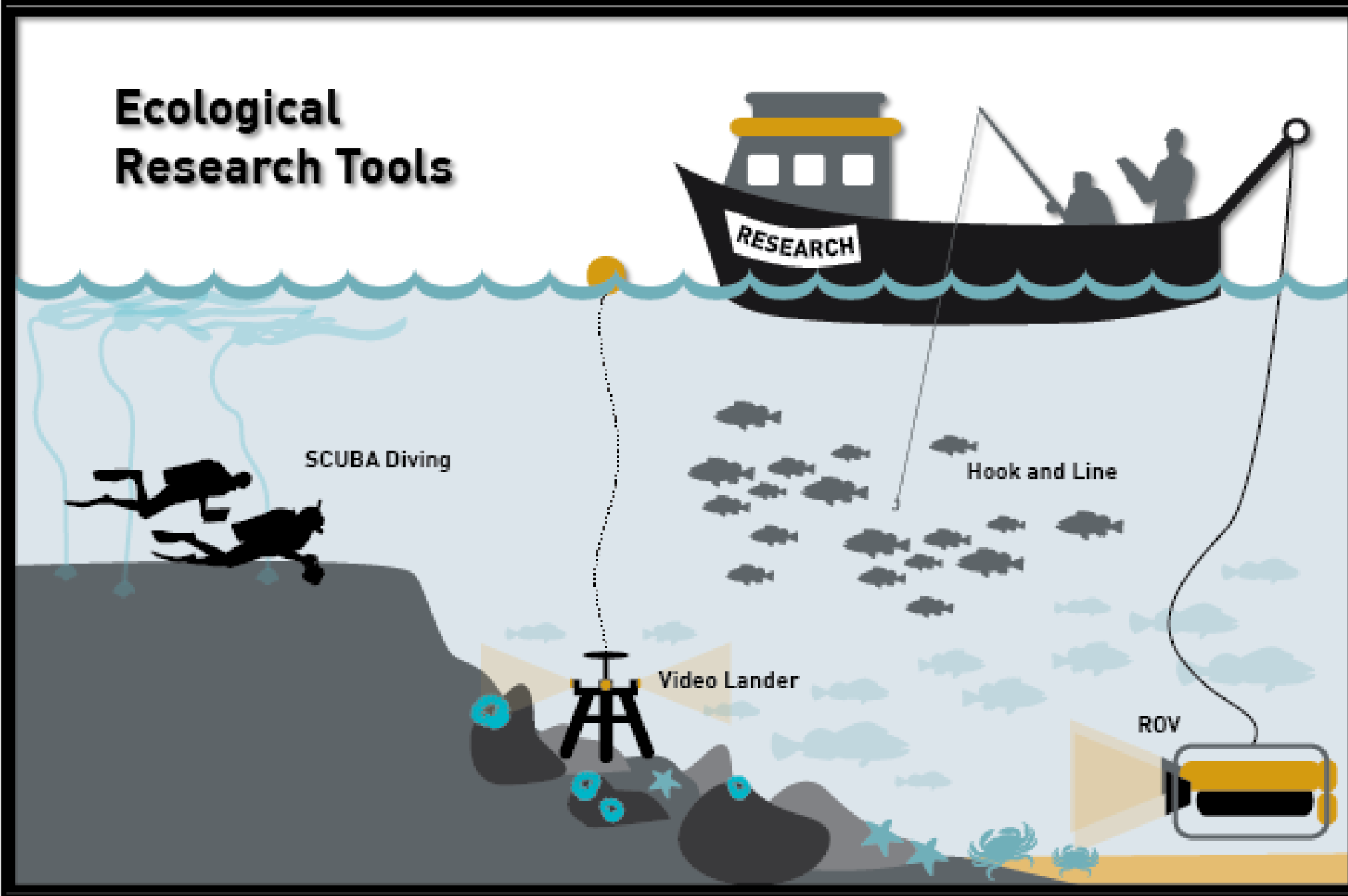




HABITAT ASSOCIATIONS FOR NEARSHORE ROCKFISH FROM AN UNCONVENTIONAL SOURCE

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Tailoring Monitoring to Local Fishing Practices

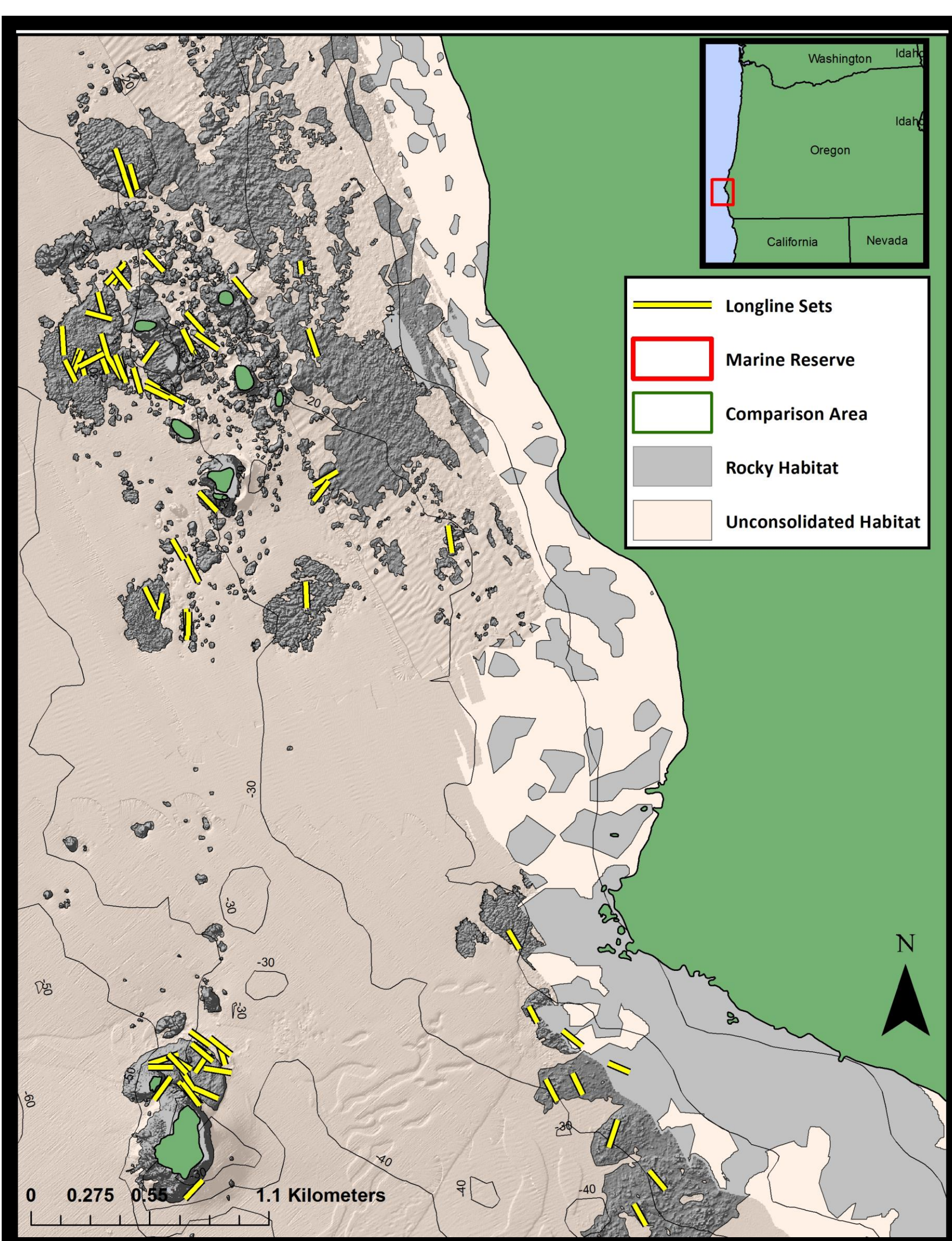


- Longlines succeeded in expanding the catch per unit effort, species richness, and community composition of our hook-and-line data (Huntington and Watson, *Marine & Coastal Fisheries*, in review).
- Here, we evaluate whether longline surveys can generate spatially explicit data for assessing habitat associations for 3 highly managed, demersal species: Cabezon, Quillback Rockfish, and Copper Rockfish.

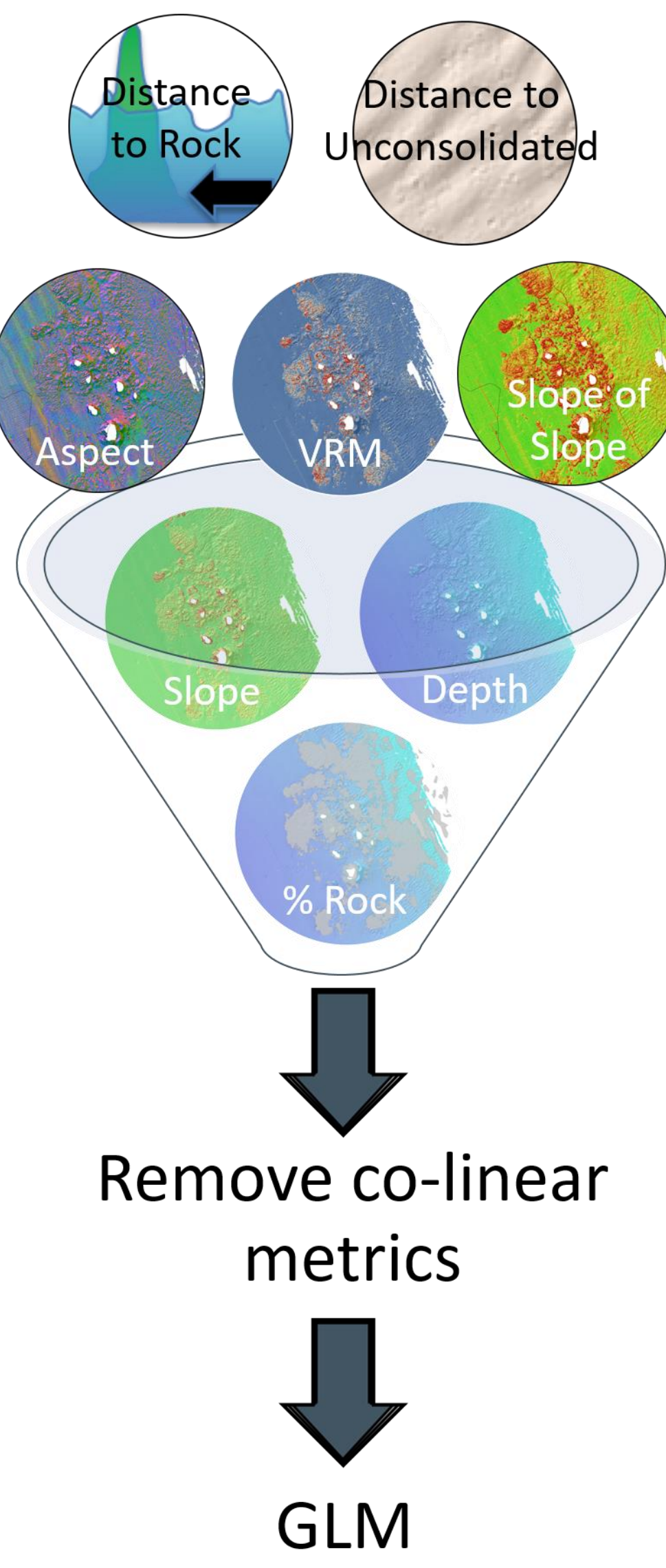
- Oregon's Marine Reserve Program uses four core monitoring tools.
- At Redfish Rocks Marine Reserve, a local 'live fish' fishery targets demersal fish species not commonly caught using the existing hook-and-line approach.
- Longline gear was evaluated as an alternative catch-and-release tool to supplement the species catch from current hook-and-line efforts.



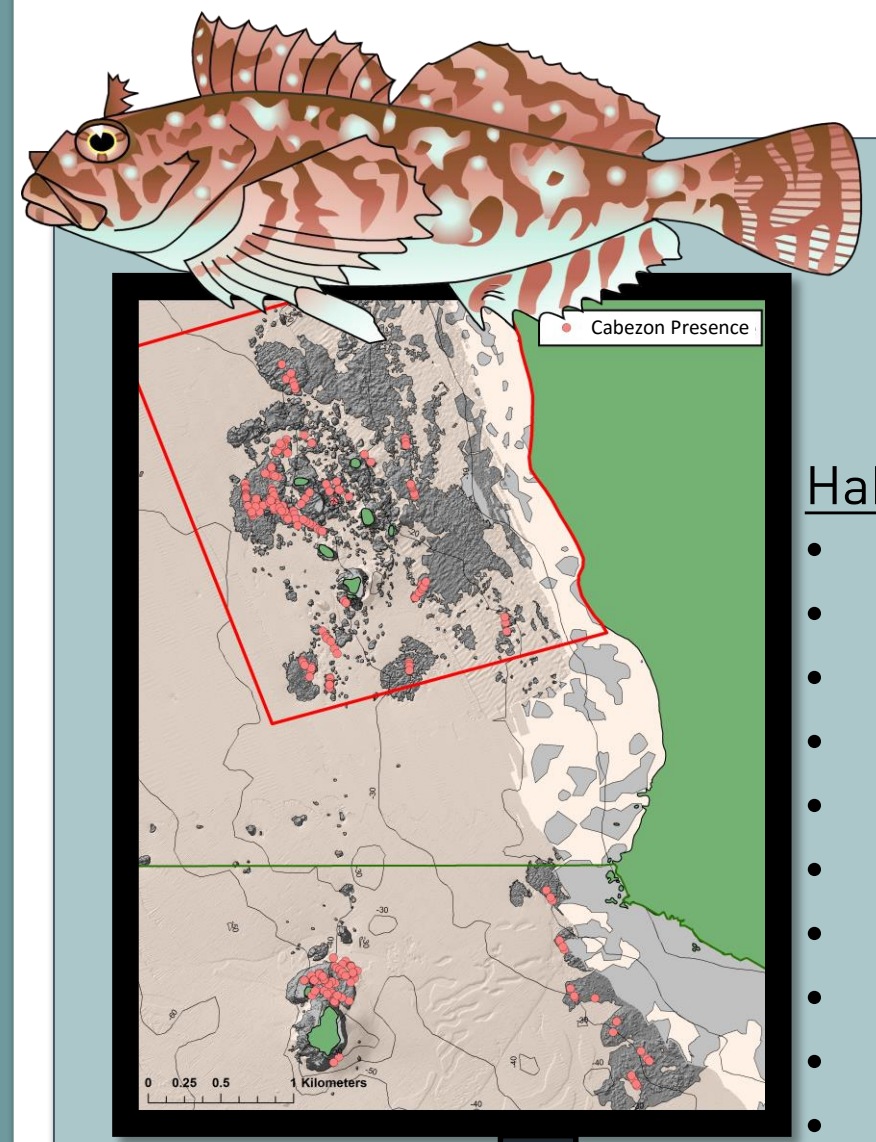
Spatially Explicit Data from Longline Survey



- Each longline set consisted of a 138m ground line with 100 (12/0) hooks spaced 1.37m apart.
- Spatial data was collected at the set start and end.
- Species occurrence on each hook was documented.
- Using the known hook spacing, species occurrence was assigned spatially.
- Bathymetric-derived habitat metrics were created.
- Species presence/absence points (1:3 ratio) were analyzed in a generalized linear model (GLM) to explore habitat associations.

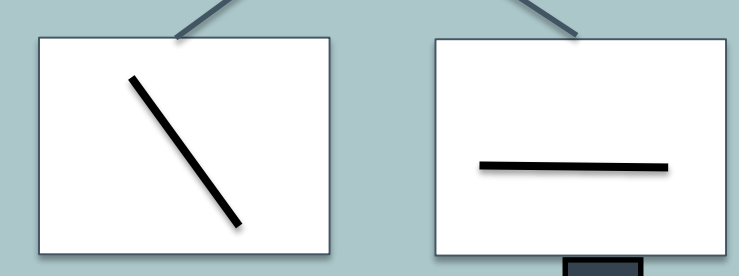


Habitat Associations: A Proof of Concept

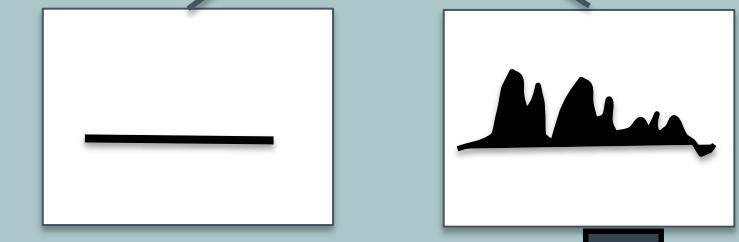


- Habitat Metrics for Model**
- Depth (2m)
 - % Rock (10m)
 - % Boulder (10m)
 - % Sand (15m)
 - Dist. To Unconsolidated
 - Dist. To Emergent Rock
 - Aspect
 - Slope
 - Slope of Slope
 - VRM (15m)

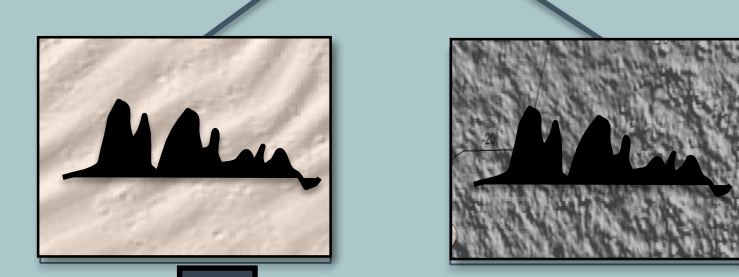
SLOPE OF SLOPE ($P < 0.05$)



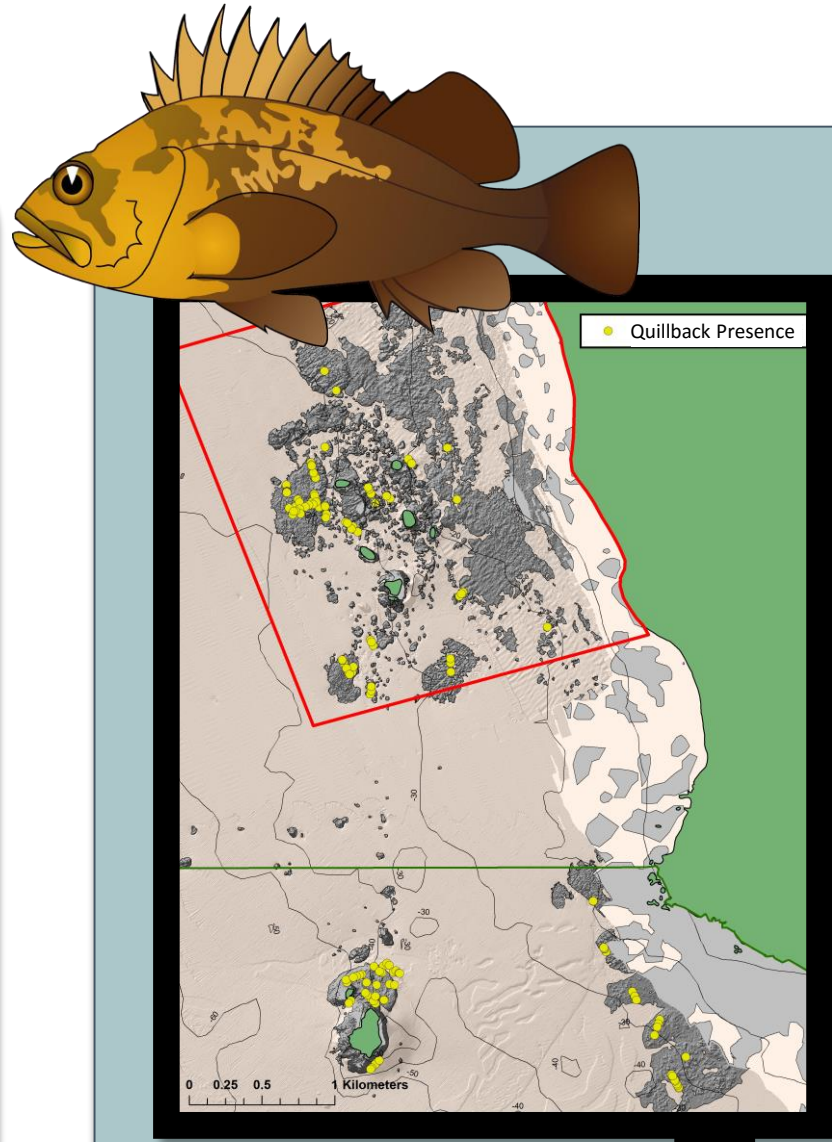
VRM (15m)
($P < 0.05$)



DISTANCE TO UNCONSOLIDATED
($P < 0.05$)

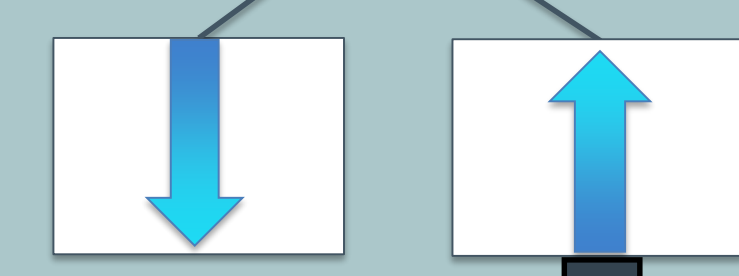


Cabezon are found more frequently in flatter habitats with mid-scale rugosity (VRM), and closer to unconsolidated habitats.

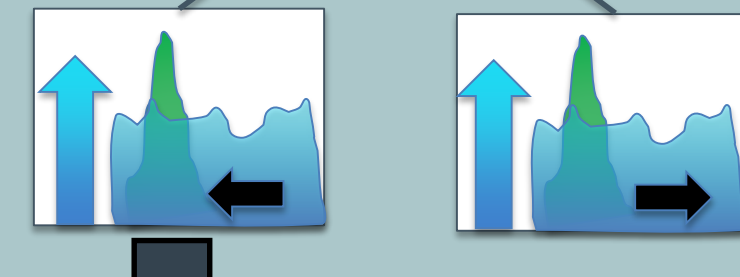


- QUILLBACK ROCKFISH**
- Habitat Metrics for Model**
- Depth (2m)
 - % Rock (10m)
 - % Boulder (10m)
 - % Sand (15m)
 - Dist. To Unconsolidated
 - Dist. To Emergent Rock
 - Aspect
 - VRM (5m)

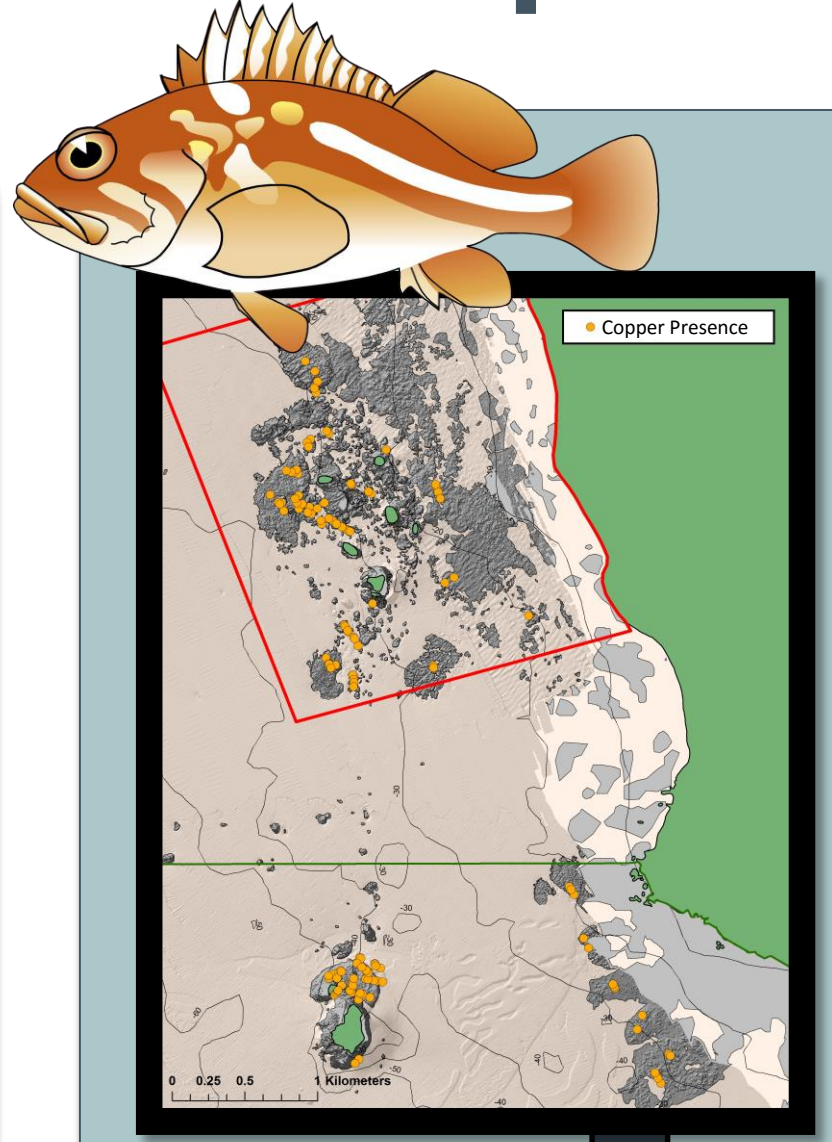
DEPTH (2M) ($P < 0.05$)



DISTANCE TO EMERGENT ROCK
($P < 0.05$)



Quillback Rockfish are found at shallower depth closer to emergent rocks.



- COPPER ROCKFISH**
- Habitat Metrics for Model**
- Depth (2m)
 - % Rock (10m)
 - % Boulder (10m)
 - % Sand (10m)
 - Dist. To Unconsolidated
 - Dist. To Emergent Rock
 - Aspect
 - Slope of Slope
 - VRM (3m)
 - VRM (15m)

No significant relationship was found between Copper Rockfish presence and habitat metrics.

This could be due to the low sample size of occurrences for this species or that influential habitat metrics were not included in the model.

Considerations for Using Longlines in Spatial Analyses

This proof of concept study successfully detected significant relationships between fish occurrence and habitat metrics.

One other published study (Parra et al 2016) has used longlines in this manner; suggesting it may be an under-used approach.

Analysis would improve with the following modifications:

1. Evaluate different modeling methods (entropy, nonparametric multiplicative regression, etc.).
2. Conduct sampling using a uniform random approach.

