



Developing methods for drone mapping of nearshore habitats in Kachemak Bay, AK



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Summary

Kachemak Bay is a highly productive estuarine ecosystem, but the spatial extent and temporal variability of its kelp forests have not been systematically documented. Our project will provide information on the most efficient methods for the mapping of kelp populations in high latitude, glacially-influenced ecosystems to meet the goals of ecosystem assessment and inform planning for mariculture operations. The technology evaluation and mapping demonstration conducted in the project will support mariculture research and planning, habitat assessment, and fisheries management for state, federal, local, and tribal organizations.

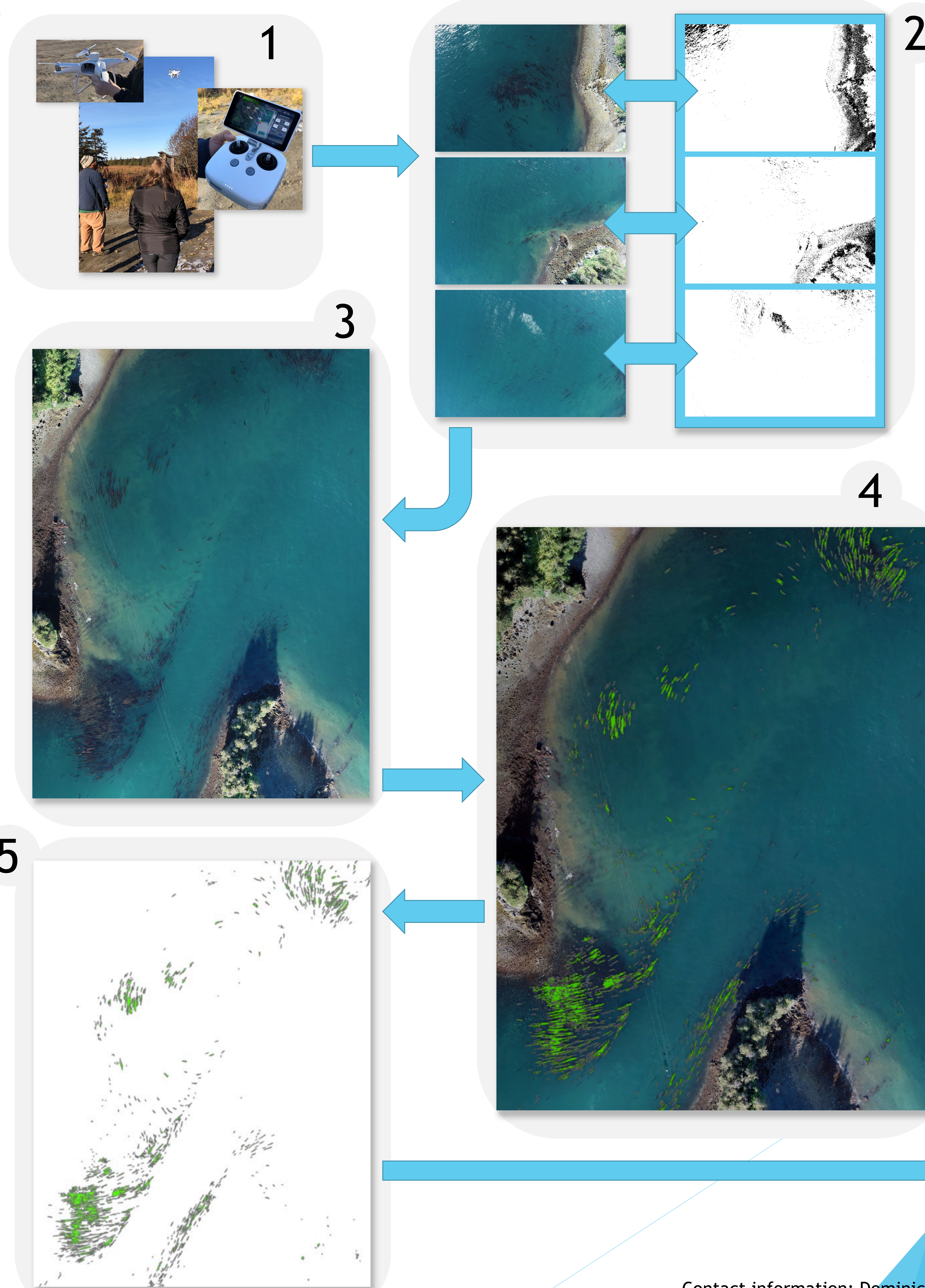
Methods

1. Imagery collected with DJI Phantom 4 RTK: 400 ft. altitude, 80% photo overlap
2. Photo masks created with the Hakai Institute's GlintMaskGenerator (see QR code): removes light artifacts from water surfaces, derived from individual photos
3. Orthomosaic generated in Agisoft Metashape: raw images and glint masks processed concurrently for final product
4. Canopy kelp mask created with the Hakai Institute's Kelp-O-Matic (see QR code): Orthomosaic processed in Python script, raster mask converted to polygons in ArcGIS Pro
5. Kelp polygons adjusted by hand: non-kelp polygons and those < 0.2 m² removed, any canopy missed is digitized by hand
6. Attributes of kelp extracted: table of canopy kelp surface area and any other parameters of interest exported for additional analyses



NOAA Kasitsna Bay Lab

KASITSNA BAY LABORATORY
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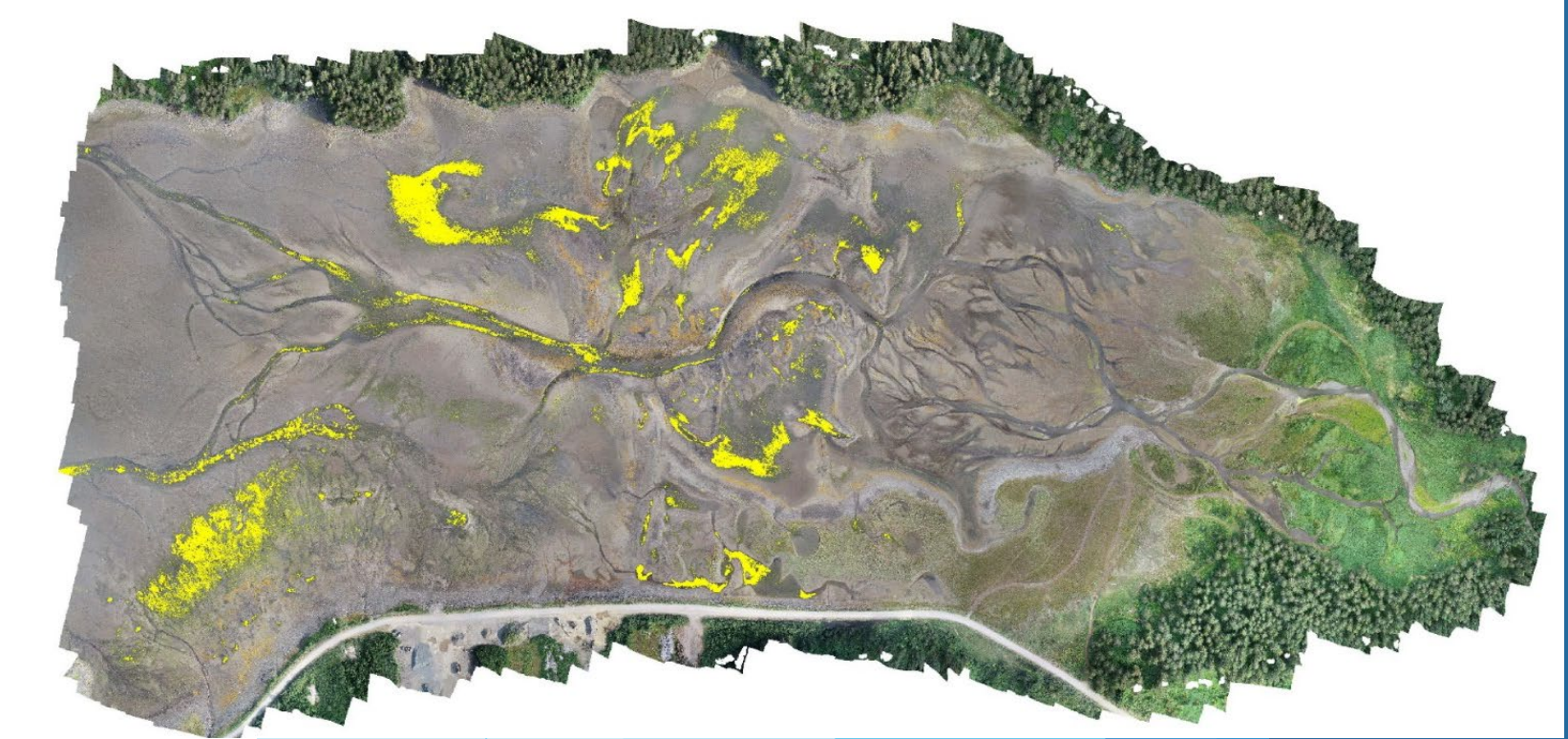


Hakai Institute's GitHub
GlintMaskGenerator
Kelp-O-Matic

Future Plans

Our current goal is to generate a comprehensive workflow from image capture to data archiving that builds upon the kelp field mapping and analysis methods outlined here. Going forward we anticipate that we will:

- Target other types of intertidal habitat, especially seagrass
- Generate the first comprehensive intertidal/shallow subtidal habitat map of Kachemak Bay
- Capture environmental change through seasonal imagery acquisition and analyses
- Extend the reach of our habitat mapping capabilities to the deep subtidal through SCUBA, drop camera, and ROV mapping



Orthomosaic of the intertidal in Jakolof Bay, AK. Seagrass is highlighted in yellow.

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OBJECTID	Shape	Id	gridcode	Shape_Length	Shape_Area	area
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4	Polygon	2599	1	0.002444	0	61.88322
5	Polygon	3265	1	0.002047	0	52.30104
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14	Polygon	2319	1	0.00091	0	19.52991
15	Polygon	3304	1	0.001171	0	19.43861
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17	Polygon	703	1	0.000947	0	16.4946
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19	Polygon	540	1	0.000978	0	14.66284
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