Marine Resource Assessment of Moloka‘i’s North Coast (‘Īlio Point – Kalaupapa)

A comprehensive baseline assessment of the nearshore marine resources along the north shore of Moloka‘i was conducted to document and evaluate the current status of the nearshore marine ecosystem, and to help guide future management actions.

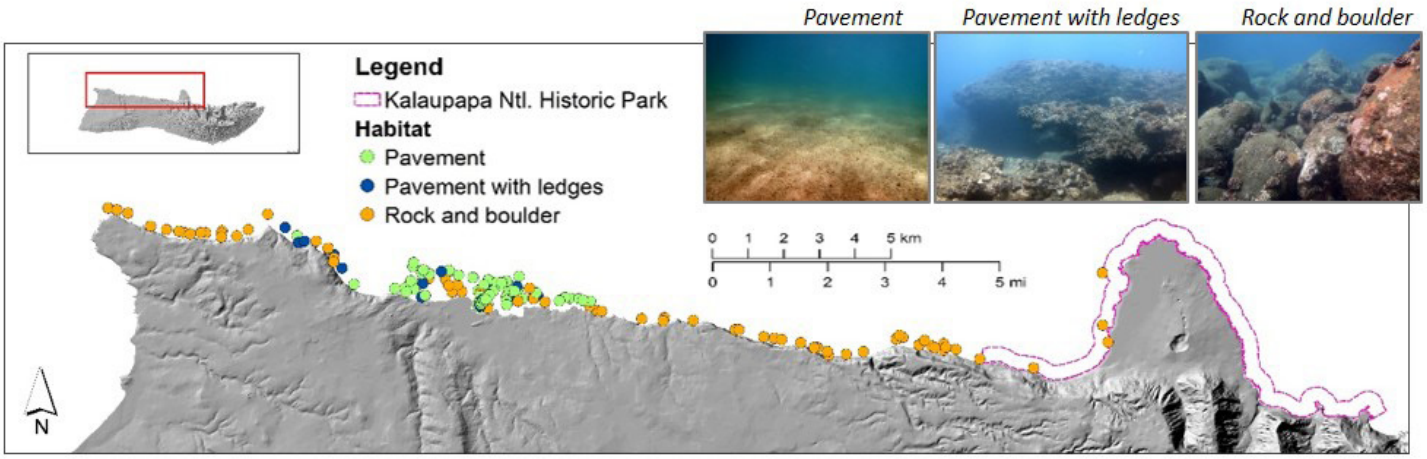

Fig 1. Underwater transect survey (n = 141) from May and August 2017 sampling periods; classified by habitat type.

Reef fish biomass

Estimated total biomass of reef fish on North Moloka‘i was high, relative to other areas in the State of Hawai‘i. Mean total biomass on North Moloka‘i is nearly 3.5 times higher than the statewide average, approximately 3 times higher than that of other north-exposed shorelines (Fig. 2), and over 15 times higher than the north shore of heavily-fished O‘ahu.

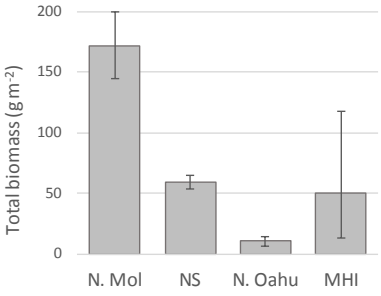

Fig 2. Total biomass of reef fish (with 95% confidence intervals), for N. Molokai, other north shores, N. Oahu, and all MHI (MHI estimate from Friedlander et al. 2017).

Mean biomass of resource species estimated from May and August 2017 survey data is consistent with estimates from Friedlander et al.’s (2017) analysis of resource biomass by moku (Fig. 3), which indicated that North Moloka’i had the highest estimated biomass of resource species in the state.

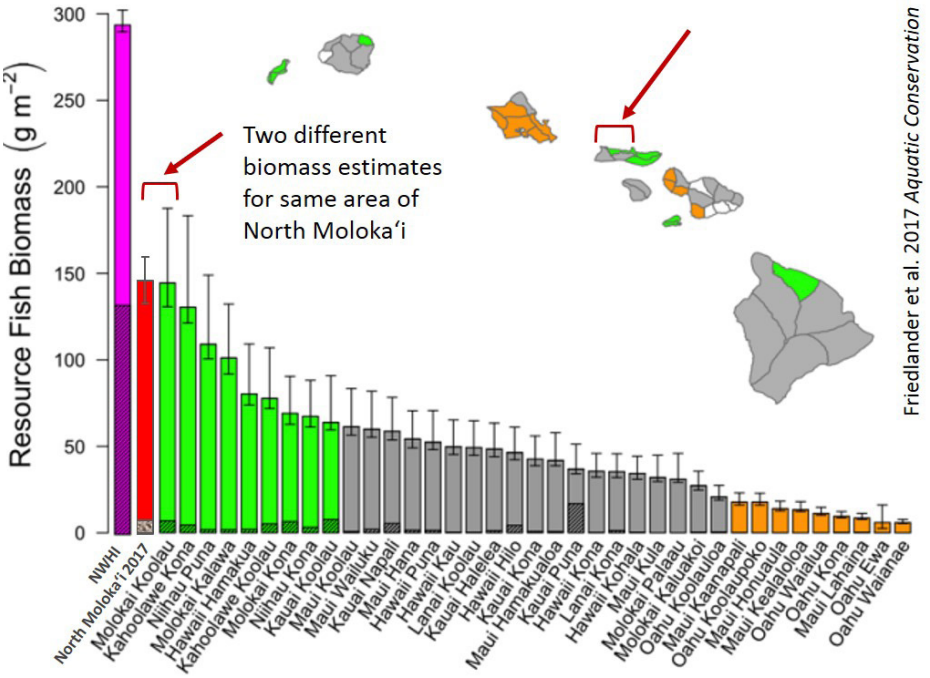

Fig 3. Mean biomass of resource fish from North Molokai 2017 surveys (red bar), compared with biomass from other areas of the main Hawaiian Islands (Friedlander et al. 2017). Cross-hatched areas represent proportion of biomass comprising reef sharks and jacks. Molokai Koolau is the same area as the 2017 sampling; both estimates indicate this area has the highest biomass in the state, but far from the biomass in the pristine Northwest Hawaiian Islands (NWHI; purple bar).

Species of interest

Mean biomass of selected resource species (kole, *Ctenochaetus strigosus*; kumu, *Parupeneus porphyreus*; uhu, *Scarus rubroviolaceus**) varied substantially by habitat (Fig. 4). Kole occurred exclusively in rock and boulder habitat. Kumu was observed in rock and boulder habitat, as well as pavement with ledges and cracks, but had very low biomass in flat pavement habitats, a pattern also observed in uhu.

Rock and boulder habitats and pavement areas with ledges and overhangs have greater structural complexity than flat pavement habitats. Higher complexity provides more holes and spaces that fish can use for refuge, and these patterns of higher biomass in habitats of greater structural complexity are further supported by analyses of rugosity rankings.

Each of the species of interest also showed higher mean biomasses on North Moloka'i, compared to other north shores in the main Hawaiian Islands, particularly North O'ahu (Fig. 5).

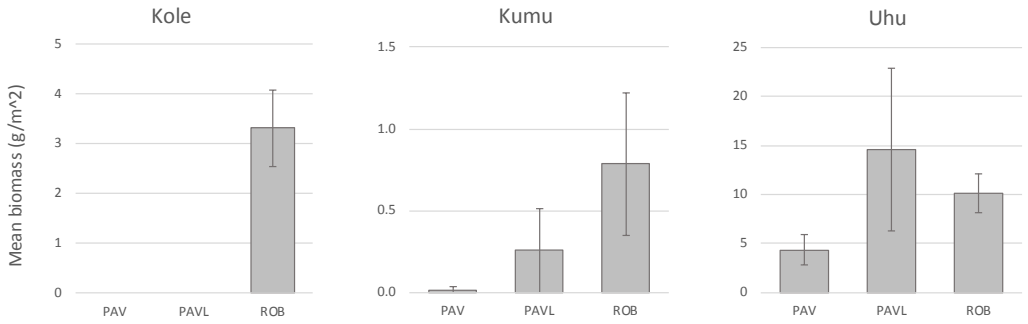

Fig 4. Mean biomass (± SE**) of species of interest, by habitat type.
PAV = pavement
PAVL = pavement w/ ledges
ROB = rock / boulder.

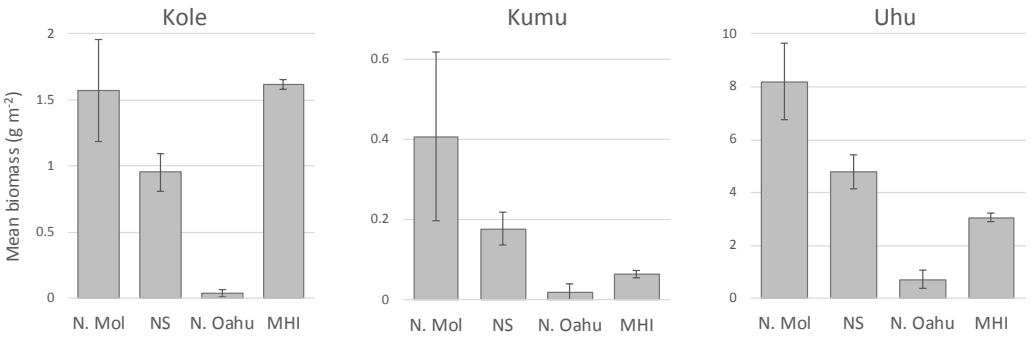

Fig 5. Mean biomass (± SE) of species of interest; North Molokai compared to all other north shores in the MHI, nearby North Oahu specifically, and statewide mean. Data source for comparisons: HIMARC 2018

**Chlorurus perspicillatus* was not abundant enough in surveys to be included in the analyses of uhu
***Note: Variance for species-specific data is Standard Error rather than 95% CI

Discussion

The north shore of Moloka'i has some of the healthiest nearshore ecosystems and highest biomass of reef fish in the state. The exposure of this shoreline to powerful waves and consistent rough water, as well as the limited shoreline access, has historically kept fishing pressure low, which has helped keep the area in its current exceptional state. However, long-term community fishers have expressed concerns with what they observe as recent declines in overall catches, as well as declining fish sizes. As resources throughout the state decrease, it is likely additional pressure will be placed on the resources of this area. As a result, it is increasingly important to consider future management plans that will help maintain the quality of this ecosystem in the face of increasing fishing effort. The resources along the northern coastline of Moloka'i are important to the community, and a community-based subsistence fishing area (CBSFA) could be an important way for the community to partner with the State and help ensure the sustainability of their fishery resources for future generations.

Main points

- Mean reef fish biomass on North Moloka'i is nearly 3.5x higher than statewide average, and nearly 3x higher than other northern coastlines.
- Target species important to the community also show higher mean biomass than similar northern shorelines (~ 1.5 to 2x higher for kole, kumu, and uhu).
- Management efforts should be considered to maintain these valuable marine resources and help uphold sustainable subsistence practices into the future.

Reference: Friedlander, AM., et al. (2017) Human-induced gradients of reef fish declines in the Hawaiian Archipelago viewed through the lens of traditional management boundaries. Aquatic Conservation.

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