

Summary of Findings

Two-Year Assessment: Ka'ūpūlehu Marine Reserve, 2018

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The coastal fishing grounds of Ka'ūpūlehu were renowned for their abundance of fish, lobster, octopus, and limpets, but coral cover and fish abundance at Ka'ūpūlehu have been declining since at least the early 1990s. As a way to restore abundance to the reefs, the State Division of Aquatic Resources (DAR) proposed a rule amendment establishing a 10-year no-take period within the existing Ka'ūpūlehu Fish Replenishment Area (FRA). In 2016, the State established the Ka'ūpūlehu Marine Reserve with overwhelming public support. While the area is resting, the community is working with DAR to develop a fisheries management plan to maintain healthy, sustainable fisheries once the Reserve is re-opened to fishing in 2026.

The Nature Conservancy and partners have supported the community's efforts by supplying rigorous scientific information on the status and trends of Ka'ūpūlehu's nearshore reefs and fisheries for more than a decade. This information established a statistically robust baseline and is helping to determine how fish stocks and the reef are changing in response to the rest period. The findings reported here reflect the results from our surveys of 182 sites in September, 2018.

Key Findings: Changes in Fish Community

Our data presented a preponderance of evidence suggesting that the rest period is having the desired benefits to the fish stocks of the Reserve.

- The abundance of **resource fish**—those harvested for food—and the size and number of large resource fish **have increased more inside the Reserve than outside**, including the commercially and culturally important mackerel scad ('ōpelu).
- Non-resource fish numbers are the same inside and outside, indicating that it is the harvest restrictions that are driving the increases in resource fish.
- Populations of prized wrasse, parrotfish, and surgeonfish species increased at **much higher rates inside the Reserve** than outside in adjacent open areas:
 - **Wrasses increased 62% inside** and 3% outside
 - **Parrotfish increased 30% inside** and 3% outside
 - **Surgeonfish increased 46% inside** and 21% outside
- **Prime spawners**—the largest fish that produce the most offspring—were **observed at nearly all sites surveyed** (94.5%), with orangeband surgeonfish (na'ena'e) and pale nose parrotfish (uhu) being the most abundant.
- **Spatial analysis showed indications of fish spillover** into adjacent areas outside of the Reserve, providing benefits to the reefs and communities that depend upon those resources.



The Ka'ūpūlehu Marine Reserve was established to give economically and culturally important fish species a chance to recover, so that sustainable fishing could start again from a place of abundance. The Reserve extends 3.6 miles from Kikaua Point to Kalaemanō. TNC surveys in and adjacent to the area have created one of the strongest datasets to assess marine management in Hawai'i, including:

- 2009-2015: **659 transects**
- 2016-2018: **438 transects**



Key Findings: Changes in Coral Community

The State did not implement management actions that would directly affect corals or the broader benthic assemblage in the Reserve, so any benefits that accrue over the years will occur indirectly, e.g. through greater numbers of herbivores aiding coral recovery by reducing algal overgrowth.

- The reefs of Ka'ūpūlehu experienced a **44% decline in coral cover due to the 2015 mass coral bleaching event**.
- Following the bleaching event, **coral cover increased slightly, suggesting that reefs are beginning to recover**, and at similar rates inside and outside the Reserve.
- **Reef-building massive corals are leading the recovery**, accounting for over 83% of all observed coral.

“I’m glad the science confirms fish are returning, but many fish live a long time. An arm’s length kala (unicorn fish) is about 55 years old. We need the remaining seven years of the rest area for all of the fish species to start to recover.”

Kekaulike Tomich
Fisher and KMLAC Member

Moving Forward

Benefits from resting a reef generally accrue over an extended time period, starting a few years after fishing cessation and building with time, indirectly cascading from harvested fish to other fish and organisms in the coral reef community. The timing of these effects tends to be highly variable among species, and is dictated by complex ecological interactions and species-specific demographic characteristics, such as individual growth rates, time to sexual maturity, and dispersal capabilities.

The trends of increasing abundance, fish size, and biomass that we observed indicate that with more time, recovery should translate into positive fisheries benefits for the Ka'ūpūlehu community. For this to occur, management agencies and the community must continue to support compliance and enforcement and monitor the effectiveness of the Reserve to identify any unexpected fishery declines before they become more difficult to manage.

Because the Ka'ūpūlehu Marine Reserve represents an important test case for community-based management in Hawai'i, monitoring the effectiveness of these new regulations, documenting the benefits and challenges, and widely sharing the results will be essential to informing future management efforts in West Hawai'i and elsewhere. The information will also inform the community's efforts to develop a fisheries management plan with DAR that allows fishing to resume at the end of the 10-year rest period in a way that sustains the health of both the fishery and the community that depends on it.

For Additional Information

Contact Dr. Eric Conklin, TNC Hawai'i Marine Science Director, at econklin@tnc.org or 808-587-6230.

Suggested Citation

The Nature Conservancy. 2020. Summary of Findings, Two-Year Assessment: 2018 Ka'ūpūlehu Marine Reserve Surveys, Ka'ūpūlehu, Hawai'i. 2 pp.



How You Can Help

The Ka'ūpūlehu Marine Life Advisory Committee (KMLAC) is a group of local landowners, businesses, advocacy groups, and families with ancestral ties to the area that have been working for more than two decades to restore coral reefs and fish populations through improved collaborative management with the State. You can support their efforts by supporting the development of a sustainable fisheries management plan for the Ka'ūpūlehu Marine Reserve to guide the prudent and sustainable use and stewardship of marine resources.