TRY WAIT

PROPOSAL TO REST KAʻŪPŪLEHU'S REEF AND RESTORE ABUNDANCE
SCIENTIFIC JUSTIFICATION

www.facebook.com/KMLAC
thekmlac@gmail.com

SUMMARY OF OUR RESEARCH PROCESS

The Try Wait proposal is a community-based plan to restore marine resources and ensure that traditional, subsistence, and cultural fishing practices are sustained within the ahupuaʻa of Kaʻūpūlehu for our future generations. This proposal to rest our reefs for ten years has been shaped by the observation, understanding, and wisdom of kūpuna and the kamaʻāina fishermen, families, and community of Kaʻūpūlehu. Kamaʻāina experts have observed declines in Kaʻūpūlehu's fisheries, from the abundance to decimation of lobster, to large schools of weke, kole, uhu and other fish previously found at depths of 5-10 feet now only found in smaller schools at 30-60 feet. These kamaʻāina observations provide a legally sound baseline documenting the decline of Kaʻūpūlehu's fisheries.[1] We also invited scientists and researchers to further document our observations. Independent research projects from the University of Hawaiʻi (UH) at Hilo and Mānoa and The Nature Conservancy (TNC) recorded impacts to the fishery consistent with the declines we have observed.[2]

As we examined existing managed areas in Hawaiʻi, such as the Waikīkī Fisheries Management Area (FMA),[3] we confirmed that early suggestions to rest Kaʻūpūlehu's reef for one to two years were unlikely to bring back the abundance and biomass of our marine resources. But permanent restrictions on fishing were out of the question for those of us who rely upon fish for our sustenance, health, culture, and livelihood. So we combed scientific literature for successful examples of reef recovery, and what we found were many examples from around the world demonstrating that the longer you can rest areas from fishing, the more reef fish will recover naturally. Where this has been done in Hawaiʻi, there are more fish, both inside and outside of the reserve. For example, a recent study from Pūpūkea on Oʻahu shows us that not only are there far more fish inside the reserve, many fish travel beyond the protected area to benefit fishermen as well.[4] On Apo Island in the Philippines, the community worked with scientists and the local government to close a portion of their coastline to fishing – and fishermen and the community are better off after protecting their place than they were before. And, although this reef is still growing more fish forty years after it was protected, benefits to both fish and fishermen were documented by year ten.[5]

---

[1] *In re Ashford*, 50 Haw. 314, 78, 317, 344-345 (holding that kamaʻāina testimony serves in the form of an expert witness in interpreting Hawaiian custom and usage) (1968).

[2] Minton, D., E. Conklin, K. Pollock, R. Amimoto, Z. Caldwell, R. Most, C. Wiggins. 2014. Baseline Surveys of Marine Resources Kaʻūpūlehu, Hawaiʻi. The Nature Conservancy.

[3] Williams, I.D., W.J. Walsh, A. Miyasaka, A.M. Friedlander. Effects of rotational closure on coral reef fishes in Waikiki-Diamond Head Fishery Management Area, Oahu, Hawai`i. 2006. *Marine Ecology Progress Series.*310: 139-149.

[4] Stamoulis, K.A., Friedlander, A.M. A seascape approach to investigating fish spillover across a marine protected area boundary in Hawaiʻi. *Fisheries Research*. 144(2013): 2-14.

[5] Raymundo, L.J., White, A.T. 2004. 50 Years of Scientific Contributions of the Apo Island Experience: A Review. *Silliman Journal*. 45(2): 32-58.

We also searched for life history information for our most important Hawaiian fishes. Some surgeonfish like manini and maiko are important food fish for us, and science shows that they live longer and often take longer to recover than other fish.[6] [7] [8] While not a food fish, the surgeonfish lau ʻipala (*Zebrasoma flavescens*) or yellow tang, has been protected since late 1999, but depleted populations did not begin to recover for four years, and took seven years to reach peak recovery.[9] Data further suggests that yellow tang reproducing within the Fish Replenishment Areas (FRAs) may be supplying juvenile fish to the entire West Hawaiʻi coastline.[10] Like yellow tang, many of the fish we eat don't reach peak reproduction until they are 5-8 years old.[11] [12] [13] We need to enable at least one generation of fish at Kaʻūpūlehu to truly replenish the reef without interruption and build a foundation for sustainable harvest.

In addition to reviewing previous research to identify the most appropriate management strategy for our place, we worked with UH and TNC to document the current status of marine resources both inside and outside of our proposed rest area, and establish a baseline against which the effects of the rest period can be measured.[14] This information will guide our eventual subsistence fishing management plan. Highlights of this research include:

- A comprehensive survey of 148 sites along the Kaʻūpūlehu coastline between 2009 and 2011 that enabled us to compare Kaʻūpūlehu to other managed areas in Kona and across the State. Results from these surveys showed that the Kaʻūpūlehu FRA has a smaller amount of food fish than other FRAs, and many fewer than in fully protected areas.
- The most comprehensive survey in the state, including 428 sites along the Kaʻūpūlehu-Kīholo coastline in 2012 and 2013, showed that there is currently no difference between the amount of fish and their diversity within the proposed rest area and outside its boundaries. This information serves as a baseline against which we can measure change after the rest area is put in place.
- Surveys of ʻopihi populations at Kalaemanō and Kaʻūpūlehu in March and April 2014 showed that the current minimum size regulations to harvest subtidal ʻopihi (kōʻele) are inadequate to ensure their continued reproduction.
- A comprehensive parentage and larval dispersal study, in which DNA samples were taken from 1,285 juvenile and adult manini in 2014 will help us understand connectivity and the contribution of Kaʻūpūlehu to fish replenishment along the northwest Hawaiʻi coast (results pending).
- 245 creel surveys completed in 2013 and 2014 to measure the current level of fishing and catch per unit effort (CPUE) within and adjacent to the proposed rest area at Kaʻūpūlehu, established a baseline that will allow us to understand how the rest area affects changes in fishing pressure and CPUE in adjacent areas.

---

[6] Birkeland, C. and P.K. Dayton. 2005. The importance in fishery management of leaving the big ones. *TRENDS in Ecology and Evolution*. 20(7): 356-358.

[7] Longnecker, K. 2008. Life history compendium of exploited Hawaiian Fishes. Report prepared for Fisheries Local Action Strategy through Hawaiʻi Biological Survey, Bishop Museum.

[8] Eble, J. 2009. Kala, *Naso unicornis*. Fisheries LAS Report.

[9] DAR Kona. 2012 Report to Hawaiʻi State Legislature.

[10] Williams, I.D., W.J. Walsh, J.T. Claisse, B.N. Tissot, K.A. Stamoulis. 2009. Impacts of a Hawaiian marine protected area network on the abundance and fishery sustainability of the yellow tang, *Zebrasoma flavescens. Biological Conservation.* 142: 1066-1073.

[11] Longnecker, K. 2008. Life history compendium of exploited Hawaiian Fishes. Report prepared for Fisheries Local Action Strategy through Hawaiʻi Biological Survey, Bishop Museum.

[12] Eble, J. 2009. Kala, *Naso unicornis*. Fisheries LAS Report.

[13] Birkeland, C. and P.K. Dayton. 2005. The importance in fishery management of leaving the big ones. *TRENDS in Ecology and Evolution*. 20(7): 356-358.

[14] Conklin, E. and D. Minton. Preliminary Results of Marine Surveys at Kaʻūpūlehu, Hawaiʻi. The Nature Conservancy (In progress)

RESEARCH THAT INFORMED OUR PROPOSAL (BY REGION AND TOPIC)

KAʻŪPŪLEHU-SPECIFIC RESEARCH

Conklin, E. and D. Minton. Preliminary Results of Marine Surveys at Kaʻūpūlehu, Hawaiʻi. The Nature Conservancy (In progress).

DAR Kona. 2012. Report to Hawaiʻi State Legislature.

Minton, D., E. Conklin, K. Pollock, R. Amimoto, Z. Caldwell, R. Most, C. Wiggins. 2014. Baseline Surveys of Marine Resources Kaʻūpūlehu, Hawaiʻi. The Nature Conservancy.

Stender, G.K., S. Farrish, L. Frame, Y. Stender, R. Swisher. 1992. Baseline Survey of Kaʻūpūlehu Bay, Hawaii. Unpublished report by the University of HawaiʻI Marine Program.

Stender, G.K., B. Owens, T. Owens, L. Chau, H. McGill, W. Smith. 1999. Qualitative Survey of Kahuwai Bay.

Williams, I.D., W.J. Walsh, J.T. Claisse, B.N. Tissot, K.A. Stamoulis. 2009. Impacts of a Hawaiian marine protected area network on the abundance and fishery sustainability of the yellow tang, *Zebrasoma flavescens. Biological Conservation.* 142: 1066-1073

HAWAII RESEARCH

<u>LIFE HISTORY OF FISH</u>

Eble, J. Kala, *Naso unicornis*. July 2009. Fisheries LAS Report.

Longnecker, K. 2008. Life history compendium of exploited Hawaiian Fishes. Report prepared for Fisheries Local Action Strategy through Hawaiʻi Biological Survey, Bishop Museum.

<u>**MARINE RESERVES** – Benefits</u>

Birkeland, C. and A. Friedlander. 2002. The Importance of Refuges for Reef Fish Replenishment in Hawaiʻi. *Honolulu, Hawaiʻi Audubon Society*.

Friedlander, A.M. and E.E. Demartini. 2002. Contrasts in the density, size, and biomass of reef fishes between the northwestern and the main Hawaiian islands: the effects of fishing down apex predators. *Marine Ecology Progress Series.* 230: 253-264.

Friedlander, A.M., E. Brown, M.E. Monaco. 2007. Coupling Ecology and GIS to evaluate efficacy of Marine Protected Areas in Hawai`i. *Ecological Applications*. 17(3): 715-730.

Stamoulis, K.A., Friedlander, A.M. A seascape approach to investigating fish spillover across a marine protected area boundary in Hawaiʻi. *Fisheries Research*. 144(2013): 2-14.

Williams, I.D., W.J. Walsh, J.T. Claisse, B.N. Tissot, K.A. Stamoulis. 2009. Impacts of a Hawaiian marine protected area network on the abundance and fishery sustainability of the yellow tang, *Zebrasoma flavescens. Biological Conservation.* 142: 1066-1073.

<u>**RECREATIONAL FISHING –** Popularity of</u>

Friedlander, A.M. and J.D. Parrish. 1997. Fisheries harvest and standing stock in a Hawaiian Bay. *Fisheries Research*. 32(1): 33-50.

ROTATIONAL CLOSURE – Long Term Fish Decline in MPA and adjacent areas
Williams, I.D., W.J. Walsh, A. Miyasaka, A.M. Friedlander. 2006. Effects of rotational closure on coral reef fishes in Waikiki-Diamond Head Fishery Management Area, Oahu, Hawai`i. *Marine Ecology Progress Series.*310: 139-149.

GLOBAL RESEARCH

BIG FISH – Reproductive Advantages
Birkeland, C. and P.K. Dayton. 2005. The importance in fishery management of leaving the big ones. *TRENDS in Ecology and Evolution*. 20(7): 356-358.

LIFE HISTORY OF FISH
McClanahan, T.R. and Humphries, A.T. 2012. Differential and slow life-history responses of fishes to coral reef closures. Marine Ecology Progress Series. 469: 121-131.

http://fishbase.org

MARINE RESERVES – Benefits
McClanahan, T.R., N.A.J. Graham, J.M. Calnan, and M.A. MacNeil. 2007. Toward pristine biomass: reef fish recovery in coral reef marine protected areas in Kenya. *Ecological Applications*. 17(4): 1055-1067.

Raymundo, L.J., White, A.T. 2004. 50 Years of Scientific Contributions of the Apo Island Experience: A Review. *Silliman Journal*. 45(2): 32-58

Raymundo, L.J., A.R. Halford, A.P. Maypa, and A.M. Kerr. 2009. Functionally diverse reef-fish communities ameliorate coral disease. *PNAS.* 106(40): 17067-17070.

Russ, G.R., A.C. Alcala, A.P. Maypa, H.P. Calumpong, and A.T. White. Marine reserve benefits local fisheries. 2004. *Ecological Applications*. 14(2): 597-606.

Selig, E.R. and J.F. Bruno. 2010. A global analysis of the effectiveness of Marine Protected Areas in preventing coral loss. *PLos ONE* 5(2): e9278.

MARINE RESERVES – Design Considerations
Parnell, P.E., P.K. Dayton, C.E. Lennert-Cody, L.L. Rasmussen, J.J. Leichter. 2006. Marine reserve design: optimal size, habitats, species affinities, diversity, and ocean microclimate. *Ecological Applications*. 16(3): 945-962.

MARINE RESERVES – Duration of Protection
Maliao, R.J., A.T. White, A.P. Maypa, R.G. Turingan. 2009. Trajectories and magnitude of change in coral reef fish populations in Philippine marine reserves: a meta-analysis. *Coral Reefs*. DOI 10.1007/s00338-009-0532-6. (online publication)

Russ, G.R. and A.C. Alcala. 2004. Marine reserves: long-term protection is required for full recovery of predatory fish populations. *Oecologia.* 138: 622-627.

RECREATIONAL FISHING – Cause of Fisheries Collapse
Eggleston, D.B., E.G. Johnson, G.T. Kellison, and D.A. Nadeau. 2003. Intense removal and non-saturating functional responses by recreational divers on spiny lobster *Panulirus argus*. 257: 197-207.

ROTATIONAL CLOSURE

Russ, G.R. and Alcala, A.C. Marine reserves: rates and patterns of recovery and decline of predatory fish, 1983-2000. 2003. *Ecological Applications.* 13(6): 1553-1565.

Cinner, J., M. J. Marnane, T.R. McClanahan, and G.R. Almany. 2005. Periodic closures as adaptive coral reef management in the Indo-Pacific. Ecology and Society 11: 31.

Jupiter, S.D., Weeks, R., Jenkins, A.P., Egli D.P., Cakacaka A. 2012. Effects of a single intensive harvest event on fish populations inside a customary marine closure. *Coral Reefs. Journal of the International Society for Reef Studies.* DOI 10.1007/s00338-012-0888-x.