

## MAUI'S CORAL REEFS: DECLINING TRENDS 1993–2015

The health of Maui's coral reefs is inextricably linked to our local economy and well-being. However, Maui's coral reefs are in serious trouble. Recent scientific studies clearly illustrate the decline now underway. During the past two decades, nearly one-quarter of Maui's corals have been lost,<sup>1,2</sup> with half of Maui's reef sites currently experiencing declining health (see map).<sup>3,4</sup> The largest declines have been observed on reefs adjacent to residential centers and agricultural lands such as Kahekili, Papa'ula Point, Honolua Bay, and Mā'alaea Bay, where on average the percent of living coral at sites has dropped from more than 30–50% in 1993, to less than 5–10% today.<sup>5,6,7</sup> Even with minimal upland development, Olowalu reef has declined from 43% to 33% live reef during this time.

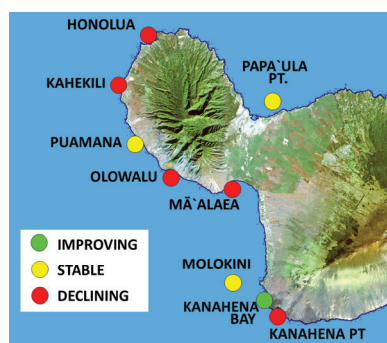
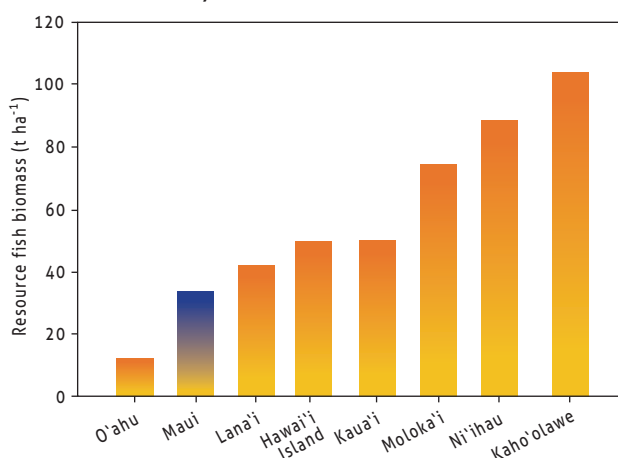
As the amount of living reef has declined, so too have Maui's native reef fish populations. Since 1995, the biomass (amount, by weight) of culturally and economically important reef fish species found on Maui's reefs has declined significantly.<sup>8</sup> As with other main islands, some fish stocks around Maui have seen declines of more than 90% over the past century.<sup>9</sup> As a result, the average amount of reef fish found around Maui's reefs is the second lowest in the State, behind only O'ahu (see Figure 1).<sup>10</sup>

The quality of Maui's coastal waters is also a concern for coral reefs because reefs require clean clear water and bottom substrate for growth and reproduction. Nearly 90% of water quality samples taken around Maui in the period 2012–2014 exceeded State Water Quality Standards for turbidity, nutrients, and/or bacteria.<sup>11</sup> Maui's impaired waters are a public health concern for humans and for marine life. Improving coastal water quality is essential to the survival and recovery of reefs.

The reasons for these declines relate to the increasing use of Maui's coastal lands and waters. There are three primary drivers behind these negative trends: (1) introduced land-based pollutants and sediments onto reefs;<sup>12,13</sup> (2) overfishing coupled with poor enforcement of current fishing regulations;<sup>14,15,16</sup> and (3) insufficient 'resting' (kapu) sites that protect marine life by providing adequate time and space to recover from stresses, and then 'spill over' and replenish adjacent areas.<sup>17,18</sup>

In addition, there are emerging impacts beyond Hawai'i's control that threaten to further damage Maui's reefs:<sup>19,20</sup> increasing ocean temperatures<sup>21</sup> that result in coral bleaching, rising sea levels<sup>22</sup>, ocean acidification<sup>23</sup>, and increasing frequency and intensity of coastal storms.<sup>24</sup>

**Figure 1: Resource fish biomass across the main Hawaiian Islands. Data courtesy of Friedlander et al. 2015.**



*Healthier reefs are more resilient and have a greater chance of recovery following disturbances and ocean change.*

Our best hope to protect Maui's corals from global threats is to reduce local stressors like pollution and overfishing.

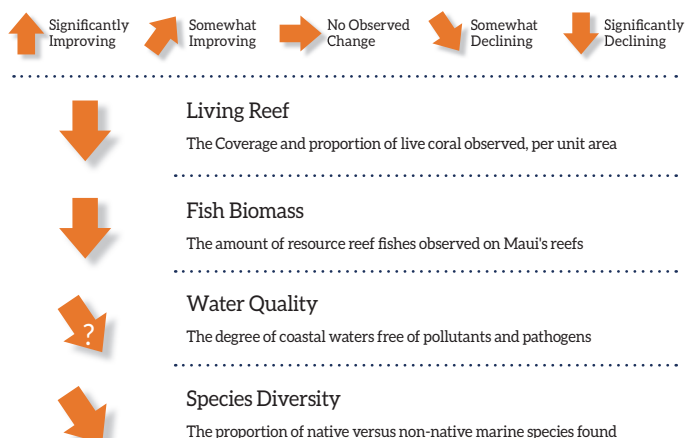
Similar to monitoring human health, we can periodically 'check-up' on the health of Maui's coral reefs. Like people, healthier reefs have a greater chance of recovery from periodic illnesses than ones that are continually stressed and/or diseased. Summary check-up results regarding the current health of Maui's reefs are presented below (Box 1). They are deeply alarming.

### Our Diagnosis in 2015

The status of Maui's coral reef health is poor. In the absence of increased treatment and effective management, continued declines in reef health are expected in coming years.

#### Box 1: Summary results on the current health of Maui's coral reefs

(trends in key diagnostics of health: 1995–2015)



# REVERSING THE DECLINE

## Why We Should Care About Maui's Reefs

Maui is home to some of the largest and most complex coral reefs in the main islands. These reefs provide innumerable cultural, economic, and recreational benefits to the people and the visitors of Maui. Continued losses will forever alter the economic value, quality of life, and traditional and cultural connections of these irreplaceable resources for Maui's people.

Simply acknowledging that there is a problem is not enough to solve it.

Through the customary and shared native Hawaiian value of kuleana, we feel strongly compelled to let the public know about the observed declines in the health of Maui's coral reefs. Fortunately, Hawai'i and other places around the world have shown us how to reverse such declines, and we believe that it is not too late to do so. Accordingly, we must act immediately to reverse and stop these alarming trends.

We are encouraged by the recent increased local engagement and action that has been taken to restore reefs in people's communities.

*The creation of community-managed makai areas (CMMAs) starting in 2010 and the initiation of the Maui Community Managed Makai Area Network in 2013 hold great promise.*

At Kahekili a new preserve is protecting herbivorous reef fish. New rules were also recently passed limiting the number of parrot and goatfish that can be fished. We also have a much stronger scientific understanding of the status and trends in the health of Maui's reefs and fish populations than we did a generation ago, providing us with an improved level of precision to guide our actions and objectively measure the outcomes of our management efforts. For example, we know through a recent comparison of 310 sites around the world that using resting areas (kapu) in modern times typically helps to restore both reef fish populations and coral habitat.<sup>25</sup> Despite these successes, we remain deeply concerned.

*This report has been written for you, because you can help to reverse Maui's declining reef health.*

There are 5 priority actions that we must increase beyond current levels of effort (see Box 2) during the next 3 years: (1) building the capacity and increasing the number of CMMAs around Maui to implement coral reef recovery strategies through collaborative efforts; (2) enhance enforcement of current marine resource rules and regulations within Maui's coastal waters; (3) expand the network of coral reef areas under protection around Maui, with a target of protecting 20% of Maui's coral reef ecosystems sustainably managed by 2020 (currently < 2%); (4) implementing policies and practices to reduce sediment and nutrients flowing onto Maui's reefs; and (5) promote a collaborative approach to marine resource management around Maui.<sup>26</sup> If we take appropriate action, Maui's reefs will recover. This hope depends on our collective commitment to do so.

### Our Recommendation for 2016+

The current level of action to restore the health of Maui's reefs is insufficient; we must commit fully to taking the actions necessary to protect Maui's coral reefs by urgently expanding the level and scope of protection and community involvement.

All footnoted references are available online at:

<http://www.mnmrc.org/mauis-coral-reefs-declining-trends-report>

### Box 2: Taking Action for Maui's Coral Reefs

Degree of Action to Date:

LOW

MODERATE

HIGH

#### Build the capacity and number of Maui's CMMAs

Community-Managed Marine Areas (CMMAs) organized and implemented by local communities and their partners around Maui



#### Enhance enforcement of current rules and regulations

Increase the effectiveness of local enforcement of current coastal and marine resource rules and regulations by designated authorities



#### Expand network of coral reef protected areas around Maui

Coral reef sites that have been designated as kapu to allow the necessary time and space for corals and reef fish to recover



#### Reduce sediment and nutrients flowing onto reefs

Implement best management practices to control storm- and waste-water runoff onto coral reefs adjacent to Maui's coastline



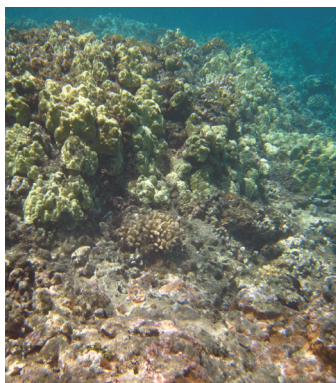
#### Promote collaborative marine resource management

Shift marine resource management authority and responsibility from State-only to a collaboration between State and local Maui communities



## REFERENCES

**This report was prepared by the Maui Coral Recovery Team:  
A voice for the health of Maui's reefs**

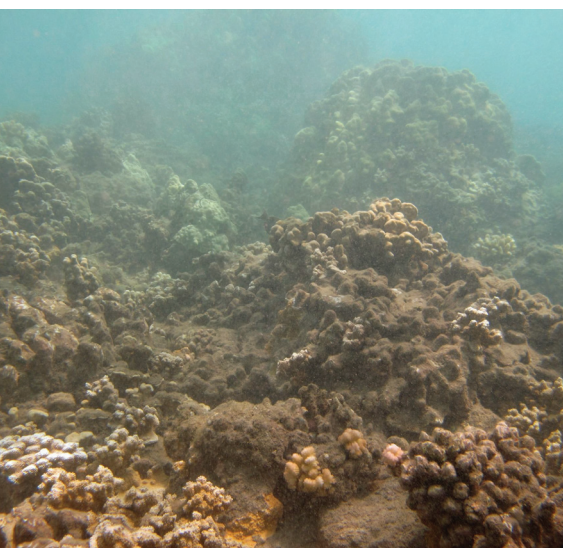
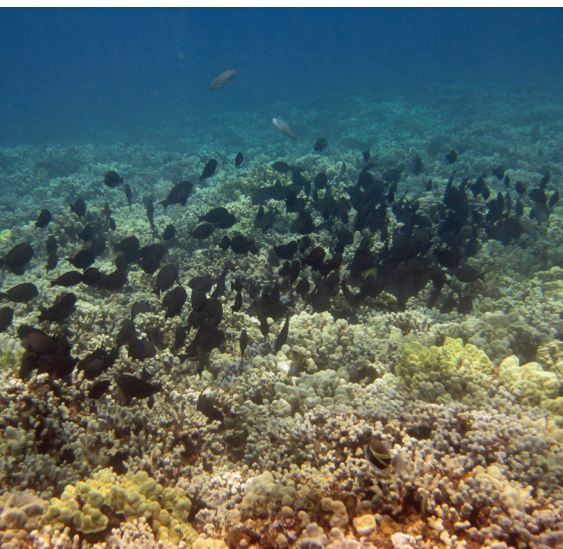


We have created this report both for Hawai'i's decision makers and the public. Our team is comprised of Hawai'i's preeminent coral reef scientific and management experts from across the islands. We work together on a voluntary basis driven by our shared concern regarding the fate of Maui's coral reefs. We support decision makers and local communities to take action that effectively manages Maui's coral reefs for the benefit of current and future generations.

- <sup>1</sup> DAR 2014. Status and Trends of Maui's Coral Reefs. State of Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources and the Hawai'i Coral Reef Initiative Research Program. Honolulu, HI. 2 pages.
- <sup>2</sup> Rodgers et al. 2015. "Over a decade of change in spatial and temporal dynamics of Hawaiian coral reef communities." *Pacific Science*. 69(1): 1–13.
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- <sup>11</sup> State of Hawai'i Water Quality Monitoring and Assessment Report: Integrated Report to the U.S. Environmental Protection Agency and the U.S. Congress Pursuant to §303(d) & §305(b), Clean Water Act (P.L. 97–117).
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- <sup>13</sup> Smith, C. E., and J. E. Smith. 2006. "Algal blooms in North Ki'hei: An assessment of patterns and processes relating nutrient dynamics to algal abundance." A Report to the City and County of Maui. Kahului, Maui.
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- <sup>23</sup> Hoegh-Guldberg et al. 2007. "Coral reefs under rapid climate change and ocean acidification." *Science* 318: 1737–1742.
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- <sup>25</sup> 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): 1–7.
- <sup>26</sup> For a practical guide on how to implement proven, peer-reviewed coral reef recovery strategies for Maui's reefs, see the Maui Coral Reef Recovery Plan (2nd edition; 2015).

Download online at: <http://www.mnmrc.org/mauis-coral-reefs-declining-trends-report>





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Our vision: the waters of Maui Nui are clean, our coral reefs healthy, and our native fishes abundant.

Learn more and get involved at <http://www.mnmrc.com> and <https://www.facebook.com/MNMRC>

*This document was prepared by the Maui Coral Recovery Team: a voice for the health of Maui's reefs. We have created this report both for Hawaii's decision makers and the public. Our team is comprised of Hawaii's preeminent coral reef scientific and management experts from across the islands. We work together on a voluntary basis driven by our shared concern regarding the fate of Maui's coral reefs. We support decision makers and local communities to take action that effectively manages Maui's coral reefs for the benefit of current and future generations.*