LIMU AND NITROGEN POLLUTION

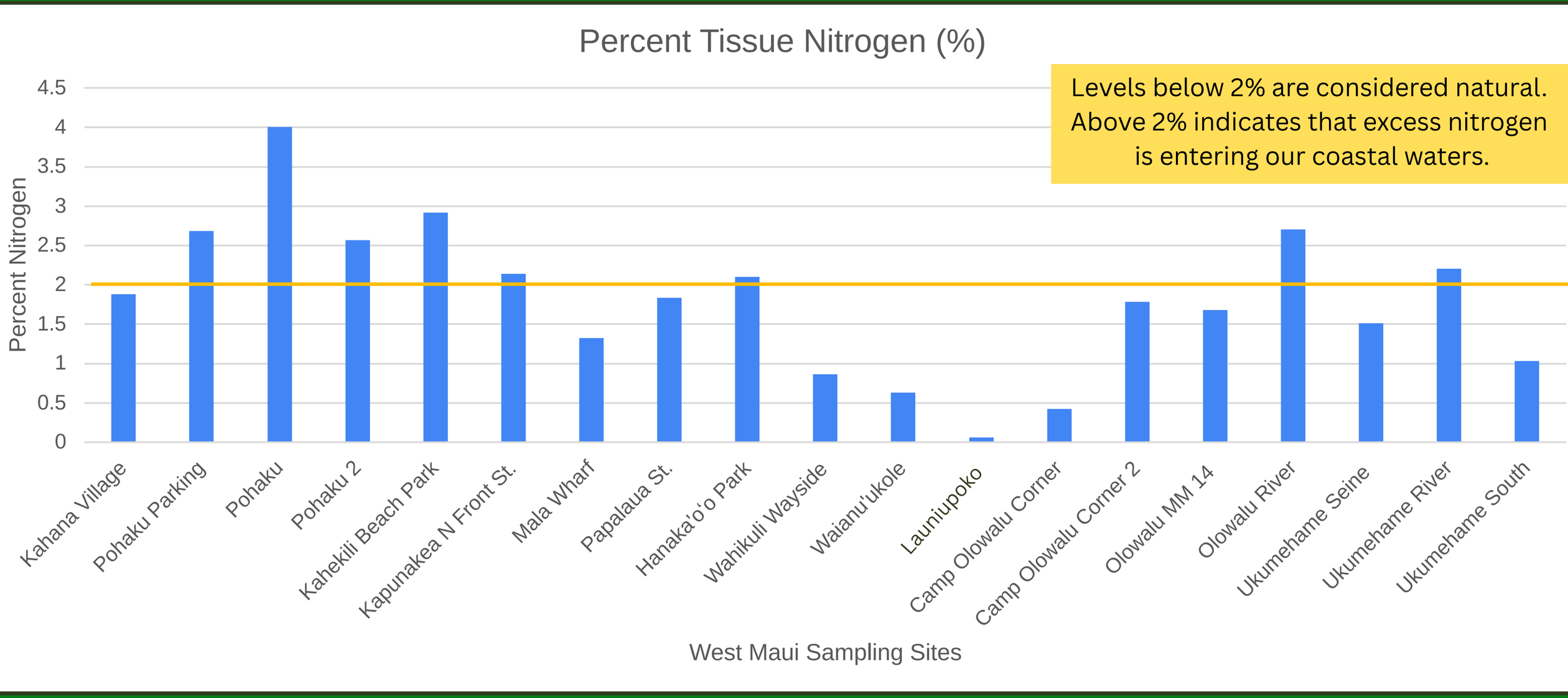
West Maui

NITROGEN LEVELS

Nitrogen is an essential nutrient for limu, which can absorb and store it when concentrations are high. However, excess nitrogen - often from fertilizers, wastewater, or a combination of both - can disrupt coastal ecosystems.

KEY FACTS

- Elevated nitrogen levels in marine algae (*limu*) show that nutrient pollution is associated with the presence of development in West Maui.
- Previously documented nitrogen enrichment from wastewater persists in the area downstream of the Lahaina Wastewater Reclamation Facility injection wells.
- Nitrogen values at near Kahana Village indicate the presence of wastewater.
- Results at Pohaku Park (S-Turns) and Olowalu River suggest fertilizer as a nitrogen source.



Pohaku Park (S-Turns) and **Olowalu River** sites show very high nitrogen levels, possibly linked to commercial fertilizer sources. Nitrogen levels at Kahana and Kahekili are more moderate, but when considered alongside isotope data (see next graph), they indicate wastewater as a potential nitrogen source.

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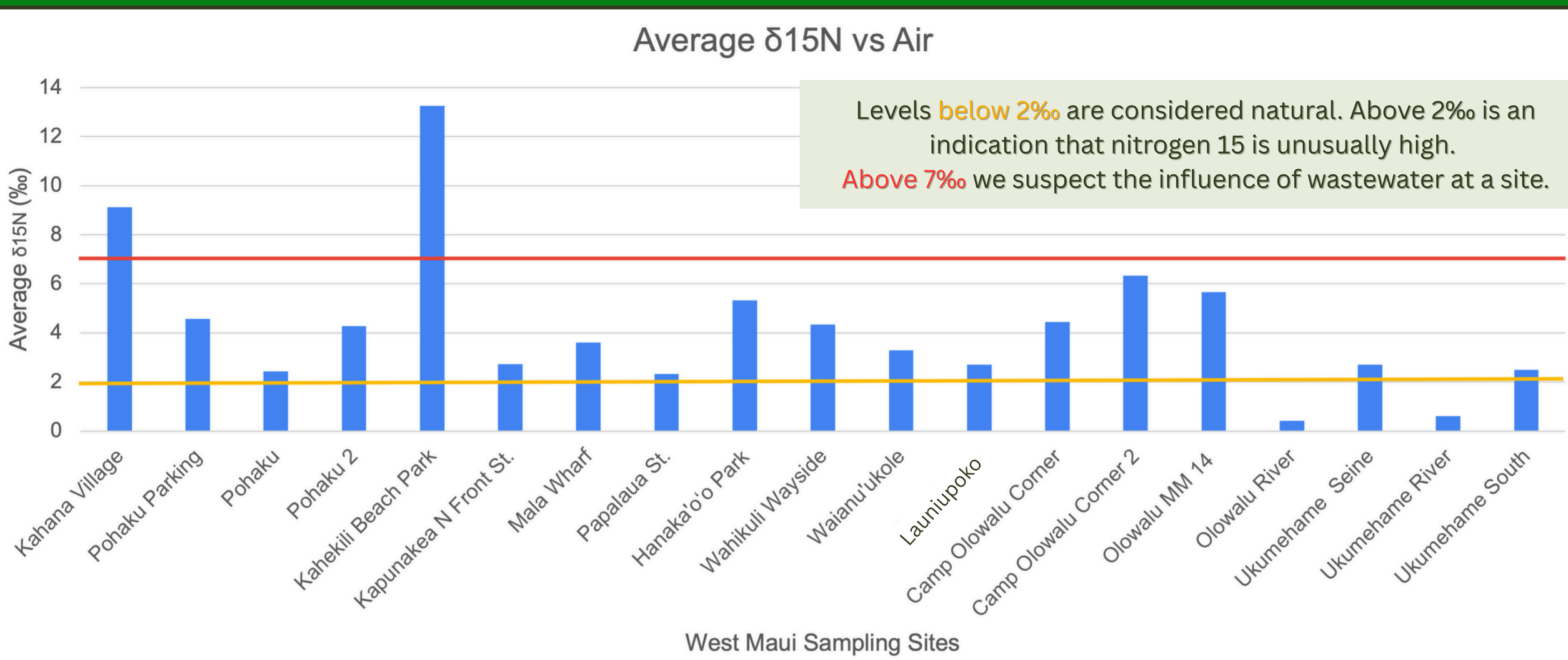
Nitrogen Ratios: Isotopes ^{14}N vs ^{15}N

Bacteria remove lighter nitrogen 14 (^{14}N) from the environment and leave more nitrogen 15 (^{15}N). As ^{15}N isotope levels increase, we suspect wastewater as the source of nitrogen at a site.

In West Maui, the nitrogen signature at **Kahekili** is from the Lahaina wastewater reclamation facility, confirming that injection wells continue to pollute this area. At **Kahana**, a clear source of wastewater is currently unknown.



WASTEWATER PLUMES

Wastewater from treatment plants is injected into the ground and eventually reaches the ocean, creating a plume of polluted water that is detectable in limu. Maui County is working to upgrade treatment processes to remove excessive nutrients and eliminate pathogens before injection.

NEXT STEPS

We are left with several West Maui sites where we cannot identify a clear source of nitrogen: Pohaku, Kahana, and Olowalu. We are working with local partners and community members to gain a better understanding of the history and environment to better identify sources of excess nutrients. In 2026, we will retest many of these sites to build upon data, detect trends in nutrient pollution, and identify sites that need mitigation.

We greatly appreciate the support of the County of Maui's Environmental Protection & Sustainability Division, which made this work possible and will enable continued progess in 2026.

Environmental Protection & Sustainability Division

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