Not Just Another Pretty Beach: Bellows Air Force Station deals with shoreline loss

Photo: Anukriti Hittle

When people think of Hawai'i, they think of beautiful beaches—and rightly so. What most people do not know is that environmental factors are causing rapid beach loss, with over 70 percent of beaches in Hawai'i having eroded to some extent and over 13 miles of beach having been lost completely to erosion over the last decade[1]. Accelerated sea level rise (SLR) will further amplify the impacts on these coasts.

Bellows Air Force Station (BAFS) on the Windward Coast of O'ahu has been with the US military since 1917. Once an active airfield, BAFS now supports training missions and offers a recreational site for military families during the week and is open to the public on the weekend. The one mile of white sandy beach at BAFS is also culturally significant – it is a sacred place where Hawaiians lived and buried the dead. SLR would have a profound negative impact on the cultural values associated with this site. The US Air Force has worked with the Hawaiian community to build a burial vault to relocate remains that are found exposed due to coastal erosion on the beach.

"The main impact to the coastal area is erosion of the beach and the dunes," said Craig Gorsuch, Environmental Manager at BAFS. Ironwood trees (*Casuarina equisetifolia*) planted in the 1950s and 1960s are one of the main culprits in beach erosion as the dense layer of needles that fall from them discourage understory growth of plants that could support dune growth. Another contributor to the erosion is the hardening of the shoreline by the ¼ mile of seawall built to protect cottages along the beach. This wall prohibits *mauka* (landward) migration of the beach and dunes which leaves smaller and smaller slivers of sandy beach as the shoreline moves *mauka*. A stone jetty built in the 1940s to keep Puha stream continually open to the ocean also contributes to the erosion. Changes in wind patterns, increasing foot traffic, and an unprecedented number of storms last summer have led to further erosion of the dunes and the shoreline. At the northern end of BAFS by the seawall during high tide there is hardly any sandy beach left for families to use.

The Air Force is actively managing the coastline in order to protect the beach from further erosion and stabilize and build the dunes along the coast. Their efforts include removing ironwood trees, establishing temporary irrigation systems, and planting native coastal vegetation. BAFS has engaged the larger community to care for and help protect the beautiful beach there. Hundreds of volunteers plant native vegetation to stabilize the dunes that protect and preserve the beach there. Five or six community events are organized each year, each of these yields not only establishes new vegetation, but also fosters a connection to the land.

Key Message: Engaging the community in coastal restoration fosters a connection to the land.

[1] Flectcher, C.H., et al. 2012. National Assessment of Shoreline Change: Historical Shoreline Change in the Hawaiian Islands. U.S. Geological Survey Open-File Report 2011-1051, 55pp. Available at http://pubs.usgs.gov/of/2011/1051

RECOMMENDATIONS FOR FUTURE WORK

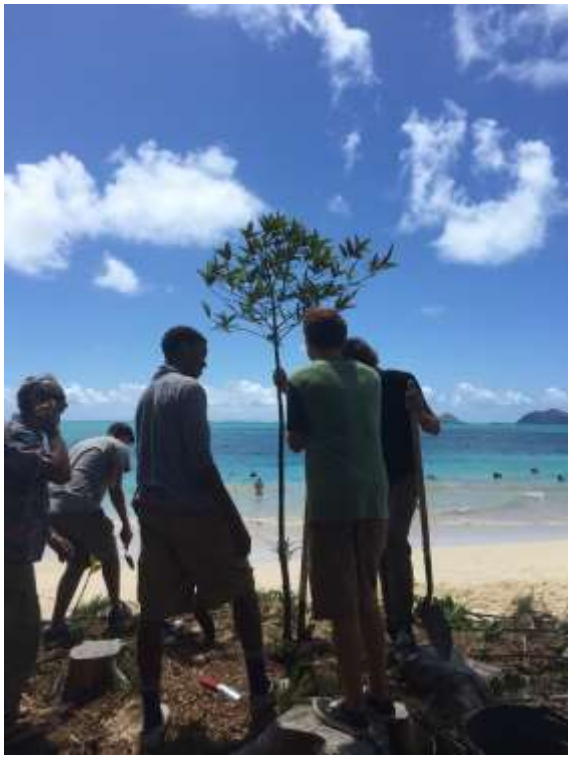
- **Information sharing**: The AF is experimenting with low cost, low technology methods to quantify the success of dune restoration at BAFS. A more regular and formal channel for information-sharing regarding these strategies for dune managers would be welcome.

- **Incorporation of SLR into BAFS plans**: AF environmental managers have been active in developing and refining the management plan for BAFS. While BAFS's management plan is a "living document," SLR is not directly addressed and related action items are not specifically incorporated into the planning document.

In addition to engaging with the community, BAFS is reaching out to peer institutions hoping to accomplish the same beach management and restoration goals. "The AF has begun sharing lessons learned regarding dune management and recommends further sharing of information such as how to make limited resources go further, how to engage volunteers, and document work in a DIY manual for windward beaches on O'ahu," said Gorsuch. Nascent mentoring programs for students and interns are excellent examples of the potential housed in this beach.

Bellows is not the only military base to face sea level rise impacts. Planning for SLR and other climate change-related impacts is a priority for the Department of Defense (DoD). A DoD report to Congress stated that "the department must consider the effects of climate change -- such as sea level rise."[2] A pilot study of SLR has been completed for Langley AFB in Virginia and the AF is now conducting a climate adaptation assessment of all its coastal bases, which is now in the data collection phase.[3]

The current commander at BAFS, Major Dawn Standridge, has taken an active role in supporting the dune restoration work, committing resources and staff to the program and has personally participated in dune out-planting days with her children. Over the next two years, BAFS will incorporate climate adaptation and SLR into the planning processes such as bolstering dune growth and allowing for inland retreat of the shoreline. Given its mission to support recreation for military personnel and the public, SLR will have to be addressed more comprehensively in the short and long term at Bellows.



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[2] DoD Releases Report on Security Implications of Climate Change. DoD News. July 29, 2015. http://www.defense.gov/News-Article-View/Article/612710

[3] Ingoglia, Mark J., USA Civil Engineering Center, Pacific Division. Email. November 22, 2015.