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Testimony of  
RYAN K.P. KANAKA'OLE  
Acting Chairperson

Before the Senate Committee on  
WATER, LAND, CULTURE AND THE ARTS

Monday, February 9, 2026  
1:00 PM  
State Capitol, Conference Room 224

In consideration of  
SENATE BILL 3053  
RELATING TO NATURAL RESOURCES

Senate Bill 3053 proposes to appropriate moneys to the Division of Aquatic Resources (DAR) of the Department of Land and Natural Resources (Department) for mangrove removal and shoreline and stream maintenance in the Nineteenth Senatorial District and nearby areas, including the West Loch and Middle Loch shorelines. **The Department supports this measure, provided that its passage does not replace or adversely impact priorities indicated in the Executive Supplemental Budget request.**

DAR has been actively working in West Loch Pearl Harbor since approximately 2018, conducting invasive mangrove removal, native wetland and shoreline restoration, and ongoing water quality and biological monitoring within the Honouliuli, Waikele, and adjacent watershed areas. Pearl Harbor is the largest estuary in Hawai'i and represents a high-priority aquatic resource that supports native fish, waterbirds, and important cultural and community uses. Through coordination with community groups and state and federal partners, DAR's efforts improve water quality, restore habitat function, and support long-term, place-based watershed stewardship. This measure would provide additional resources to continue this important work.

Mahalo for the opportunity to comment on this measure.

## SB 3053 Support

By Ron Tubbs B.S.N.D. UHM

### **Coastal wetlands in Hawaii, including mangroves and salt marshes, are significant carbon sinks, sequestering carbon at rates up to 10 times higher than tropical forests, with mangroves specifically storing around $8.3tCO_2e/ha/yr$ .**

These ecosystems store vast amounts of carbon in soil, with restoration efforts showing potential to significantly offset statewide CO<sub>2</sub> emissions.

- **Carbon Sequestration Rates:** Coastal wetlands (mangroves/salt marshes) globally and in similar tropical climates sequester carbon at high rates. Specific rates for mangroves are around  $1.74MgCha^{-1}yr^{-1}$   $1.74 Mg C ha^{-1} yr^{-1}$ , ranging from 1.0 1.0 to  $9.2MgCha^{-1}yr^{-1}$   $9.2 Mg C ha^{-1} yr^{-1}$
- **Storage Density:** Coastal wetlands can store three to five times more carbon per acre than tropical forests.
- **Significance in Hawaii:** While specific total tonnage for all Hawaiian coastal wetlands is not isolated in the search results, Hawaii's overall terrestrial ecosystems (which include coastal areas) offset approximately 13% of the state's CO<sub>2</sub>O<sub>2</sub>emissions from energy and transportation, with the island of Hawai'i being the largest sink.
- **Restoration Impact:** Restored coastal wetlands in Hawaii can accumulate high carbon stocks, with soil organic carbon (SOC) in restored mangroves ranging from 15.315.3 to  $200.1MgCha^{-1}$   $200.1 Mg C ha^{-1}$
- **Vulnerability:** Destruction of these wetlands risks releasing stored carbon, which is particularly concerning for coastal development.

Mangroves, in particular, are highly effective, with some studies indicating they sequester approximately 8.3 tons of carbon dioxide equivalents per hectare per year ( $tCO_2e/ha/yr$   $tCO_2e/ha/yr$ ).

Coastal wetlands (mangroves, salt marshes, and seagrasses) are among the most efficient carbon sinks on Earth, sequestering approximately 100 0 million metric tons (MMT) of CO<sub>2</sub> CO<sub>2</sub> annually on a global scale. They store carbon in soils at rates up to 10 times greater than mature tropical forests, with typical sequestration rates ranging from 5to 8 metric tons of CO<sub>2</sub>e/ha/year

#### **Key Sequestration and Storage Data**

- **Global Impact:** Coastal blue carbon ecosystems sequester about

#### **Why Coastal Wetlands are Efficient Sinks**

Wetland plants, such as mangroves and tidal marsh grasses, absorb

## CO<sub>2</sub>

### CO<sub>2</sub>

from the atmosphere through photosynthesis and store it in their biomass. However, the majority of the carbon is stored in the waterlogged, oxygen-poor (anoxic) soil. Because of the lack of oxygen, organic matter decomposes very slowly, allowing carbon to accumulate over centuries or even millen

### Top Carbon Sequestering Ecosystems & Plants:

- **Koa Forests:** Highly effective, storing up to 60 metric tons of carbon per hectare in mature stands.
- **‘Ōhi‘a Forests:** Mature forests can store as much carbon as tropical rainforests, particularly in wet lowland environments.
- **Native Biodiverse Forests:** These are 42 times more effective than monocultures at storing carbon over the long term.
- **Wetlands:** Critically important for storing, not just sequestering, carbon to prevent greenhouse gas release.
- **Agricultural Crops:** Sugarcane and napiergrass are identified as potential high-carbon soil sequesters.

### Key Findings on Carbon in Hawaii:

- **Island Breakdown:** Hawai‘i Island holds 58% of the state's total carbon, with Kauai boasting the highest carbon density per unit area.
- **Sequestration Rate:** Terrestrial ecosystems sequester an average of 0.34 TgC/yr, with 70% of this occurring on Hawai‘i Island.
- **Restoration Impact:** Reforestation projects on Mauna Loa and Haleakalā (Nakula/Kahikinui) are crucial for rebuilding these high-capacity sinks.

Peatlands on Mount Ka‘ala (O‘ahu) and coastal wetlands/mangroves are among Hawaii's most significant carbon-sequestering ecosystems. Mount Ka‘ala's high-elevation bogs represent a 50,000-year sedimentary history of carbon storage. Meanwhile, coastal wetlands like [Kealia Pond National Wildlife Refuge](#) and others on Moloka‘i are critical for "blue carbon" sequestration.

Key details regarding carbon sequestration in Hawaii:

- **Highest Carbon Density:** Kauai has the highest carbon density among the islands, estimated at .
- **Unique Ecosystems:** Mount Ka‘ala in the Wai‘anae Range is recognized for its highly sensitive, long-term carbon sequestration response to environmental changes.

- **Coastal Blue Carbon:** Restored mangroves and coastal wetlands (such as those being mapped on Maui and Moloka'i) are vital for storing carbon, particularly in soils, reducing greenhouse gases.
- **Total Storage:** Hawaii Island holds the highest total carbon storage, largely due to its size.

Thanks, Ron Tubbs, B.S.N.D.