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STATE OF HAWAII
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Testimony of
SUZANNE D. CASE
Chairperson

Before the House Committee on
WATER & LAND

Wednesday, February 8, 2017
9:00 A.M
State Capitol, Conference Room 325

In consideration of
HOUSE BILL 386
RELATING TO BEACH MONITORING

House Bill 386 proposes to appropriate funds for the two-year extension of the Post-Bypass Beach Monitoring Program of the Kīkīaola Small Boat Harbor Sand Bypass Operation at Waimea, Kaua‘i. **The Department of Land and Natural Resources (Department) supports this measure provided that its passage does not replace or adversely impact priorities indicated in the Executive Budget request.**

It is the mission of the Department to manage public lands and ocean resources, including beaches throughout the State. The Department is very much at the forefront of addressing impacts related to coastal erosion and beach loss in Hawai‘i. Beaches are central to our culture and economy, yet our beaches are being lost at alarming rates due to natural processes and human impacts, threatening alongshore public access and upland development.

In 2014 the Department led a project that successfully bypassed 60,000 cubic yards of sand around Kīkīaola Small Boat Harbor. The harbor blocks the natural alongshore transport of sand originating from the Waimea River Mouth. The project was necessary to move impounded sand from the up-current side of the harbor to the severely eroded down-current side. The Department has funded post-bypass beach monitoring for the past two years. Continued monitoring will help in understanding the ongoing performance of the bypass project and help inform the timing of future sand bypass projects.

Thank you for the opportunity to testify on this measure.

Written Testimony Presented to the
HOUSE COMMITTEE ON WATER AND LAND
February 8, 2017

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Aloha Chair Yamane, Vice Chair Kong and Members of the House Committee on Water and Land. I strongly support, HB 386, which provides for a two-year extension of the post-bypass beach-monitoring program of the Kikiaola Small Boat Harbor sand bypass operation at Waimea, Kauai.

Since 1960, the seaward protruding Kikiaola Small Boat Harbor structure, 1.7-1.9 miles west of the Waimea River Mouth sediment source, has blocked, like a damn across a major river, the natural westward movement of sand along the coast (Figure 1). While Waimea Beach, east of the harbor, built out by over 300 feet and increased in sand volume by over 350%, 0.6-mile-long Kikiaola Beach down drift (west) of the harbor eroded landward by over 200 feet and suffered a decrease in pre-harbor sand volume of well over 50%. The decrease seriously jeopardized valuable property, both private and State, west of the harbor. Over a period of three months in 2014 (May 9-August 14), at the cost of \$1.1 million, 60,000 cubic yards of sand was moved, by excavator and truck from Waimea Beach east of the harbor to the 0.2-mile portion of Kikiaola Beach immediately west of the harbor (Figure 1). Over the past 29 months, ocean waves and wave-generated alongshore currents have worked to repair the Waimea Beach sand excavation sites and modify the Kikiaola Beach bypass sand replenishment deposits. Since April 2014, the beach system has been precisely monitored on a monthly basis at seven beach profile survey localities. Changes in beach profile cross-sectional area at each locality, closely associated to sand volume, are displayed in Figure 2.

This beach-monitoring program at Kikiaola, unprecedented for the State of Hawaii, has revealed significant information on the dynamics of a beach system and how it responds, or does not respond, to both the removal and deposition of tens of thousands of cubic yards of sand along a beach. Over two years since completion of the sand bypass operation, three principal findings can be reported: 1) Waimea Beach east of the Kikiaola Harbor structure has displayed considerable stability in terms of sand movement. The two Waimea Beach localities from which 40,000 and 20,000 cubic yards of sand was excavated have not regained sand volume. This is an important indicator that Waimea Beach alongshore currents are persistent, but not exceptionally dynamic. 2) The 0.2-mile section of Kikiaola Beach immediately west of the harbor that received 60,000 cubic feet of sand displayed a moderate degree of stability after a few months following the bypass operation; however, recent renewed erosion of the pile of bypass sand has provided a reminder that this is an unstable coastal setting that will require periodic monitoring in order to determine what should be done with the coast in the near future. 3) The 0.3-mile extension of Kikiaola Beach west of the sand bypass deposit displayed only minor fluctuation in beach character, suggesting a lack of impact of the sand bypass operation on Kikiaola Beach's down drift portion more than two years following the bypass operation.

The primary take away from the Waimea-Kikiaola Beach Monitoring Program has been demonstration of the value of monitoring coastal programs such as the \$1.1 million Kikiaola Harbor Sand Bypass Operation. Monitoring has been of considerable value in evaluating the Kikiaola operation. It also has demonstrated the need for monitoring similar future beach replenishment operations throughout the State, operations that will undoubtedly be needed in the future. For the immediate future at Kikiaola, it is imperative that Bill 386 be implemented in order to best develop an optimum procedure for managing erosion of the coastal zone immediately west of the harbor. \$58,000 was awarded for monitoring the sand bypass operation for two years following its completion; \$67,400 has been requested to extend the program for another two years with the added incorporation of aerial drone surveys that will provide a high value upgrade to the monitoring program.

Mahalo for the opportunity to provide this testimony in strong support of HB 386.

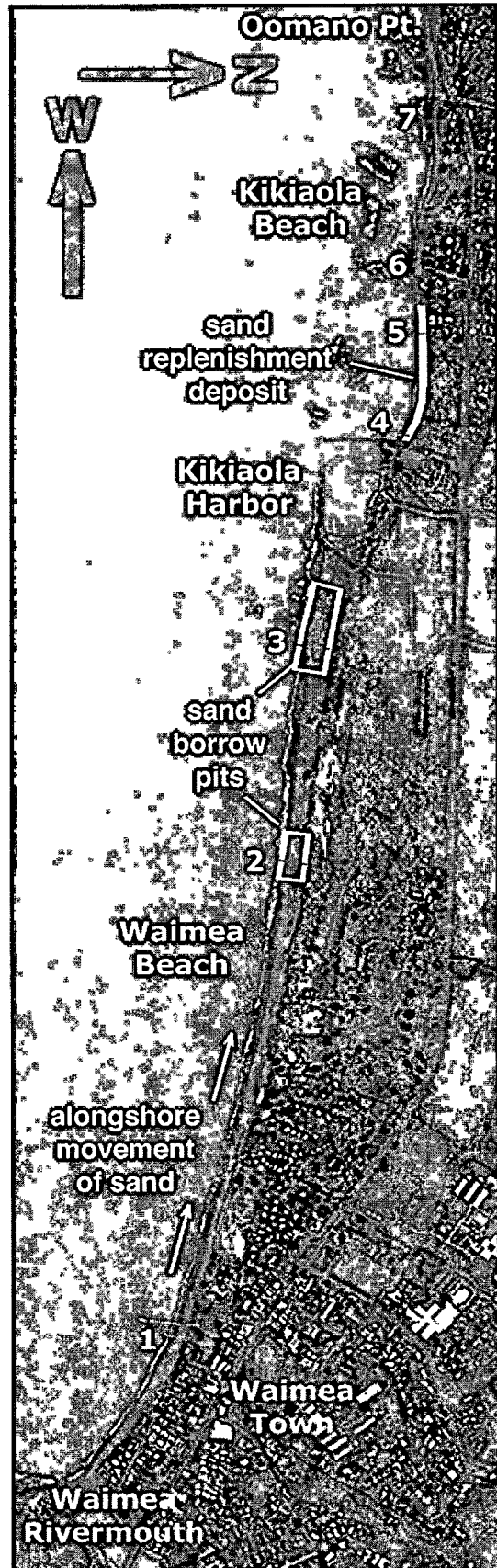


View eastward from beach profile locality 5 (Kikiaola Place) of the sand bypass deposit of Kikiaola Beach 26 months following the mid-August completion of the Kikiaola bypass operation. The harbor's west breakwater is visible in the distant right portion of the photo. Notable is the escarpment produced by wave erosion of the bypass sand deposit all along the 0.2 mile portion of Kikiaola Beach immediately west of Kikiaola Harbor.

Kikiaola Harbor Sand Bypass Monitoring Program Apr 2014-Oct 2016

Beach Profile Localities	Distance From Waimea Rivermouth (miles)
OOMANO PT.	2.50
7. Oomano Place	2.40
6. Mamo Place	2.20
5. Kikiaola Place	2.06
4. Kikiaola Harbor	1.90
KIKIAOLA HARBOR	1.67-1.88
3. Waimea Harbor	1.58
2. Waimea Cottages	1.17
1. Waimea Pier	0.36
WAIMEA RIVERMOUTH	0.00

Figure 1. Dec. 16, 2013 Google Earth image of Kauai's 2.5-mi-long South Shore Waimea-Kikiaola Beach Complex, Hawaii's largest volcanic sand beach. Sand is derived from the Waimea River that drains Waimea Canyon and is transported westward to Oomano Pt. Since 1960, Kikiaola Small Boat Harbor has blocked alongshore movement of sand, resulting in considerable erosion of Kikiaola Beach west of the harbor. In mid-2014, 60,000 cubic yards of sand was moved, by excavator and truck, from Waimea Beach to Kikiaola Beach. The sand bypass nourishment operation has been monitored on a monthly basis utilizing beach profile surveys at the seven localities illustrated by yellow numbers. The bypass sand deposit is now showing signs of advanced renewed degradation. Extension of the monitoring program is needed in order to determine the optimum time for renewed nourishment of Kikiaola Beach in order to continue to provide protection of coastal properties west of the harbor.



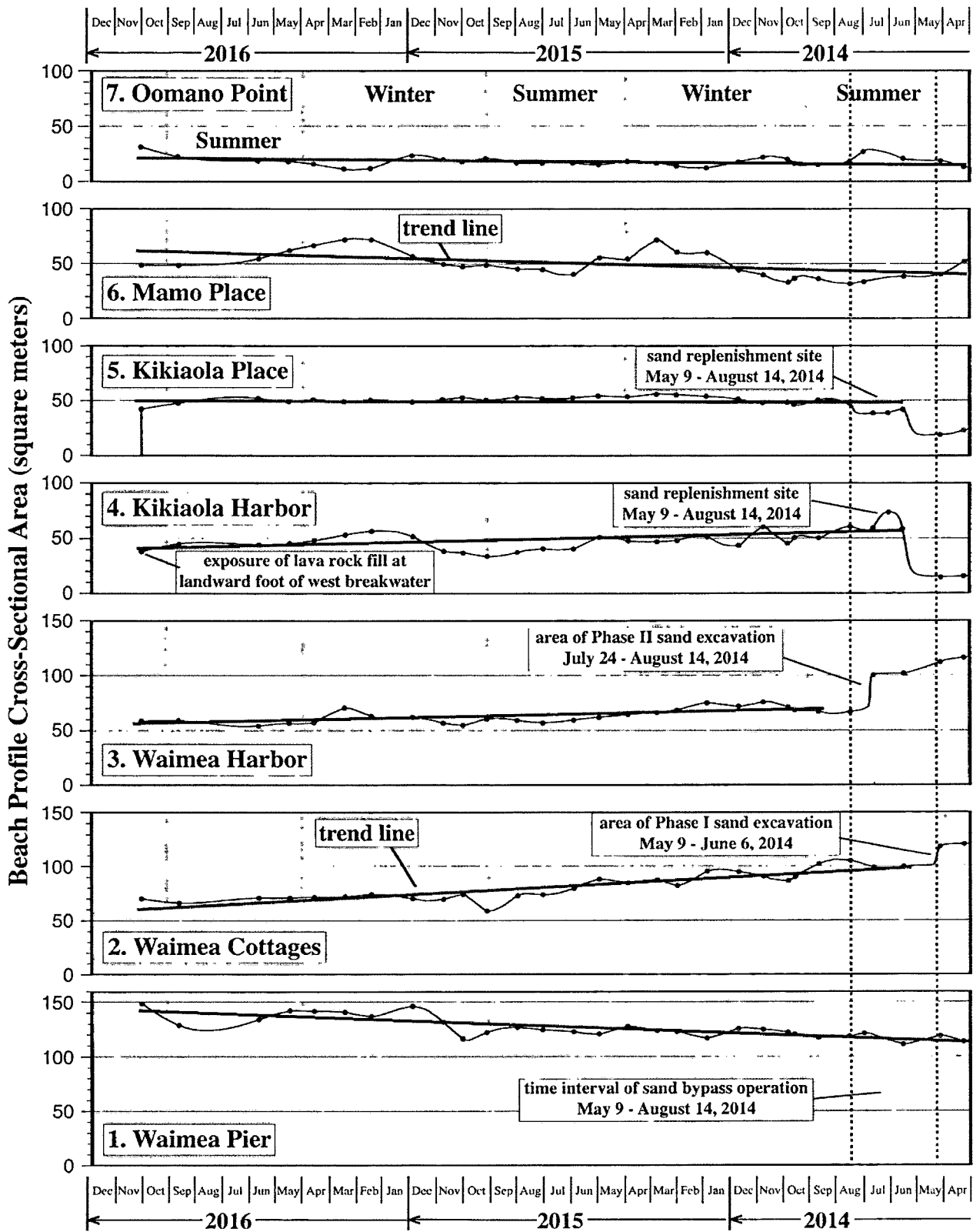


Figure 2. Plots of beach profile cross-sectional area for Waimea/Kikiaola localities, April 2014 - October 2016. See expanded explanation on facing page.

Figure 2. Plots of profile cross-sectional area, and index of sand volume, for Waimea/Kikiaola beach survey localities, April 2014 to October 2016 (31 months), arranged from bottom to top as displayed in Figure 1 to depict the alongshore movement of beach sediment from its source at the Waimea River mouth westward for 4 km (2.5 mi) to Oomano Point. These plots summarize the variation in beach profile cross-sectional area in response to both the normal seasonal fluctuation in beach character and the May-August 2014 sand bypass operation. Plots display both a moving average (Spline Fit) of profile area (black line) and a trend line (green) indicating overall increase or decrease in the cross-sectional area of the active sand beach.

1. Waimea Pier: Although undisturbed directly by the sand bypass operation, the beach at this locality, only 0.6 km (0.35 mi) from the river mouth, displayed a 30% gradual increase in cross-sectional area, over the 31-month investigation, from ~115 to nearly 150 sq meters (135-180 sq yd).

2. Waimea Cottages: Immediately following the Phase I (May 9-June 6, 2014) excavation of 40,000 cubic yards (30,400 cu m) of sand from the vicinity of this profile locality, the beach displayed a 15% decrease in cross-sectional area from ~120 to 100 sq m (145-120 sq yd). Since June 2014, the beach has continued to deteriorate, displaying an additional 30% decrease in profile cross-sectional area, over 31 months, to an area of 68.5 sq m (82 sq yd), in late October 2016.

3. Waimea Harbor: Immediately following the Phase II (July 24-August 14, 2014) excavation of 20,000 cubic yards (15,200 cu m) of sand from the vicinity of this locality, the beach displayed a 30% decrease in profile cross-sectional area from ~100 to 67 sq m (120-80 sq yd). Since, over 26 months to late October 2016, the beach has continued to deteriorate, with profile cross-sectional area decreasing by another 18%, to less than 58 sq m (67 sq yd).

4. Kikiaola Harbor: The deposition of bypass sand at this locality, May 9-August 14, 2014, resulted in an immediate 400% increase in profile cross-sectional area, from 15 to 70 sq meters (18-84 sq yd). Since, the locality has undergone, gradually over 26 months to late October 2016, an additional 25% decrease in cross-sectional area to less than 40 sq m (48 sq yd). Recently, as displayed in the late October 2016 survey, renewed erosion has exposed the landward lava rock boulder foot of Kikiaola Harbor's west breakwater.

5. Kikiaola Place: The deposition of bypass sand at this locality, May 9-August 14, 2014, resulted in an immediate 150% increase in profile cross-sectional area, from ~20 to 50 sq m (24-60 sq yd). Since, until the most recent beach profile survey, the locality has displayed considerable stability, varying only from ~48-50 sq m (58-50 sq yd). However, the late October 2016 survey displayed a significant decrease in profile cross-sectional area to only 41 sq meters (49 sq yd).

6. Mamo Place: This down-drift beach locality has displayed little to no impact of the sand bypass operation. Beach profile cross-sectional area has fluctuated from ~35-45 sq m (40-55 sq yd) through summer months to 55-70 sq m (65-85 sq yd) through the winter in response to the seasonal fluctuation in wave energy, from relatively high in the summer to low in the winter. A subtle overall increasing trend in sand volume indicated in the plot, ending in late October 2016, is due to the high sand content resulting from the previous five months of moderately high summer surf.

7. Oomano Point: This distal, narrow, eroded beach displayed no obvious impact of the sand bypass operation. Only minor month-to-month fluctuation was recorded in profile cross-sectional area through the 31-month study period, April 2014-October 2016.