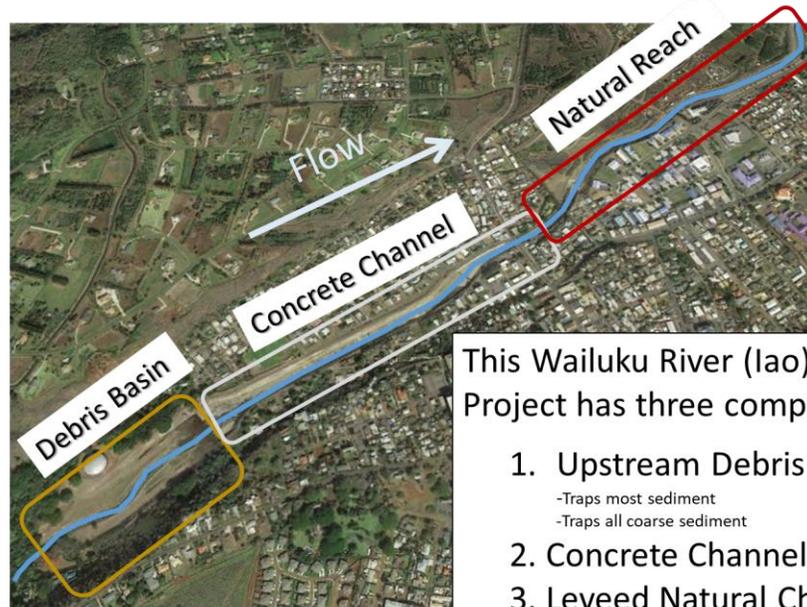




Description

The federally constructed, locally maintained, debris basin at the upstream end of the Iao Stream Flood Control Project, Maui, Hawaii intercepts too much sediment. The current design drives costly maintenance and creates a supply limited condition downstream that scours a flood-risk management channel. This proposal investigates regional, win-win, management strategies that reduce deposition maintenance costs upstream and erosional maintenance costs downstream.



Upstream Debris Basin Deposition



Downstream FRM Channel Erosion



Figure 2: Debris Basin, filled with sediment (left) and scour in the natural leveed reach (right) after the same event (Sep, 2016).

Issue/Challenge To Address

The Wailuku River (formerly known as Iao Stream) has three components that protect the community from flood risk. A large debris basin traps sediment upstream. It is designed to intercept potentially catastrophic debris flow events that could fill the downstream channel and drive avulsions. Downstream of the debris basin, a concrete lined channel transitions to leveed reach with a natural channel bottom (Figure 1).

But the debris basin works too well. While this structure must provide protection from a catastrophic debris flow it does not have any designed flexibility to pass all or part of the sediment from smaller events. This complete sediment trap has caused two, paired problems. The local sponsor (County of Maui) spends a significant portion of their total



transportation-maintenance budget removing sediment from the basin. But the upstream sediment trap also creates a supply limited ('hungry water') situation in the unlined, leveed, channel downstream. The unlined, leveed, reach has incised as much as 10 ft below the original channel invert since the project was built in 1981.

Successes Lessons Learned

This is a new start.

Projected Benefits Cost Savings Value Added

The County has spent over a million dollars in the last three years cleaning out the debris basin and estimates that their annual cost for cleaning the basin to be between \$400,000 and \$600,000 (considered to be a substantial amount of their annual transportation maintenance budget). Any sediment passed by a new design would reduce these costs. The USACE Honolulu District (POH) and the County spent a total of \$4.90 million (\$3.2 million and \$1.68 million, respectively), repairing the flood channel scour damaged by the 2016 flood event. The levees that are scouring in the downstream reach protect 690 structures and levee failure presents life-and-safety hazards. Finally, keeping rocks within the river is of cultural significance to the local Hawaiian community. The river carries rocks from the site of the battle of Kepaniwai, which have sacred value to stake holders, who advocate for keeping them in the river.

Expected Products

- Sediment Budget
- Load Frequency Curve
- Debris Basin Trap Efficiency and FRM Channel Transport Capacity Calculations
- Tech Note
- Meeting with County of Maui O&M team

Stakeholders/Users

The County is very interested in strategies to reduce their maintenance costs and works closely with POH on this system to properly maintain the project. USACE will work with the County to acquire data, interview staff, solicit ideas and will report our findings to them.

Leveraging Opportunities

This work leverages a current FRM Design Deficiency study on the Iao project.

Points of Contact

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