Unique Challenges to Stream Restoration in Hawaii

Matt Rosener
Hydrologist
Hanalei Watershed Hui
Kauai, Hawaii

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Talk Outline

- Background
- Challenges
- Opportunities
- Needs
- Conclusion

Hawaii Stream Restoration Challenges

- History of land use/abuse
  - Deforestation, grazing, etc.
- Continued land use impacts
  - Development, military, etc.
- Development patterns
  - Infrastructure in place
  - Floodplains

Hawaii Stream Restoration Challenges

- Extreme hydrology
  - Steep slopes/intense rainfall regime
- Extreme channel hydraulics
  - Velocity and shear stress
- **Flood control requirements**
  - **Can limit restoration options available**
- **Regulatory constraints**
  - **Outdated engineering standards**

Excessive water withdrawl

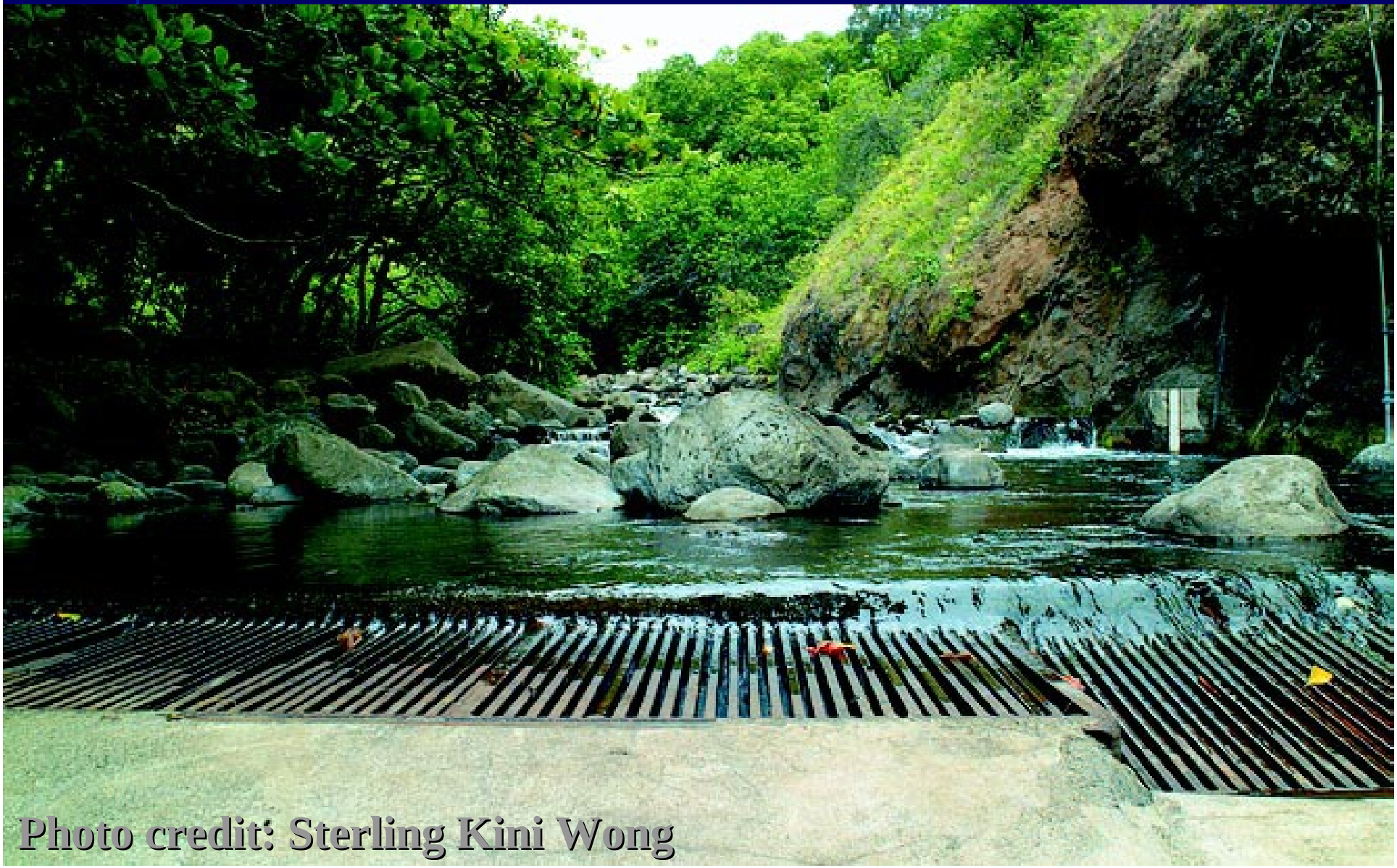


Photo credit: Sterling Kini Wong

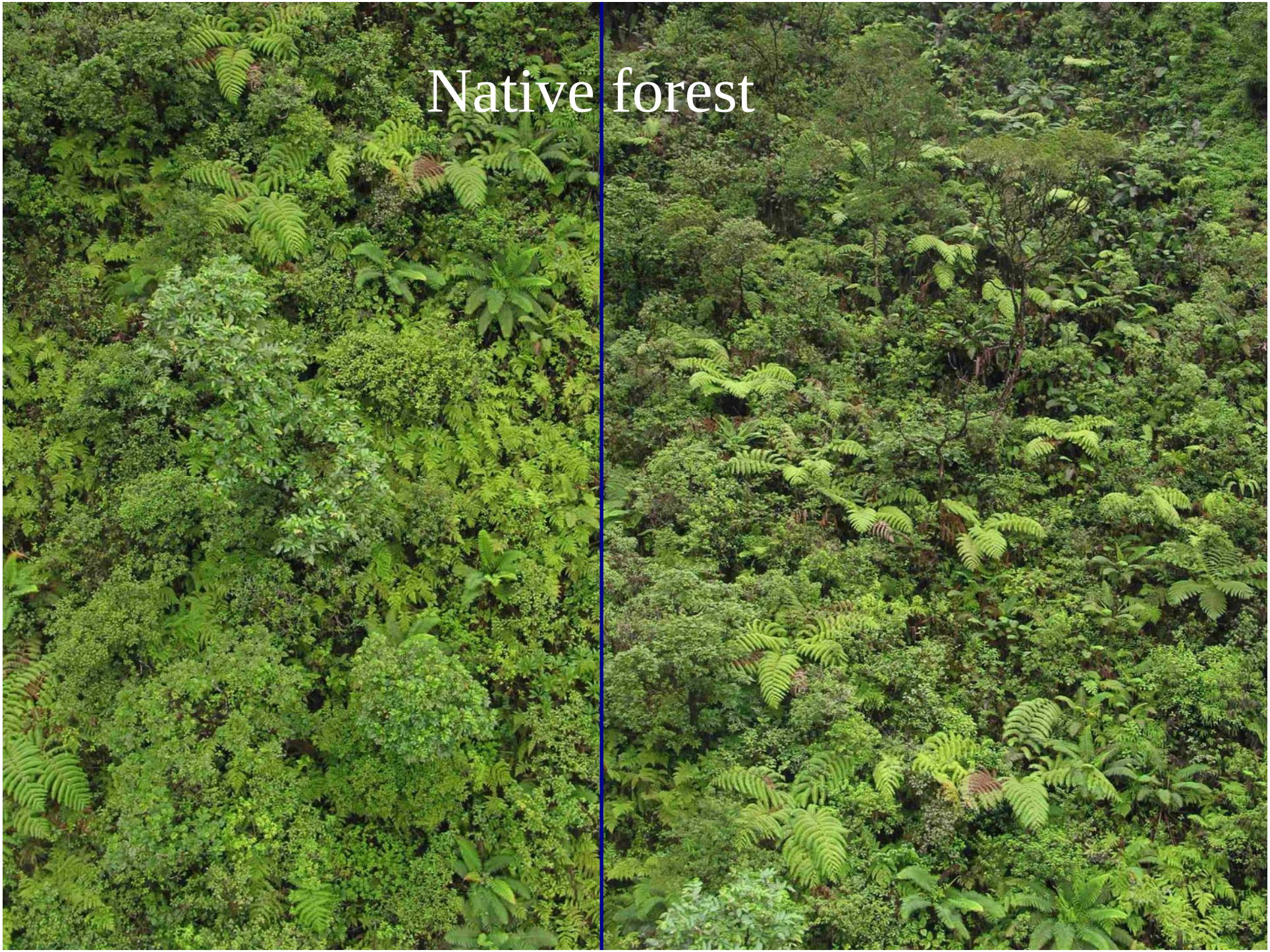
Hawaii Stream Restoration Challenges

- Invasive species in waterways & riparian zones – e.g. hau bush


Hau Removal
Trials at Waipa

Hawaii Stream Restoration Challenges

- Invasive species in uplands
  - Feral animals, exotic plants
  - Affect water, sediment balances
  - Altered hydrologic regime?
  - Increased sediment yields?
- Relatively poor understanding of watershed processes in Hawaii


Native forest

Lumahai

Wainiha

Alakai Swamp

Albezia forest

Paperbark forest

Australian Tree Fern

- landscaping plant
- spreading quickly
- difficult to control


Hau Bush


Uluhe fern

Landslides

- important sediment source
- all natural ?
- or influenced by vegetation?

Hawaii Stream Restoration Challenges

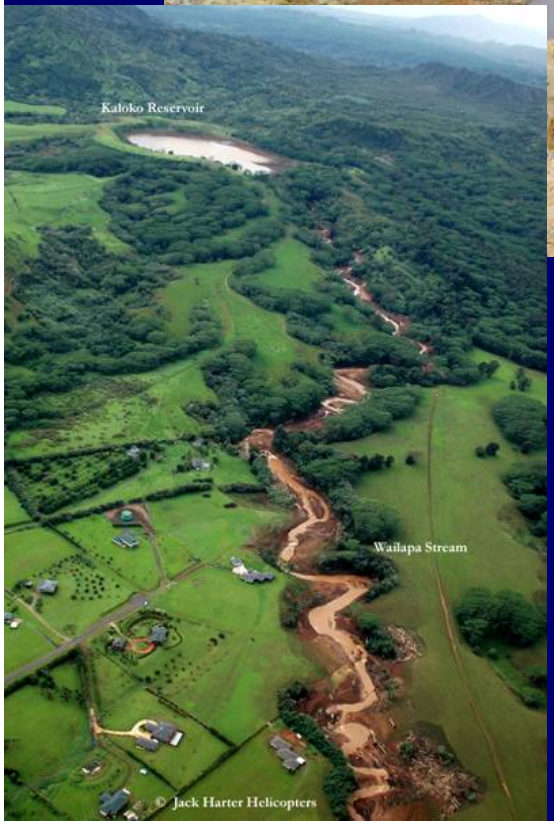
- Public perception – lack of awareness
- Capacity in engineering community for new style of management or restoration
- Lack of undisturbed reference sites – what condition are we restoring to?
- Need for continued maintenance

Hawaii Stream Restoration Opportunities

- Restoring streamflow where possible
- Small watersheds, large landowners
- Relatively undisturbed natural systems
- Growing public awareness
- Development of local watershed hui
- Using existing traditional management framework

Disturbance Events

= Opportunity?



Hawaii Stream Restoration Needs

- Willing landowners
- Better collaboration between agencies
- River engineering/bioengineering expertise
- Research on hydrologic processes
- Increased monitoring
- Greater focus by gov’t agencies on mgmt.

Hawaii Stream Restoration Needs

- Instream flow standards
- Updated drainage, erosion control, BMP, wastewater standards, riparian ordinances?

- Metrics for success
- Venues for relaying lessons learned

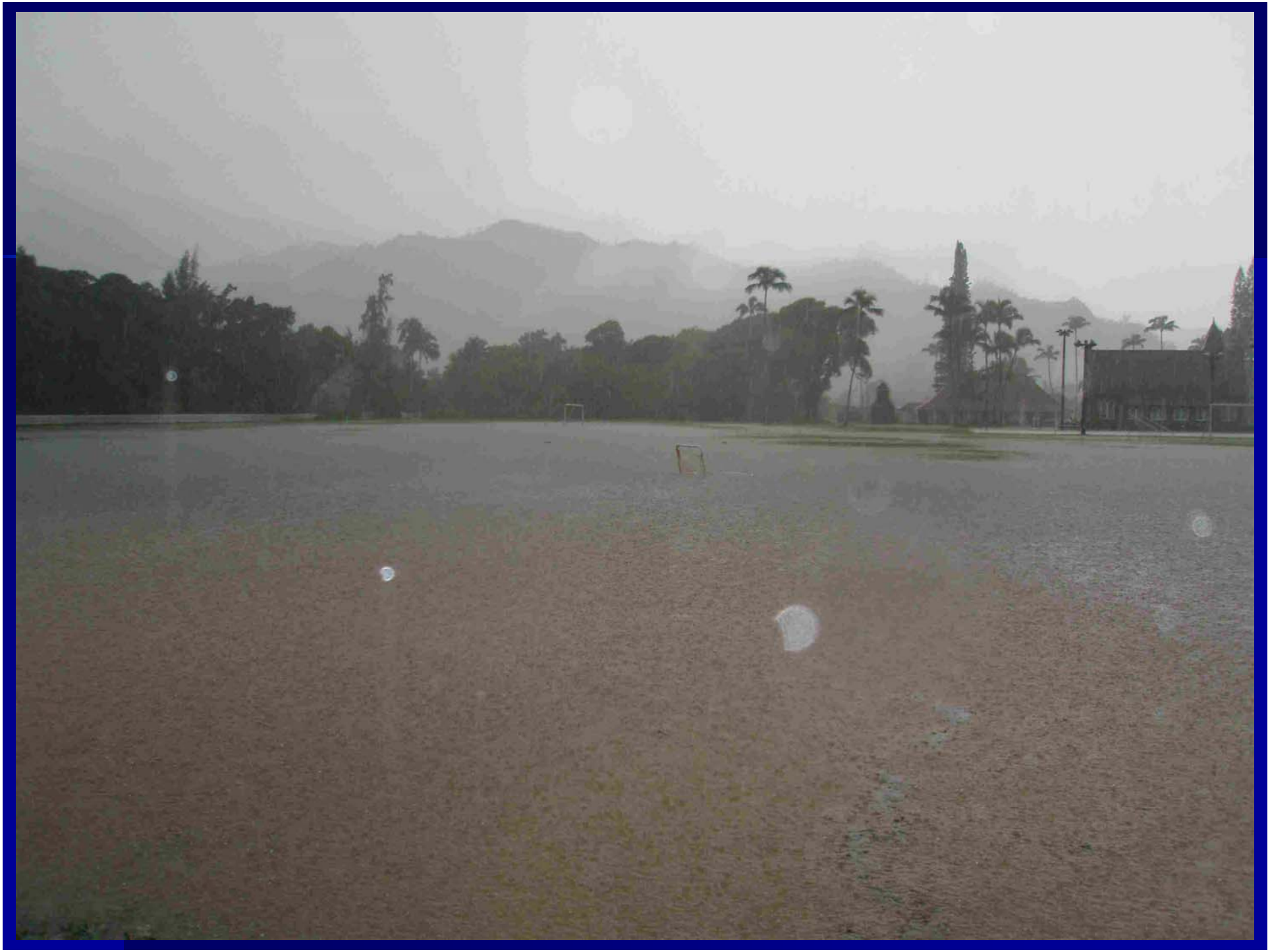
Conclusions

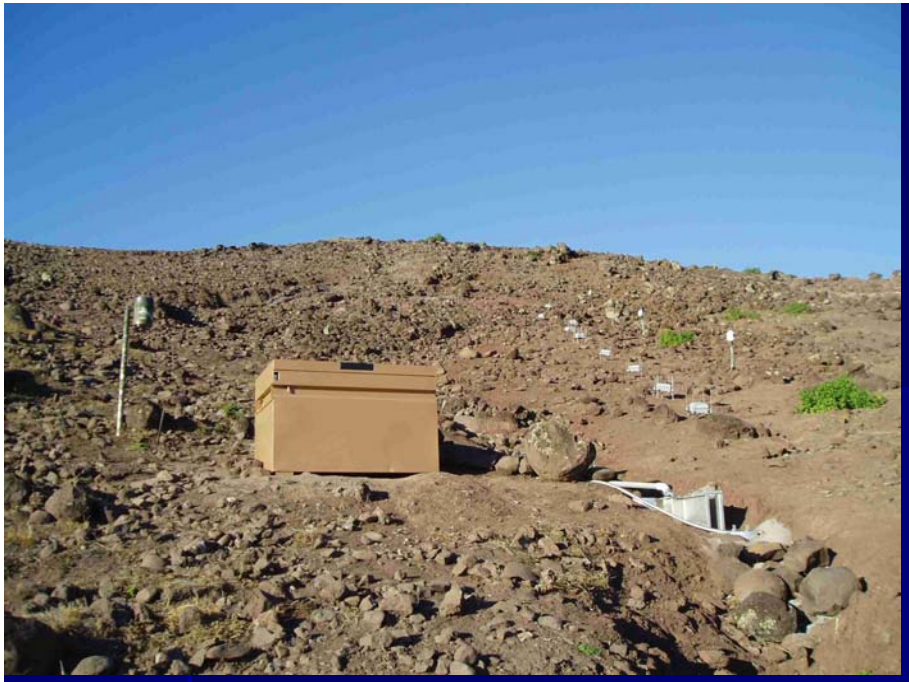
- Hawaii's streams are not storm sewers
- Watershed management gaining momentum – public awareness growing
- Substantial challenges vs. great opportunities – the glass is half-full!
- Windows closing? – let's not wait
- Management within cultural context
- Local-level management encourages use of local knowledge

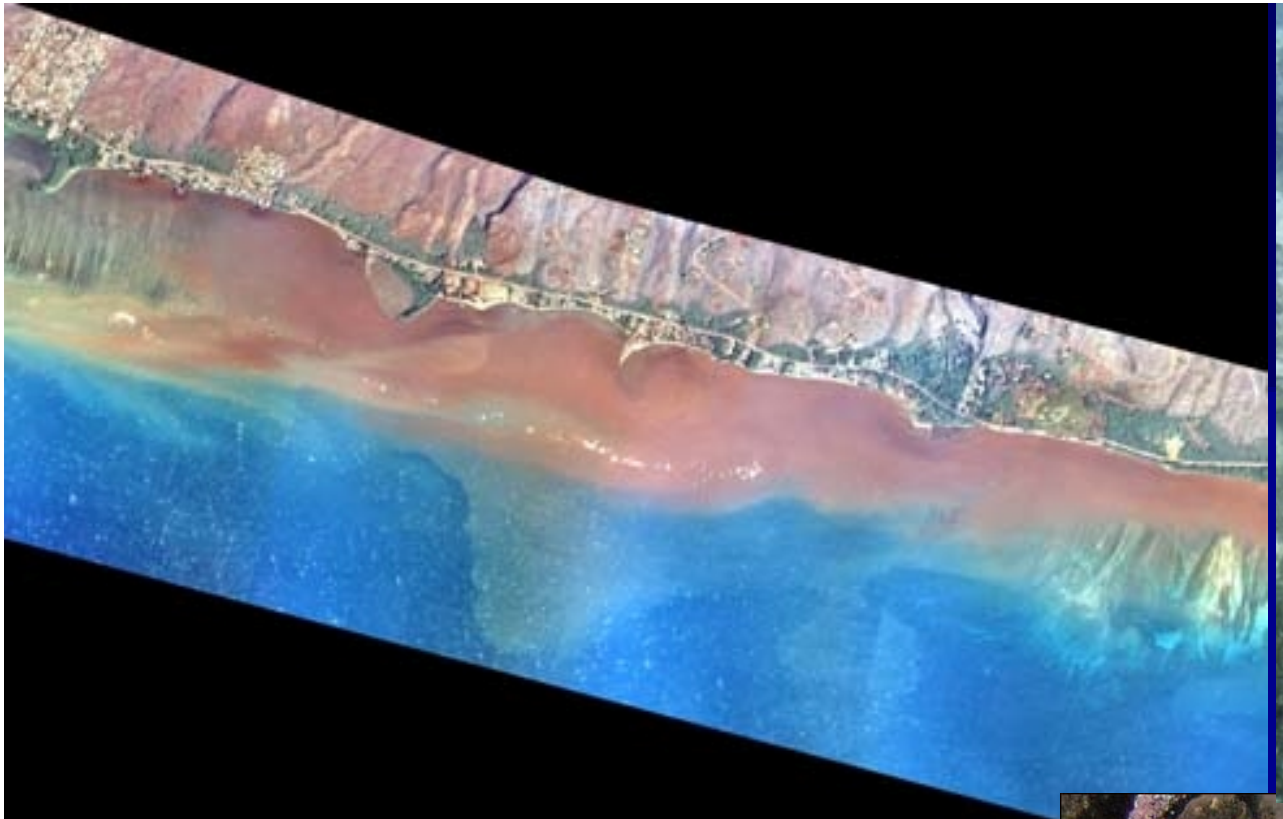

Mahalo!

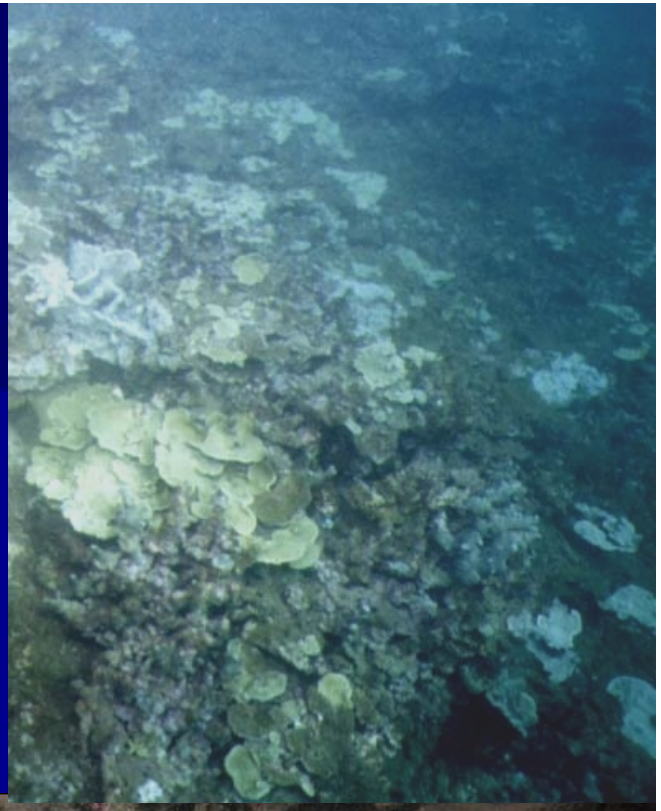
Pristine ?

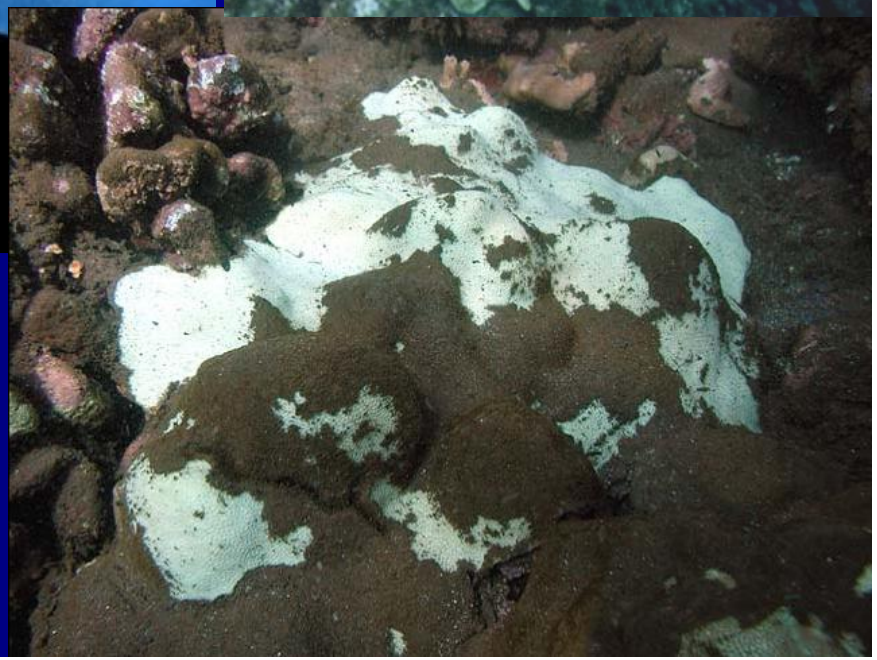
Natural ?











USGS Ridge-to-Reef Research