# Kaiaka Bay Watershed-Based Plan

PUBLIC REVIEW DRAFT

## Community Meeting – Waialua Elementary School

February 21, 2018

Katie Franklin, Townscape, Inc.

# Presentation Overview

- Introduction & Project Background
- Overview of Watersheds
- Water Quality Issues & Pollutant Sources
- Management Recommendations
- Next Steps




# Background Information

## Project Sponsors

- City & County of Honolulu, Department of Facility Maintenance
- State Department of Health, Clean Water Branch

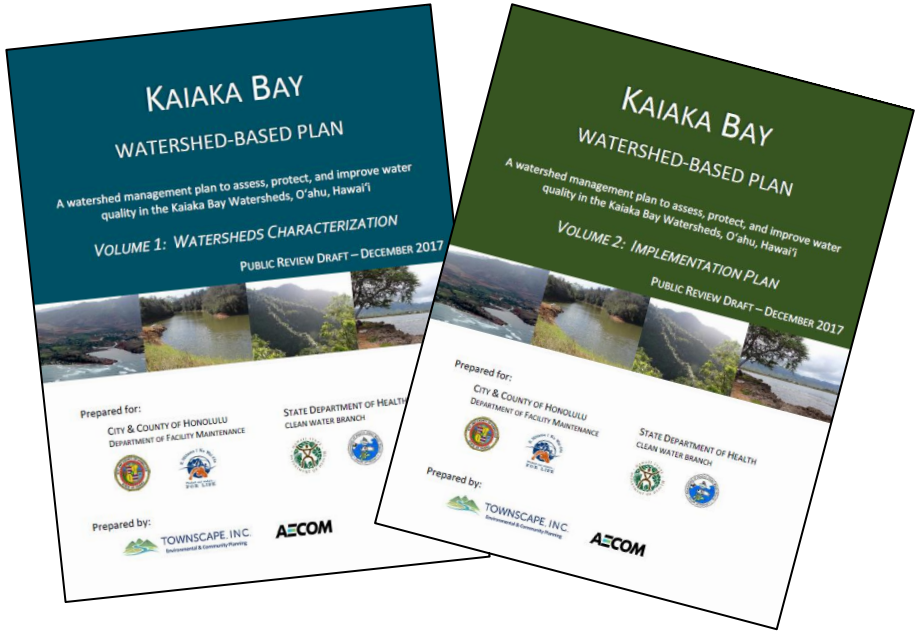
## Goals of the Watershed-Based Plan (WBP)

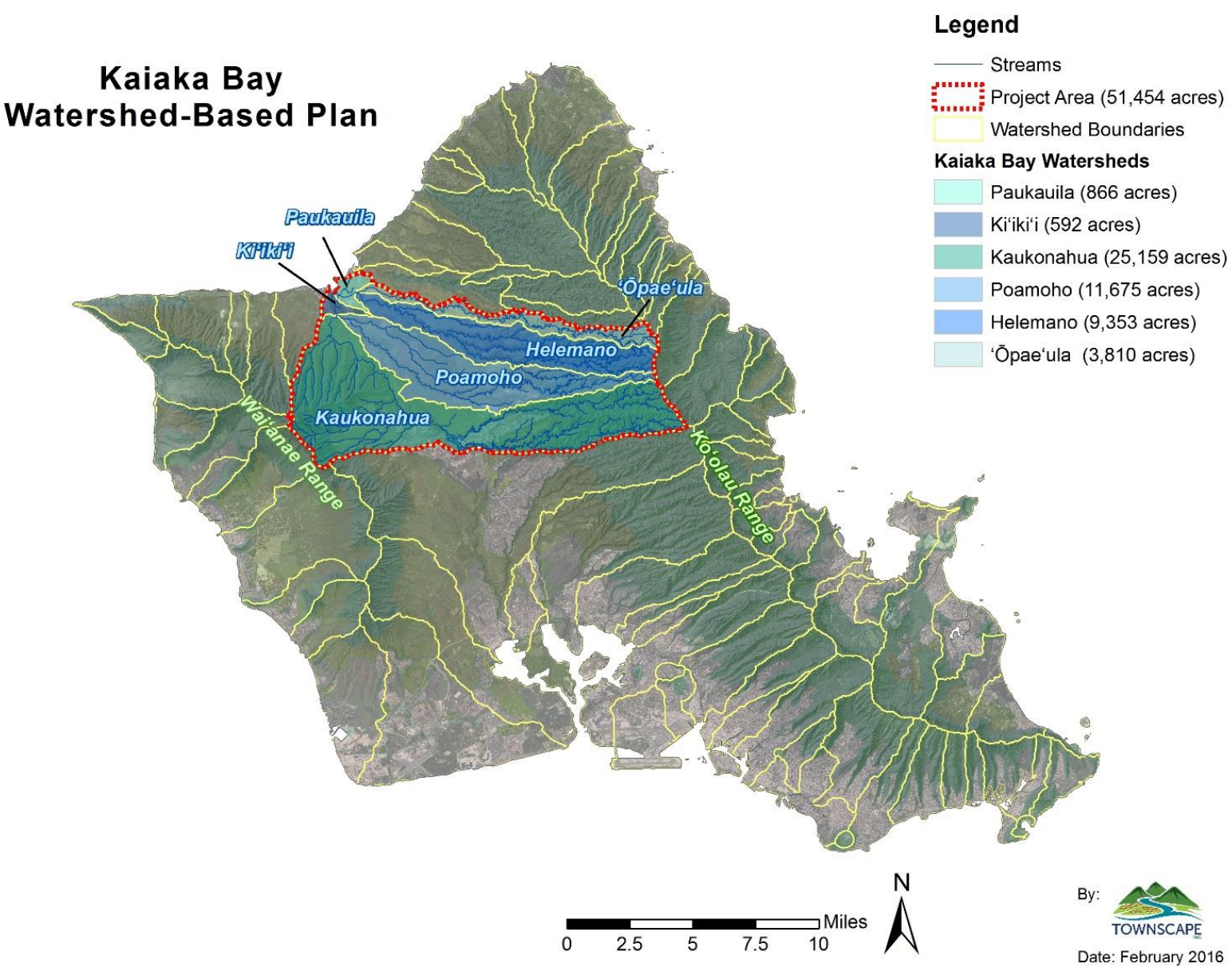
- ✓ Reduce erosion and sediment loads
- ✓ Reduce nutrient loads
- ✓ Address other types of pollutants as opportunities arise or as necessary
- ✓ Improve relevant policies & programs
- ✓ Increase education & outreach

# What is a “Watershed-Based Plan”?

EPA’s “Nine Elements” of a WBP

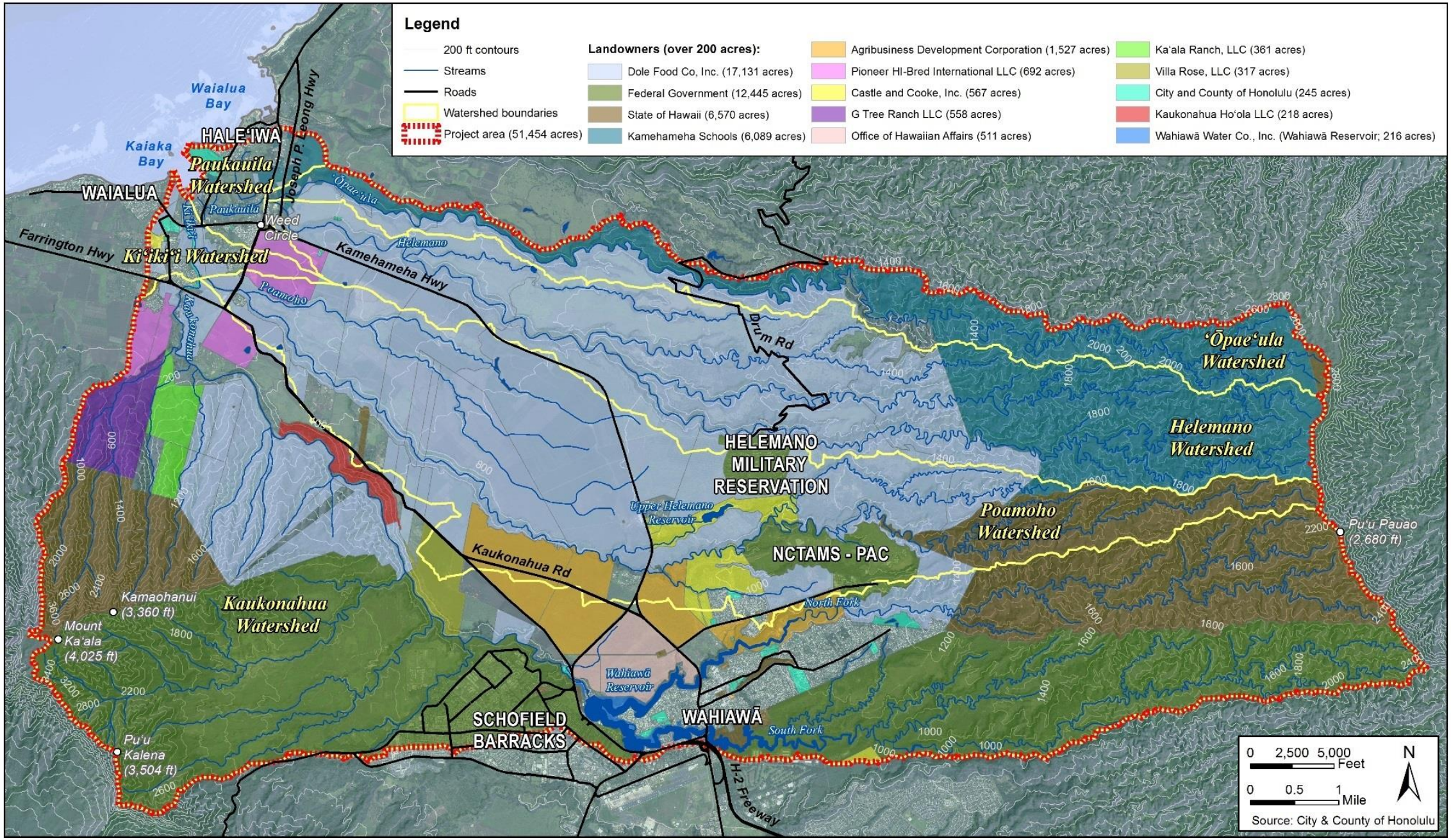
1. Identify pollutant sources
2. Estimate pollutant loading and necessary load reductions
3. Describe management measures to reduce pollutant loads
4. Estimate technical/financial assistance and relevant authorities needed
5. Develop an information/education component
6. Develop a project schedule
7. Describe interim, measurable milestones
8. Identify progress indicators
9. Develop a monitoring component

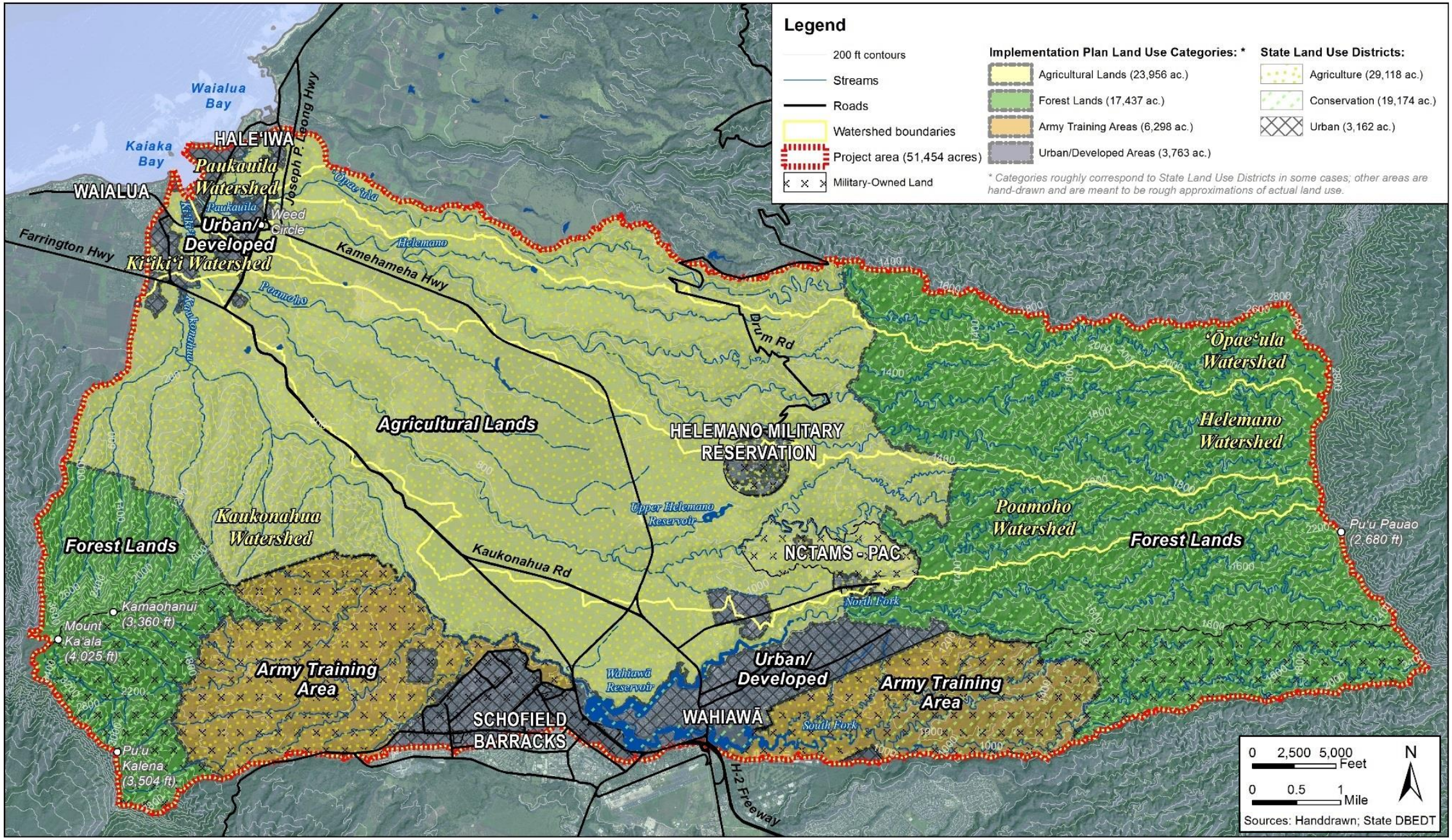





# Kaiaka Bay Watersheds

- Over 51,000 acres (13.5% of O'ahu's land area)
- Two major stream systems, six watersheds
- Kaukonahua Stream is Hawai'i's longest stream (33 miles)
- All waterbodies are listed on the State's list of impaired waterbodies (303d list)


Legend
200 ft contours
Streams
Roads
Watershed boundaries
Project area (51,454 acres)
Landowners (over 200 acres):
Dole Food Co, Inc. (17,131 acres)
Federal Government (12,445 acres)
State of Hawaii (6,570 acres)
Kamehameha Schools (6,089 acres)
Agribusiness Development Corporation (1,527 acres)
Pioneer HI-Bred International LLC (692 acres)
Castle and Cooke, Inc. (567 acres)
G Tree Ranch LLC (558 acres)
Office of Hawaiian Affairs (511 acres)
Ka'ala Ranch, LLC (361 acres)
Villa Rose, LLC (317 acres)
City and County of Honolulu (245 acres)
Kaukonahua Ho'ola LLC (218 acres)
Wahiawā Water Co., Inc. (Wahiawā Reservoir; 216 acres)
Waialua Bay
Kaiaka Bay
HALE'IWA
WAIALUA
Paukauila Watershed
Joseph P. Leong Hwy
Ōpae'ula
Paukauila
Weed Circle
Farrington Hwy
Ki'iki'i Watershed
Kamehameha Hwy
Helemano
Poamoho
Kaukonahua
Drum Rd
'Ōpae'ula Watershed
Helemano Watershed
HELEMANO MILITARY RESERVATION
Upper Helemano Reservoir
Poamoho Watershed
Pu'u Pauao (2,680 ft)
NCTAMS - PAC
Kaukonahua Rd
North Fork
Kamaohanui (3,360 ft)
Mount Ka'ala (4,025 ft)
Kaukonahua Watershed
Wahiawā Reservoir
SCHOFIELD BARRACKS
WAHIAWĀ
South Fork
Pu'u Kalena (3,504 ft)
H-2 Freeway
0 2,500 5,000 Feet
0 0.5 1 Mile
N
Source: City & County of Honolulu


Legend
200 ft contours
Streams
Roads
Watershed boundaries
Project area (51,454 acres)
Military-Owned Land
Implementation Plan Land Use Categories: *
Agricultural Lands (23,956 ac.)
Forest Lands (17,437 ac.)
Army Training Areas (6,298 ac.)
Urban/Developed Areas (3,763 ac.)
* Categories roughly correspond to State Land Use Districts in some cases; other areas are hand-drawn and are meant to be rough approximations of actual land use.
State Land Use Districts:
Agriculture (29,118 ac.)
Conservation (19,174 ac.)
Urban (3,162 ac.)
Waialua Bay
Kaiaka Bay
HALE'IWA
WAIALUA
Paukauila Watershed
Paukauila
Weed Circle
Urban/ Developed
Ki'iki'i Watershed
Ki'iki'i
Farrington Hwy
Joseph P. Leong Hwy
'Opae'ula
Helemano
Poamoho
Kaukonahua
Kamehameha Hwy
Drum Rd
Agricultural Lands
HELEMANO MILITARY RESERVATION
Upper Helemano Reservoir
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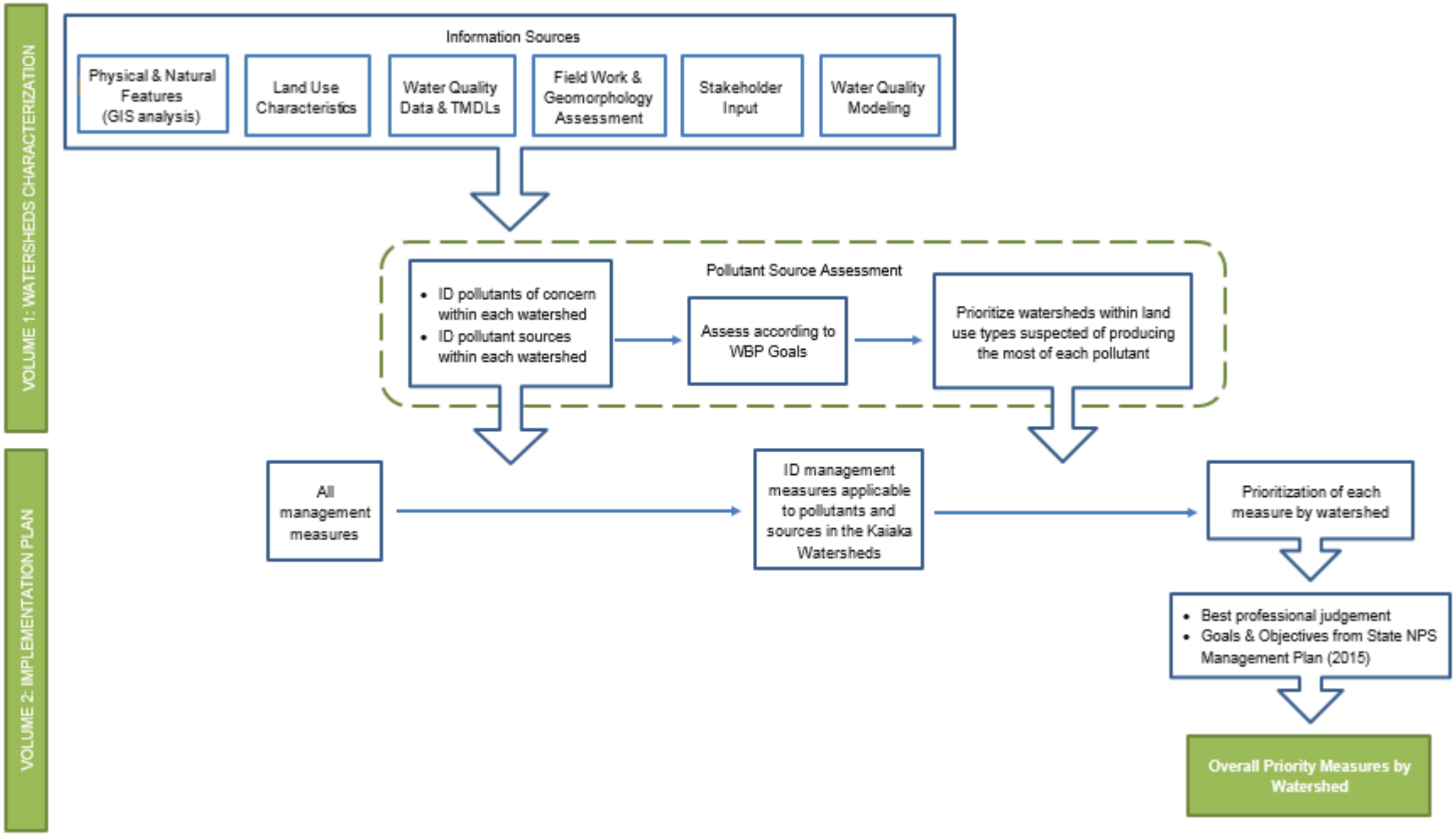
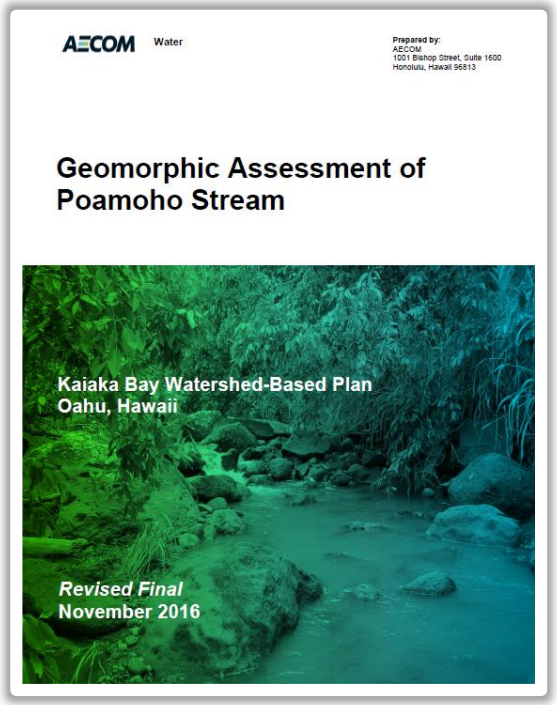
South Fork
Pu'u Kalena (3,504 ft)
H-2 Freeway
0 2,500 5,000 Feet
0 0.5 1 Mile
N
Sources: Handdrawn; State DBEDT

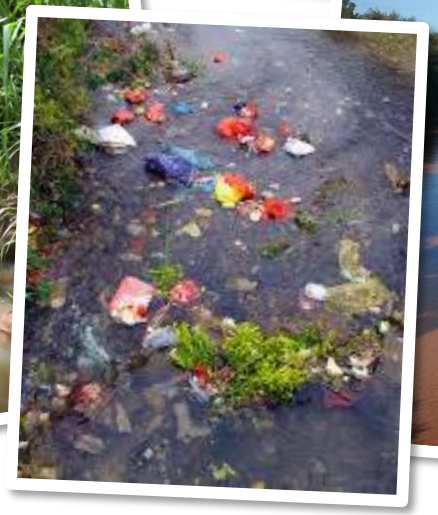
# Methodology



# Known & Suspected Water Quality Issues

- → Nutrients (nitrogen & phosphorus)
- → Suspended sediments
- → Turbidity
- → Trash
- → Bacteria/pathogens
- → Pesticides & other chemical contaminants

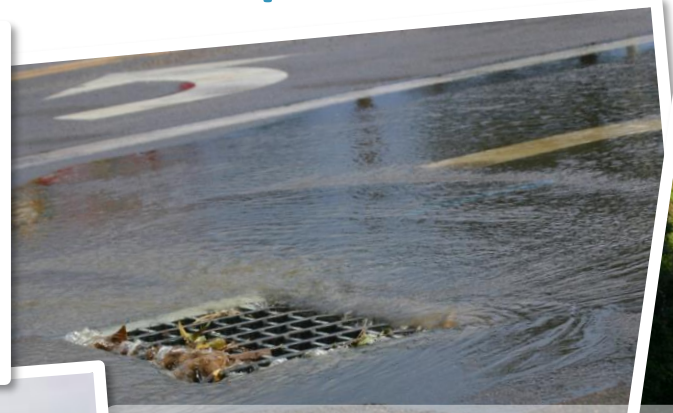



# Pollutants by Watershed

| | Ki'iki'i Stream System | | | Paukauila Stream System | | | Marine Embayment |
|---|---|---|---|---|---|---|---|
| | Ki'iki'i Watershed | Kaukonahua Watershed | Poamoho Watershed | Paukauila Watershed | Helemano Watershed | 'Ōpae'ula Watershed | Kaiaka Bay |
| Total Nitrogen | X | X | X | X | X | X | X |
| Nitrate/ Nitrite | X | X | X | X | X | X | X |
| Total Phosphorus | X | X | X | X | X | X | - |
| Turbidity | X | X | X | X | X | X | X |
| Fecal Indicator Bacteria | X | X | X | X | X | - | X |
| Possible Chemical Contaminants | - | X | - | - | X | - | X |
| Trash | - | X | - | - | - | - | - |
| Chlorophyll a | - | - | - | - | - | - | X |

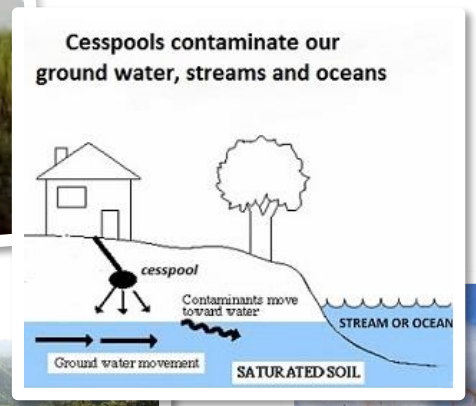
*A black 'X' = Pollutants that have been detected at excessive levels*
*A red 'X' = Pollutants listed on the State's 303(d) list*
*A dash (no 'X') does not necessarily indicate that the pollutant is not a concern, rather the dash represents a lack of data*

# Known & Suspected Sources of Pollution

*A few examples – no particular order*







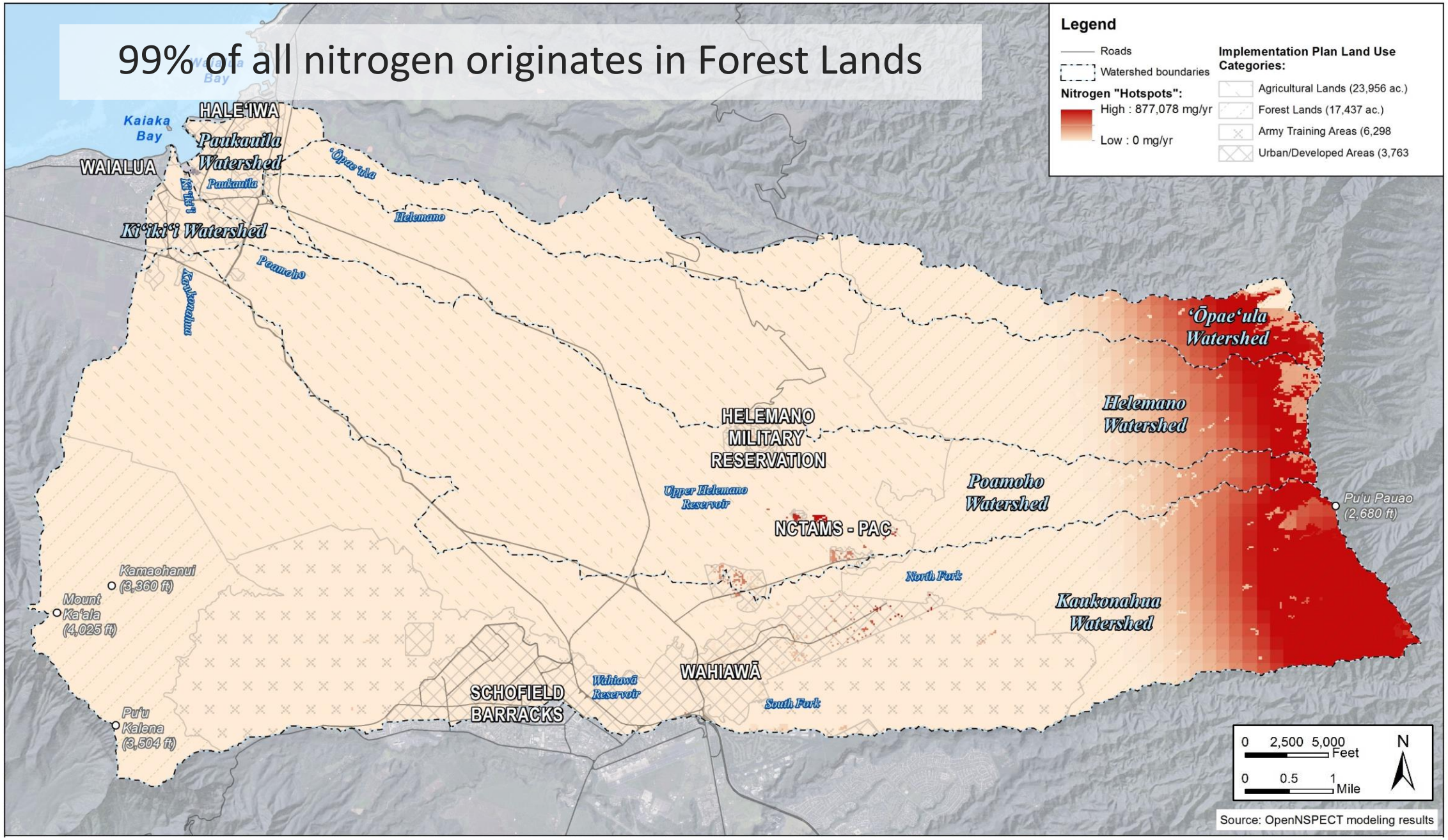
# Watershed Modeling

OpenNSPECT

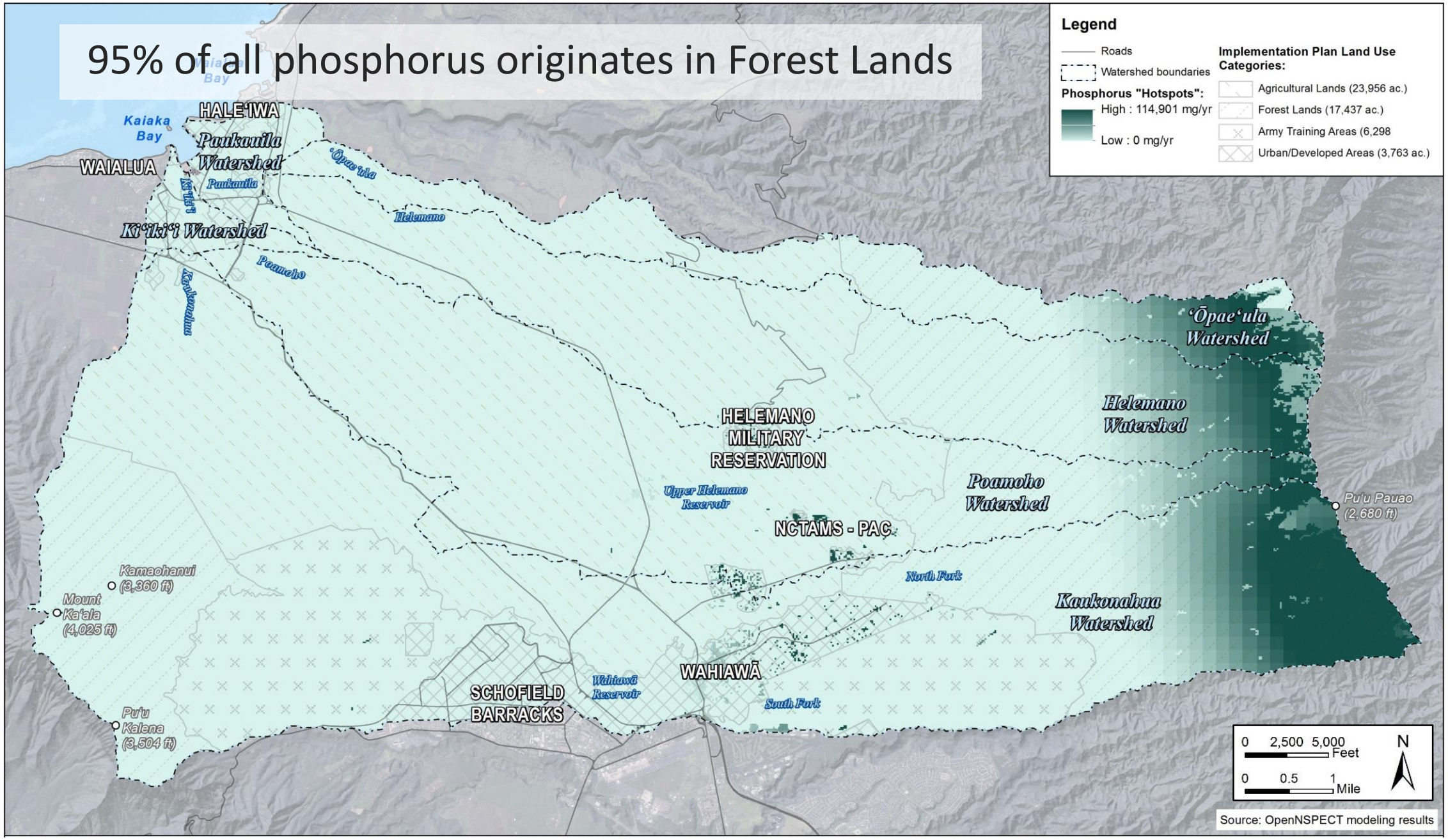
An open source version of the Nonpoint-Source Pollution and Erosion Comparison Tool

- Models rill & sheet erosion ONLY
- Uses default landcover classifications
- Cannot account for:
  - OSDS (e.g., cesspools)
  - Fertilizer application
  - Stream channel erosion
  - Specific crops or vegetation types
  - Man-made hydrological features

# 99% of all nitrogen originates in Forest Lands

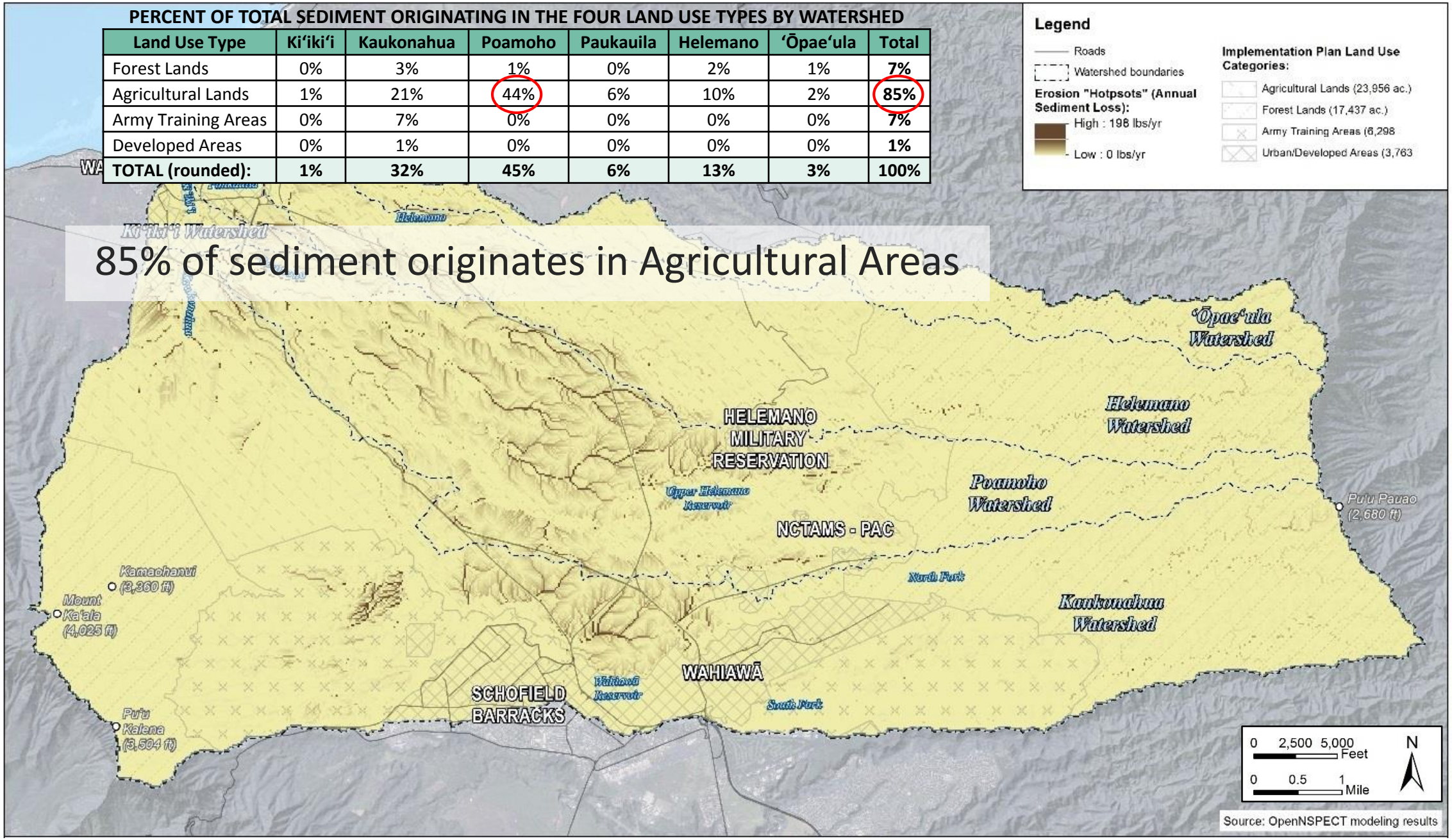


# 95% of all phosphorus originates in Forest Lands



**PERCENT OF TOTAL SEDIMENT ORIGINATING IN THE FOUR LAND USE TYPES BY WATERSHED**

| Land Use Type | Ki‘iki‘i | Kaukonahua | Poamoho | Paukauila | Helemano | ‘Ōpae‘ula | Total |
|---|---|---|---|---|---|---|---|
| Forest Lands | 0% | 3% | 1% | 0% | 2% | 1% | **7%** |
| Agricultural Lands | 1% | 21% | 44% | 6% | 10% | 2% | **85%** |
| Army Training Areas | 0% | 7% | 0% | 0% | 0% | 0% | **7%** |
| Developed Areas | 0% | 1% | 0% | 0% | 0% | 0% | **1%** |
| **TOTAL (rounded):** | **1%** | **32%** | **45%** | **6%** | **13%** | **3%** | **100%** |




85% of sediment originates in Agricultural Areas

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- Cannot account for:
  - OSDS (cesspools)
  - Fertilizer application
  - Stream channel erosion
  - Specific crops or vegetation types
  - Man-made hydrological features

## Priorities for nutrients:

- Forests of the Koʻolau mountain range, especially Kaukonahua, Helemano, and ʻŌpaeʻula watersheds
- Developed areas, especially developed areas in the Poamoho watershed

## Priorities for erosion/sediments:

- Bare ground areas, especially in Kaukonahua and Poamoho watersheds
- Agricultural areas, especially in Poamoho, Kaukonahua, Paukauila, and Kiʻikiʻi watersheds

# Prioritization of Watersheds

| GENERAL LAND USE TYPE | Priority Watersheds: Sediments | Priority Watersheds: Nutrients | Priority Watersheds: Other Pollutant Types |
|---|---|---|---|
| Forest Lands | Kaukonahua<br>Poamoho<br>Helemano<br>ʻŌpaeʻula | Kaukonahua†<br>Poamoho†<br>Helemano†<br>ʻŌpaeʻula†<br>*† Primarily the forests of the Koʻolau range* | None‡<br>*‡ Not considered significant or feasible to address* |
| Agricultural Lands | Kaukonahua<br>Poamoho<br>Paukauila<br>Kiʻikiʻi | Poamoho | Poamoho<br>*(pesticides)* |
| Developed Areas | Kaukonahua<br>Poamoho<br>Paukauila<br>Kiʻikiʻi | Kaukonahua<br>Poamoho<br>Paukauila<br>Kiʻikiʻi | Kaukonahua<br>Paukauila<br>Kiʻikiʻi<br>*(pollutants associated with urban stormwater runoff)* |
| Army Training Areas | Kaukonahua | Kaukonahua | None‡<br>*‡ Not considered significant or feasible to address* |

- ✓ Modeling results
- ✓ Water quality data
- ✓ AECOM geomorphic assessment (Appendix)
- ✓ Stakeholder consultations
- ✓ Professional judgement

# Priority Management Measures

Nine Priority Measures (out of 19 identified)

**Forest Lands:**

1) Watershed protection & forest management

**Agricultural Lands:**

2) Erosion and sediment control from actively farmed lands
3) Livestock, ranching, & pasturelands management
4) Fire prevention
5) Field access road management

**Developed Areas:**

6) Nonpoint source wastewater treatment
7) Stormwater management

**Army Training Areas:**

8) Fire prevention & management
9) Erosion management along roads, trails, & frequently used areas




# Implementation of Priority Measures

| Potential Implementing Entities | | | |
|---|---|---|---|
| **Forest Lands** | **Agricultural Lands** | **Developed Areas** | **Army Training Areas** |
| • DLNR DOFAW | • NRCS | • U.S. Army (DPW) | • U.S. Army |
| • KMWP | • West O'ahu SWCD | • City DFM | – ITAM |
| • WMWP | • ORC&D | • City ENV | – DPW |
| • OISC | • City DPP | • Other landowners | – OANRP |
| • OANRP | • DOA | • Residents | |
| • Kamehameha Schools | • ADC | | |
| | • Other land owners | | |
| | • Farmers | | |

- DOH CWB will hopefully issue a Request for Proposal later this year to implement projects using CWA Section 319 funding
- First project(s) would be funded and implemented in 2019
- Every subsequent year another project may be funded
- Applicants for 319 grants may submit proposals for watersheds that are not deemed "priority," however, priorities get additional points when scored

# Policies & Programs

17 different strategies to address 13 “key issues,” including:

- Improve the exclusion process to the City’s Grading & Grubbing Permit for farmers with approved conservation plans
- Increase funding for agricultural education programs, conservation planning organizations, watershed management programs, and wildfire management/prevention
- Increase incentives to replace cesspools
- City Office of Climate Change, Resilience, and Sustainability should recommend policies that protect water quality

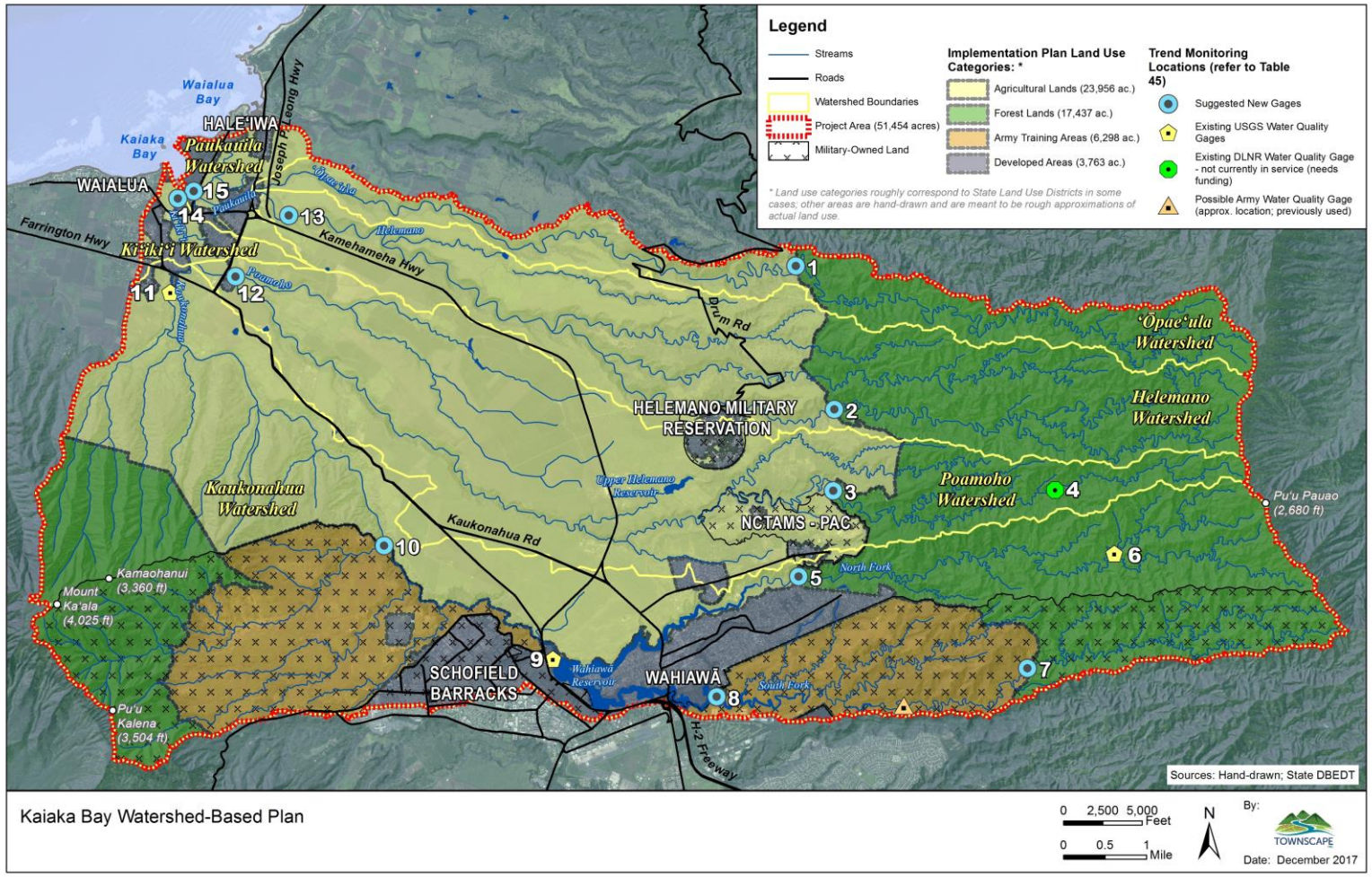
# Outreach & Education

Eight different recommendations, including:

- Multilingual agricultural outreach & education programs for farmers
- “Hike Pono” program
- Public education on invasive species
- Community-based water quality monitoring programs
- Integrate relevant lessons into school programs
- Expand public education related to stormwater & cesspools
- Stream/beach clean-ups & restoration

# Water Quality Monitoring

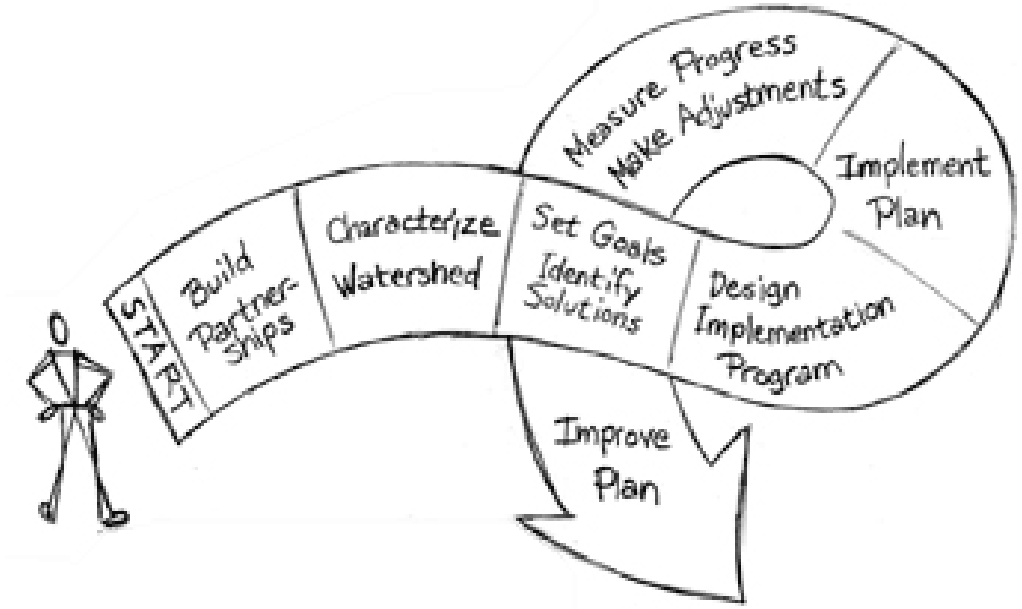
- Suggested Monitoring Locations
- Progress Indicators & Measurable Milestones
  - Short, Medium, and Long-term



# Adaptive Management

- Watershed planning is an adaptive process

- Monitoring is essential to improve the plan and continually make progress




# Next Steps

- Public review of draft plan
  - Available at the Wahiawā and Waialua public libraries
  - Online at *http://health.hawaii.gov/cwb/clean-water-branch-home-page/polluted-runoff-control-program/watershed-plans/*
- Deadline for comments – March 10, 2018
- Finalize plan – April 2018
- Procure funding for implementation of priority measures & projects
- Begin implementation
- Conduct water quality monitoring to detect improvements
- Modify plan as needed (adaptive management)

# Thank you!

## Questions?

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