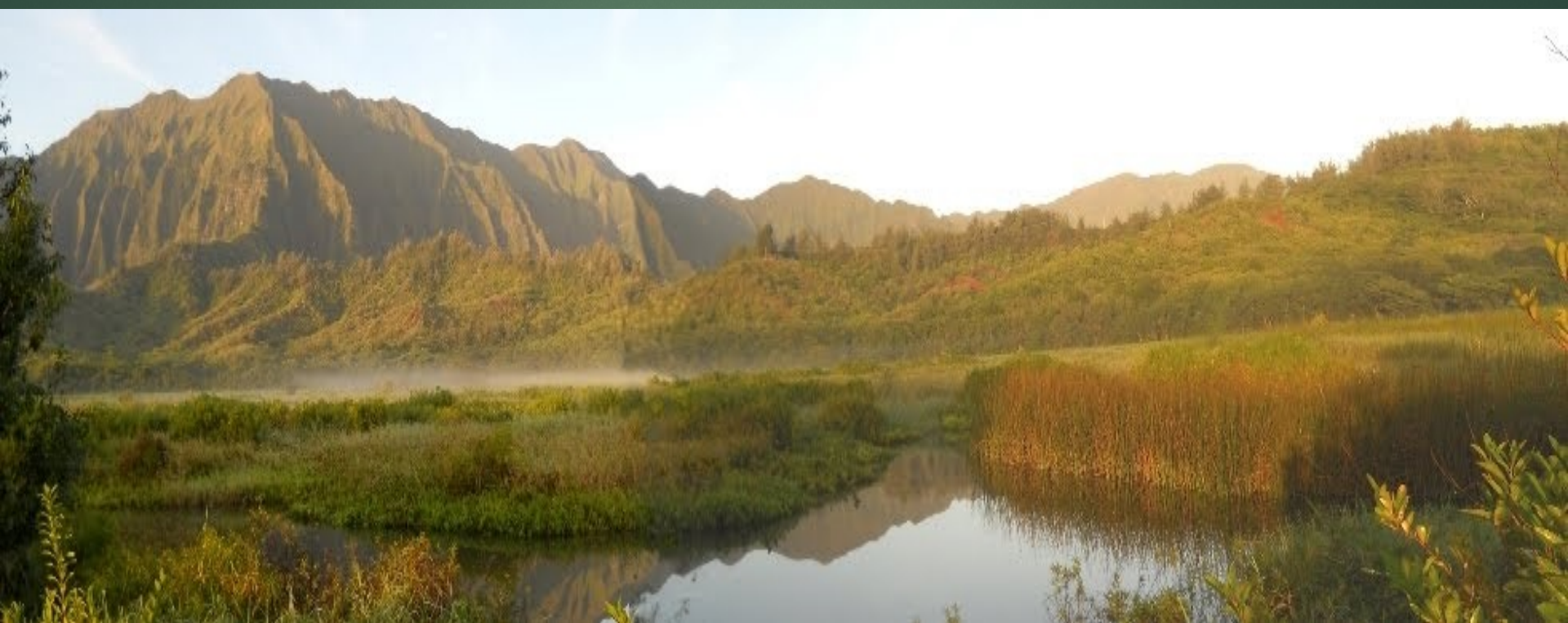




He`eia Community Development Plan & Rules Project

Townscape, Inc.
August, 2018





Meeting Agenda



Pule



Introductions



Meeting Protocol



Presentation - Townscape



Questions/Discussion



Pau

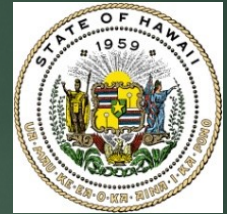


Meeting Protocol

- ☐ Keep your questions until the end
- ☐ Limit questions to this Project
- ☐ 3 minutes per person/issue
- ☐ Raise your hand to speak
- ☐ Speak clearly and respectfully
- ☐ Mahalo for not shouting & swearing



Purpose : HRS Chapter 206E

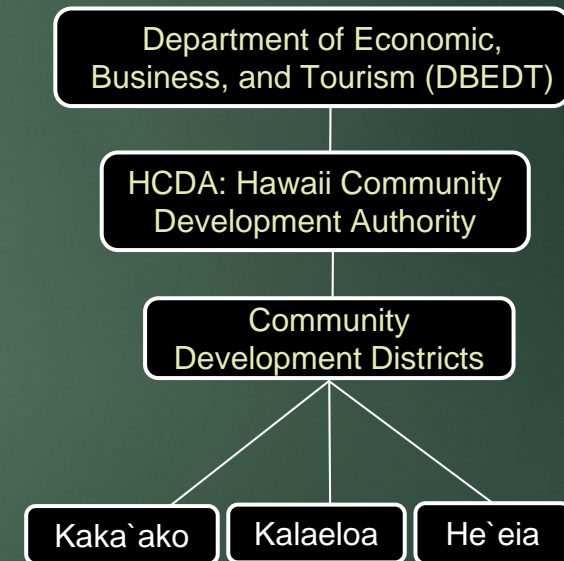


- Established the He`eia CDD in 2012

- HCDA : Redevelopment Authority

- Required a Plan & Rules for the District

- Agriculture, Culture, Education, Restoration





Planning Process (18 Months)

■ Townscape contracted in Sept. 2012

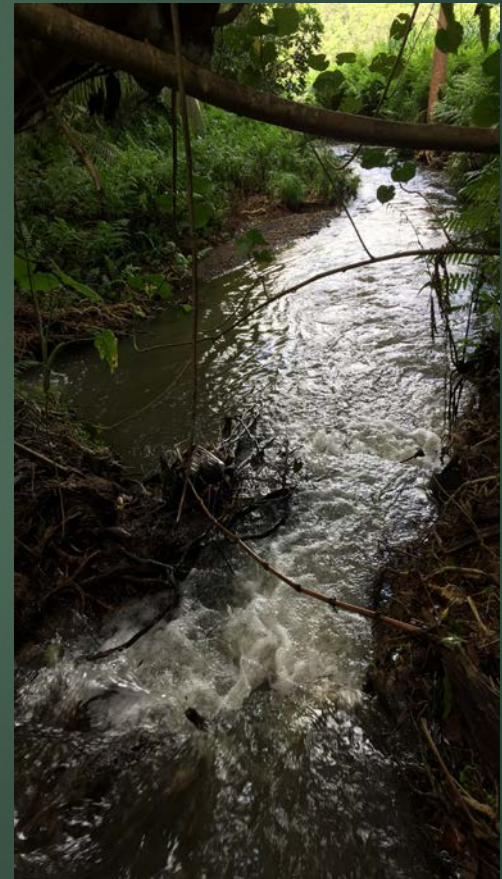
■ Background Research of Site

■ Consultations

■ Develop DRAFT Plan ; DRAFT Rules

■ Develop FINAL Plan & Rules

■ Adopt FINAL Plan & Rules



Site Background



Watershed Overview



History & Culture



Plants & Animals



Water

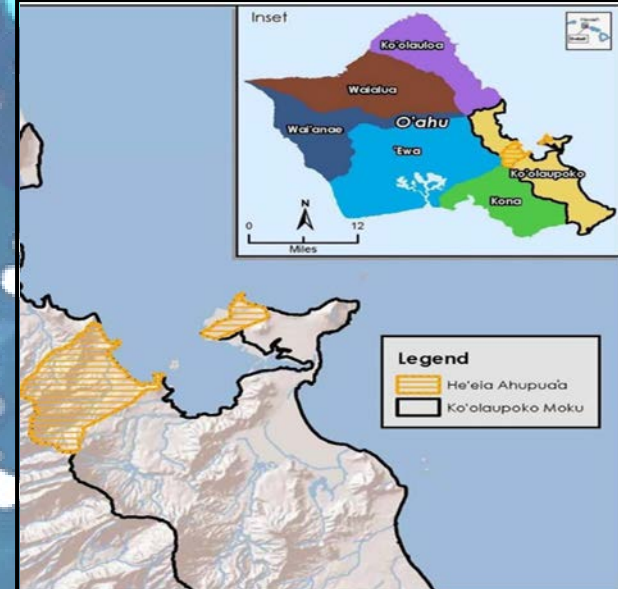
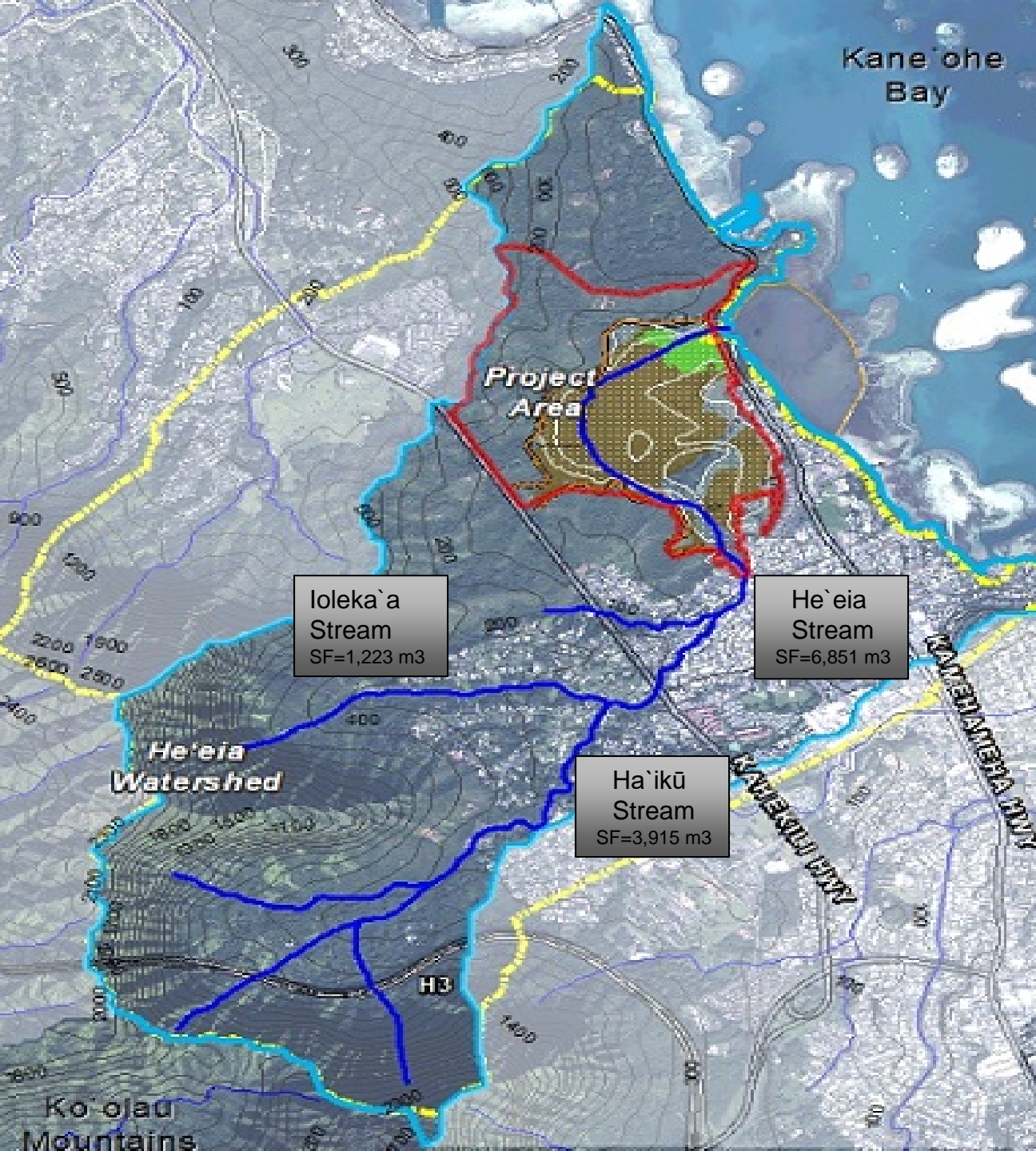


Sea Level Rise & Climate Change





HE`EIA COMMUNITY DEVELOPMENT DISTRICT



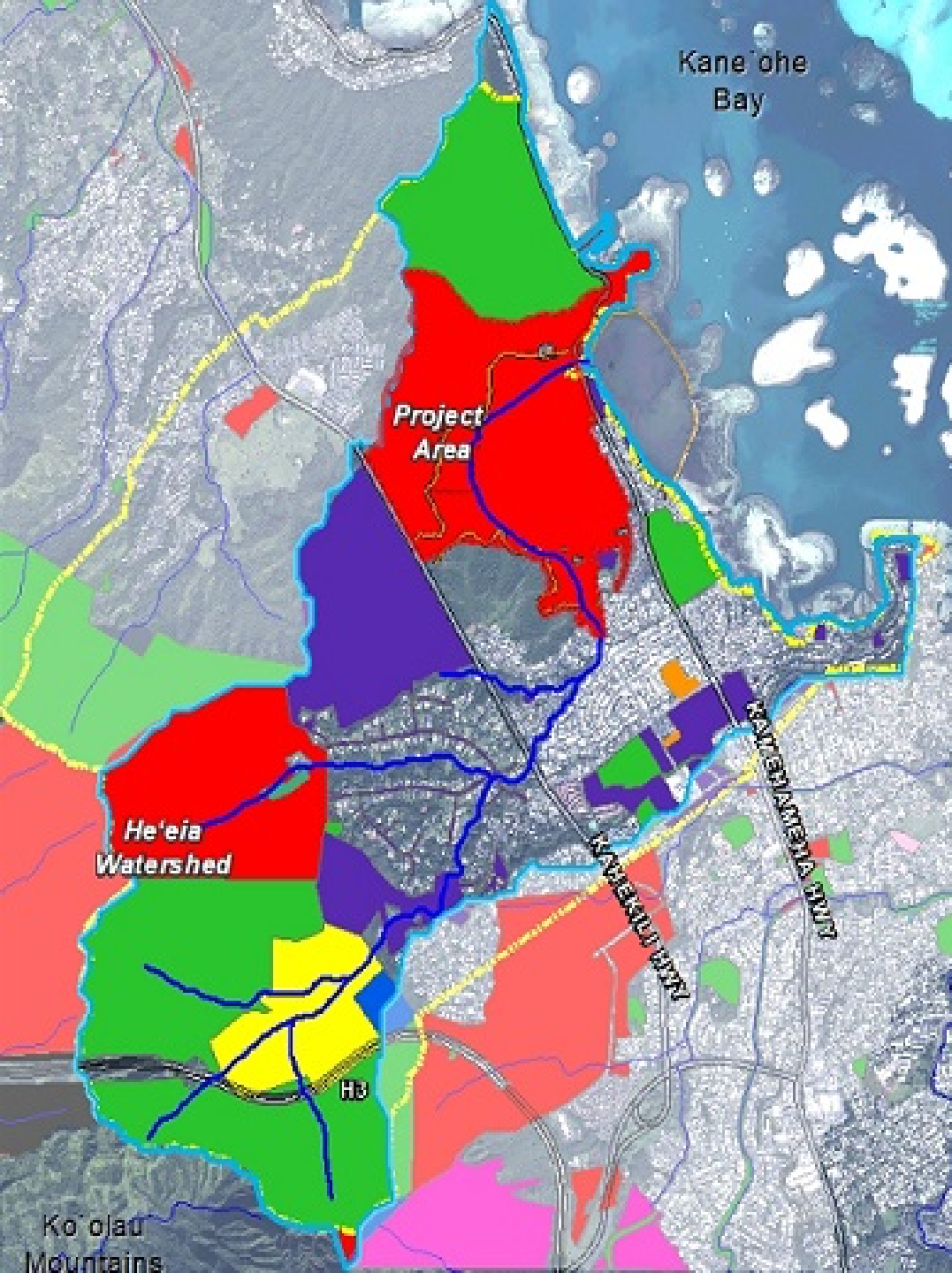
LEGEND

- He'eia Ahupua'a (>2,240Ac)
- He'eia Watershed (2,240Ac)
- He'eia Com-Dev District (409Ac)
- He'eia Stream (7.1 miles)
- Estuarine (15Ac)
- Palustrine (162Ac)



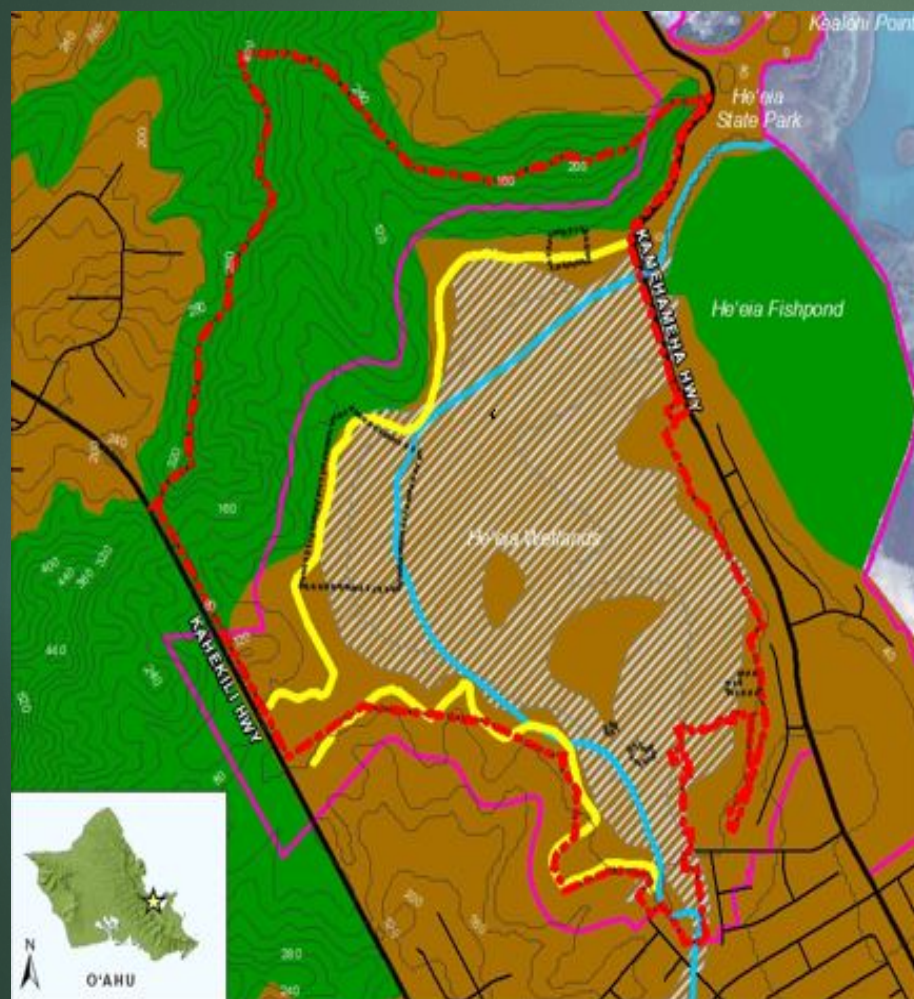
He'eia Watershed, Ko'olau Poko District, O'ahu

Major Landowners



- Austin Trusts
- Bishop Museum
- Church Jesus Christ LDS
- E.M. Stack
- Govt. County of Honolulu
- Govt. Federal
- Govt. State
- Govt. State DHHL
- Hawaiian Electric Company
- Kamehameha Schools
- Koolau Land Partners LLC
- Roman Catholic Church
- The Queen Emma Foundation

State Land Use District



- ❑ Most of District in Urban District
- ❑ Most of District in SMA
- ❑ Majority of District in the 100-Yr Flood Zone

Legend

- | | |
|---|--------------|
| — 40-foot contours | Conservation |
| — He'eia Stream | Urban |
| — Kealahi Road | |
| — Major paved roads | |
| — He'eia Community Development District | |
| — ProjectAreaTMKs | |
| — Special Management Area | |

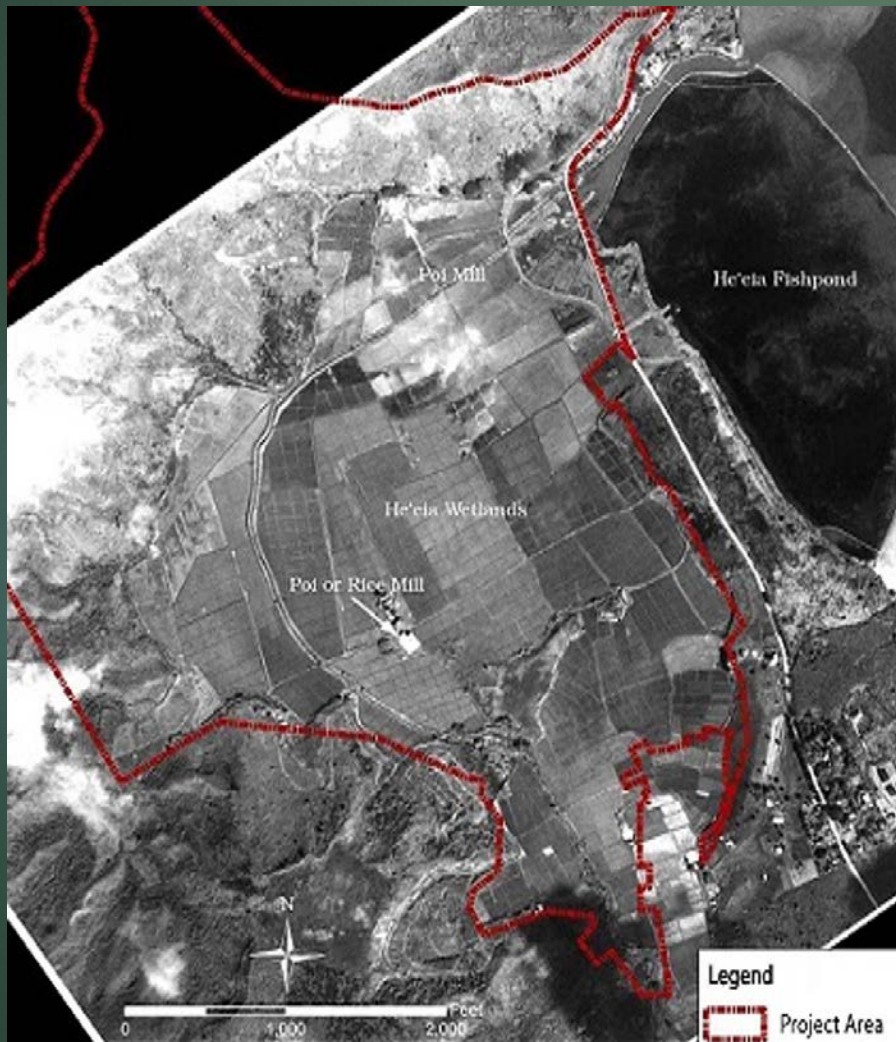
History & Culture

13

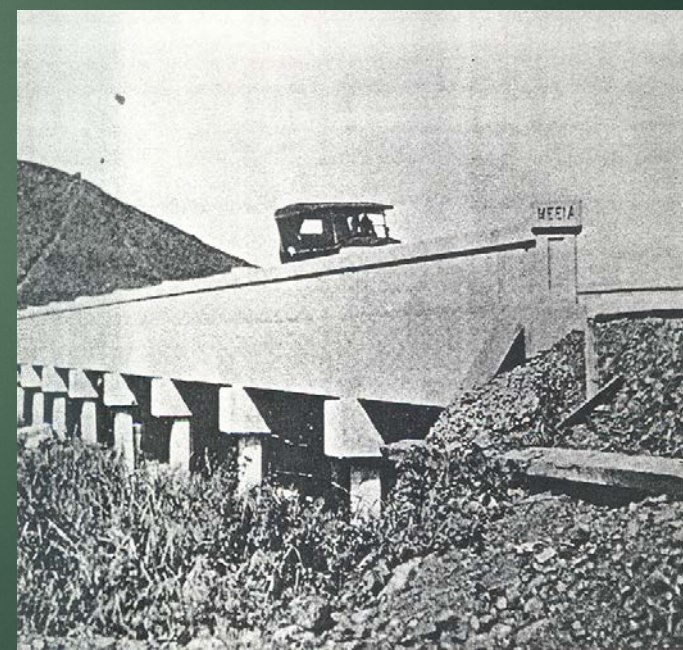
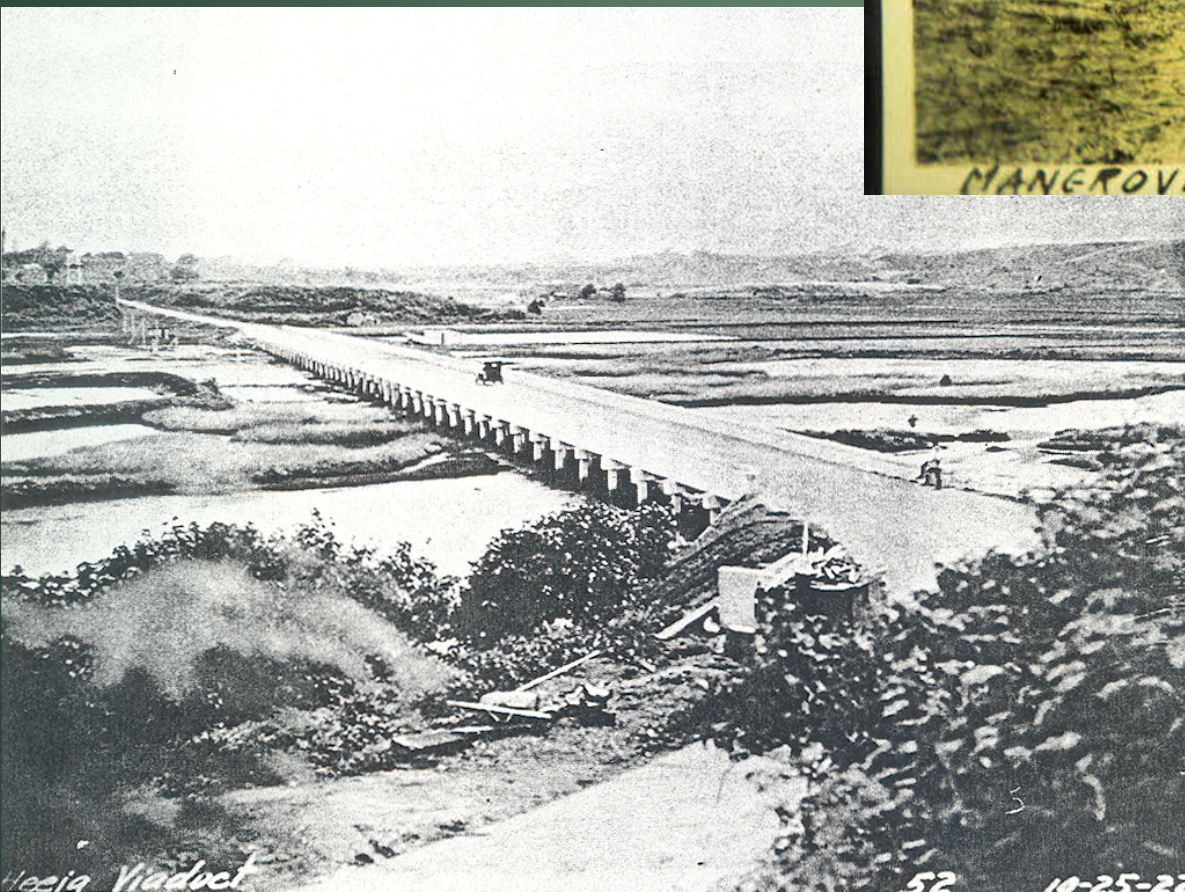


History of Agriculture

14

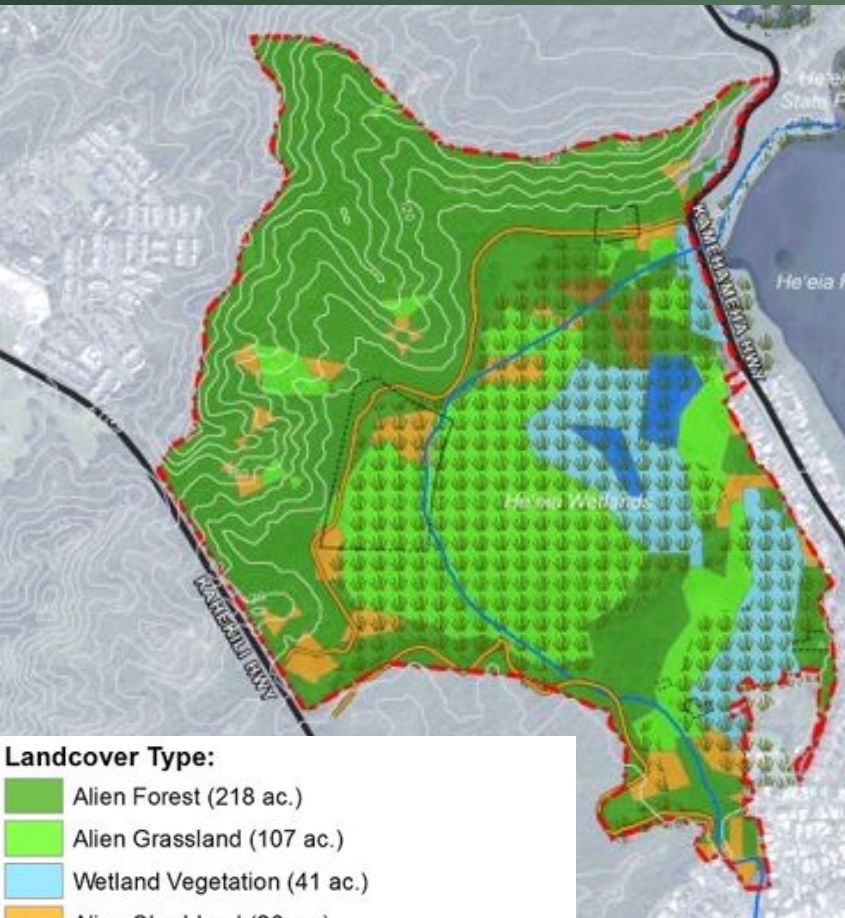


- ❑ Culturally significant place
 - ❑ Numerous mo`olelo
 - ❑ Archaeological sites (17 sites)
- ❑ Expansive lo`i terraces
- ❑ Retained by Kamehameha 1 and awarded to Abner Pākī in Māhele
- ❑ Numerous kuleana parcels (93)
- ❑ Changes in land uses over time
 - ❑ Taro, rice, sugarcane, pineapple, taro, ranching, military
- ❑ Opportunity to restore agriculture & food security



Vegetation

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Landcover Type:

Alien Forest (218 ac.)
Alien Grassland (107 ac.)
Wetland Vegetation (41 ac.)
Alien Shrubland (26 ac.)
Open Water (8 ac.)
Low Intensity Developed (6 ac.)
Very Sparse Vegetation to Unvegetated (4 ac.)

- ❑ Invasive species dominate
- ❑ Vegetation is predominantly Alien Forest (218 acres)
- ❑ Marsh consists mostly of Alien Grasses (107 acres)
- ❑ Mangroves at stream mouth
- ❑ Invasive plants consume & transpire more water than natives
- ❑ Natives:
 - ❑ Improve filtration & recharge
 - ❑ Reduce salinity
 - ❑ Habitat for native organisms

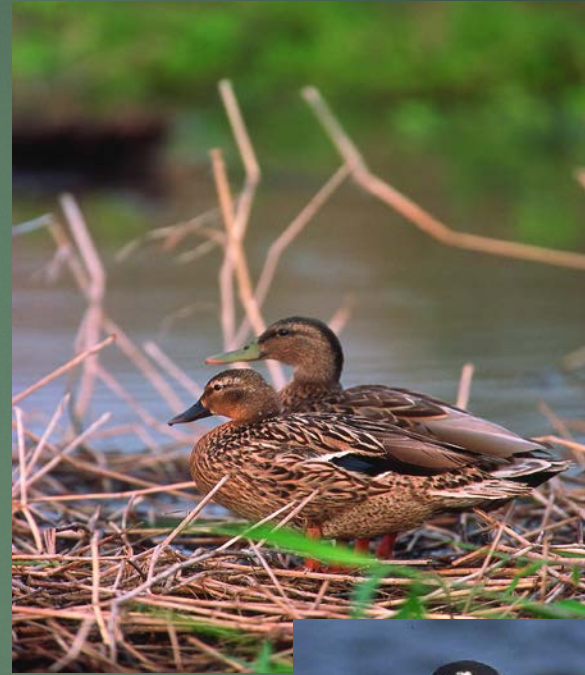
Endangered Wetland Birds

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`Alae `Ula



Kōlea



`Alae Kea

Ae`o



Wai - Water

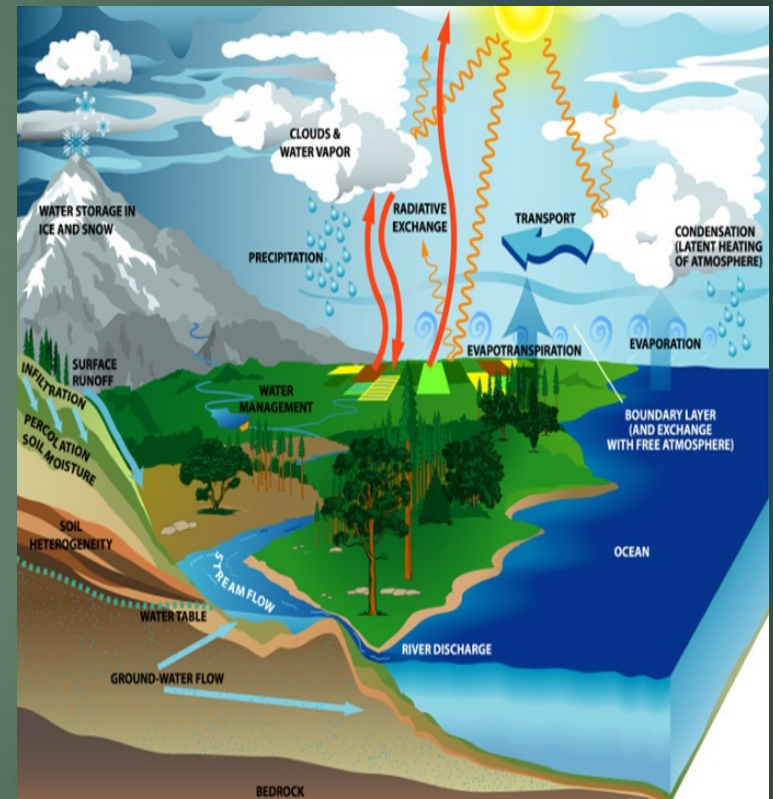
18



Water Conditions at He`eia

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- ❑ Precipitation (80.4 in/yr)
- ❑ Spatial variability of rainfall
- ❑ Water dynamics (Ghazal 2017):
 - ❑ 35 % annual rainfall = Recharge
 - ❑ 45 % lost via evapotranspiration
 - ❑ 44 % annual rainfall = Stream flow
 - ❑ 87 % stream flow from baseflow
- ❑ Ground water essential at He`eia
- ❑ Recharge correlated with rainfall variability (Nov-April wet season)



Source: <https://smap.jpl.nasa.gov>

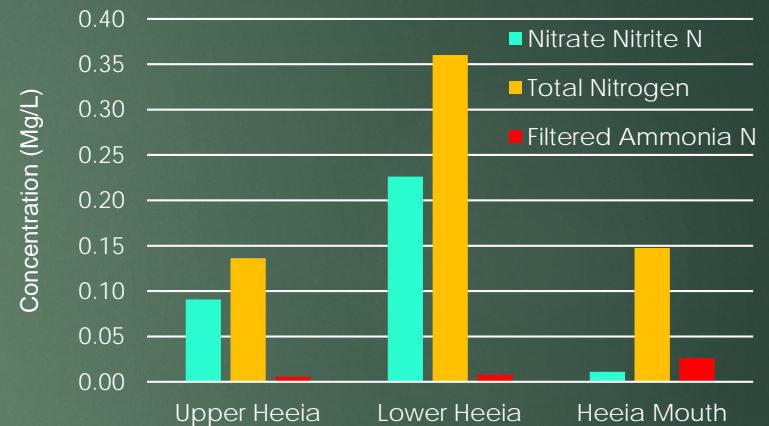
Water Quality

20

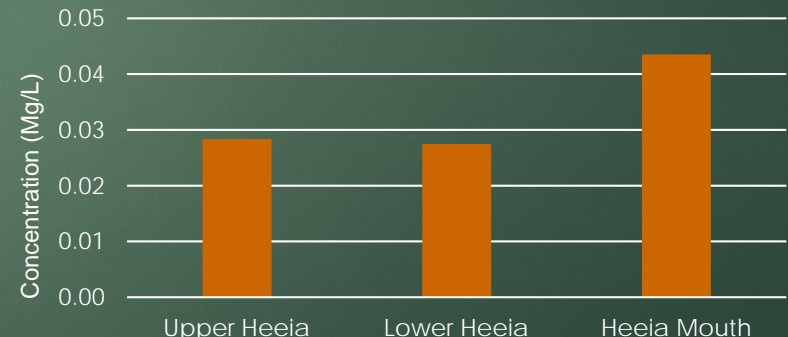
- ❑ Sustains ecological processes
- ❑ District impacted by Upstream
- ❑ Turbidity highest at the coast
- ❑ Nitrogen higher in mid-watershed
- ❑ Phosphorous higher at coast



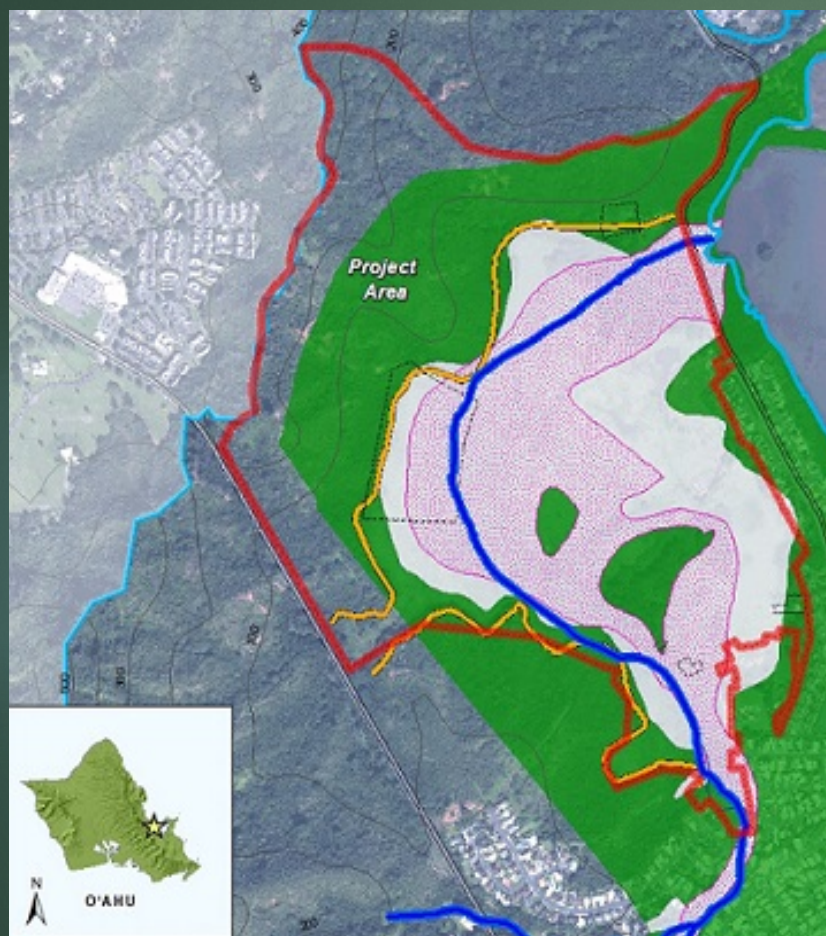
Nitrogen Concentrations (Mg/L) at He'eia, 2014-2016



Average Annual Phosphorous Concentrations (Mg/L) at He'eia, 2014-2016



Flood Map



- ❑ Most of District in 100-Yr flood zone
- ❑ Reduce floods:
 - ❑ Clearing stream channel
 - ❑ Native plants
 - ❑ Manage development in flood zone

ZONE

-  100-Yr Flood
-  500-Yr Flood
-  Floodway

Climate Change

Predictions

- ❑ Rainfall decrease by 10% wet season
- ❑ Rainfall increase by 5% in dry season
- ❑ Rising temperatures
- ❑ Increase in water consumption from population growth & urbanization

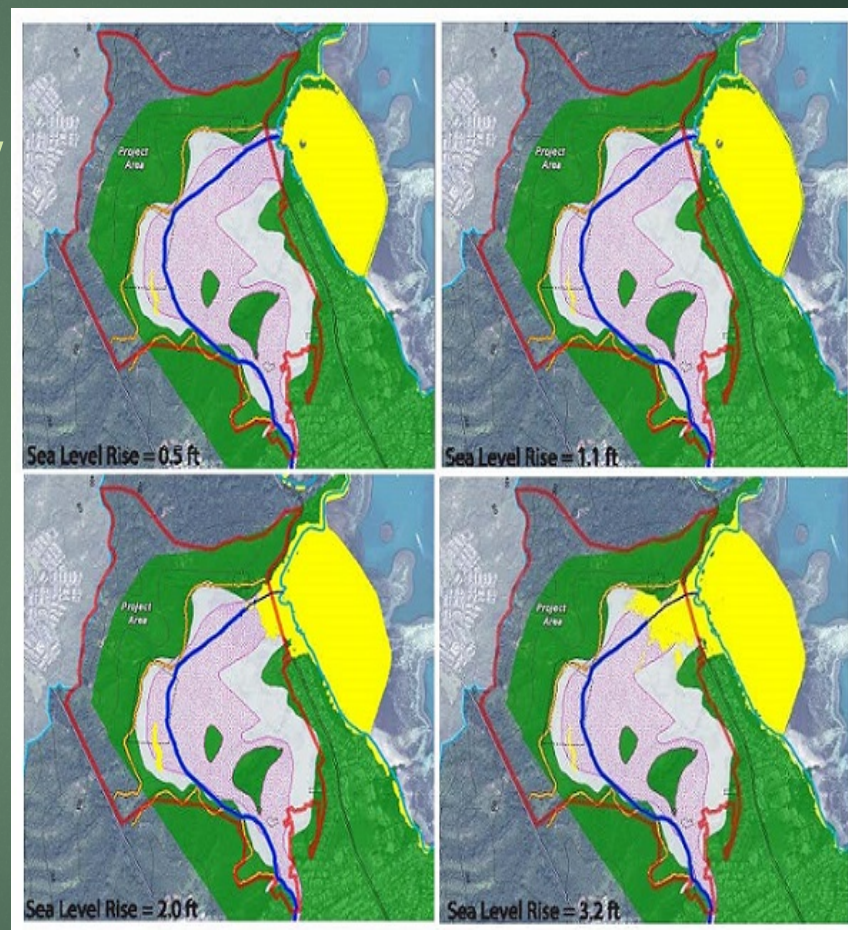
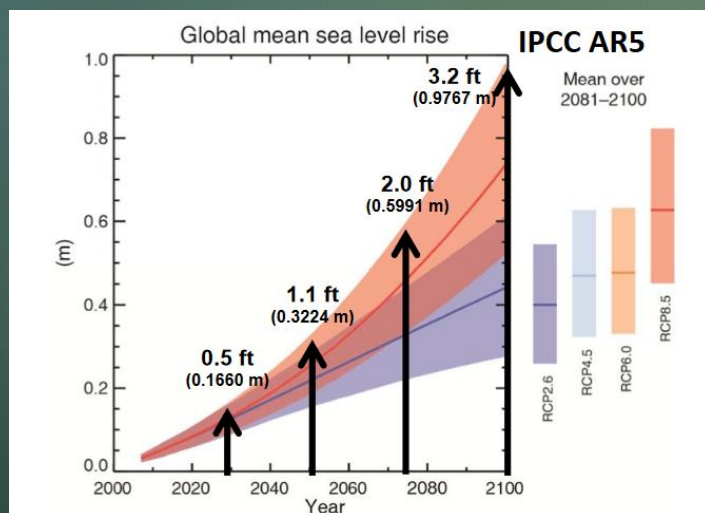
Likely Impacts

- ❑ Hawaii rainfall - 70% in wet season
- ❑ Temperatures increase evapo-transpiration
- ❑ Decline in sustainability of groundwater resources

Sea Level Rise (SLR)

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- ❑ Expect SLR of 3.2 ft by 2100
- ❑ Inundation of Kamehameha Hwy
 - ❑ Infrastructure planning
- ❑ SLR raises groundwater;
 - ❑ Expect more flooding
- ❑ Marine & Freshwater inundation



Marine Inundation from SLR

What can we do?

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Restoration, Restoration, Restoration !!!

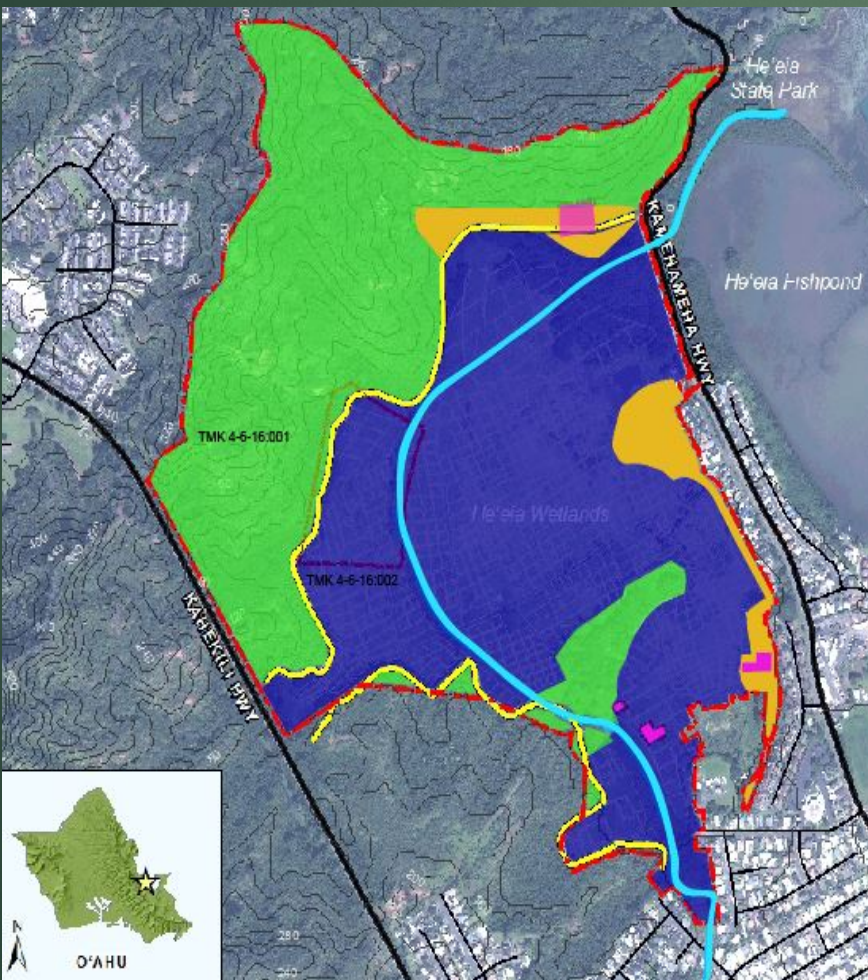




Land Use Plan – Concepts

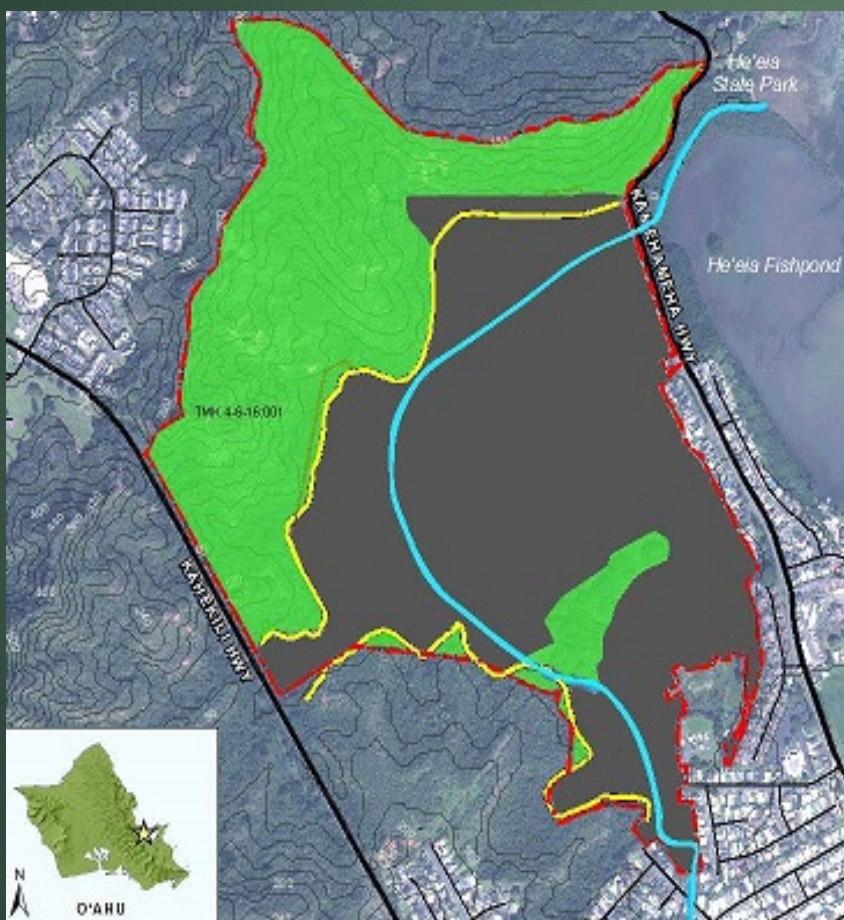
Land Divisions/ Categories

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Land Division	Description
1. Kula Uka	Lands suitable for Dryland Agriculture in higher elevations, generally outside the 100-year flood zone, and mostly within the Conservation District
2. Kula Kai	Low lying lands that are lower in elevation than Kula Uka lands but higher than Loko I'a Kalo lands and suitable for Dryland Agriculture; Entirely within the Urban District
3. Loko I'a Kalo	Low lying lands suitable for Wetland Agriculture, inundated by fresh and salt water, and completely within the Urban District
4. `Āina Kuleana	Lands consisting of four kuleana parcels awarded during the Great Māhele in 1850

Kula Uka (Uplands)



Land Characteristics

- ❖ Lands higher in elevation than other land types
- ❖ Generally outside the 100-Year Flood Zone
- ❖ Majority of lands in Conservation District
- ❖ Predominantly alien forest vegetation
- ❖ May contain unexploded ordnances (UXOs)

Land Uses

- ❖ Dryland Agriculture
- ❖ Restoration Activities
- ❖ Education & Research
- ❖ Cultural Practices
- ❖ Ancillary Facilities for Agriculture, Restoration, Education, and Cultural Practices.

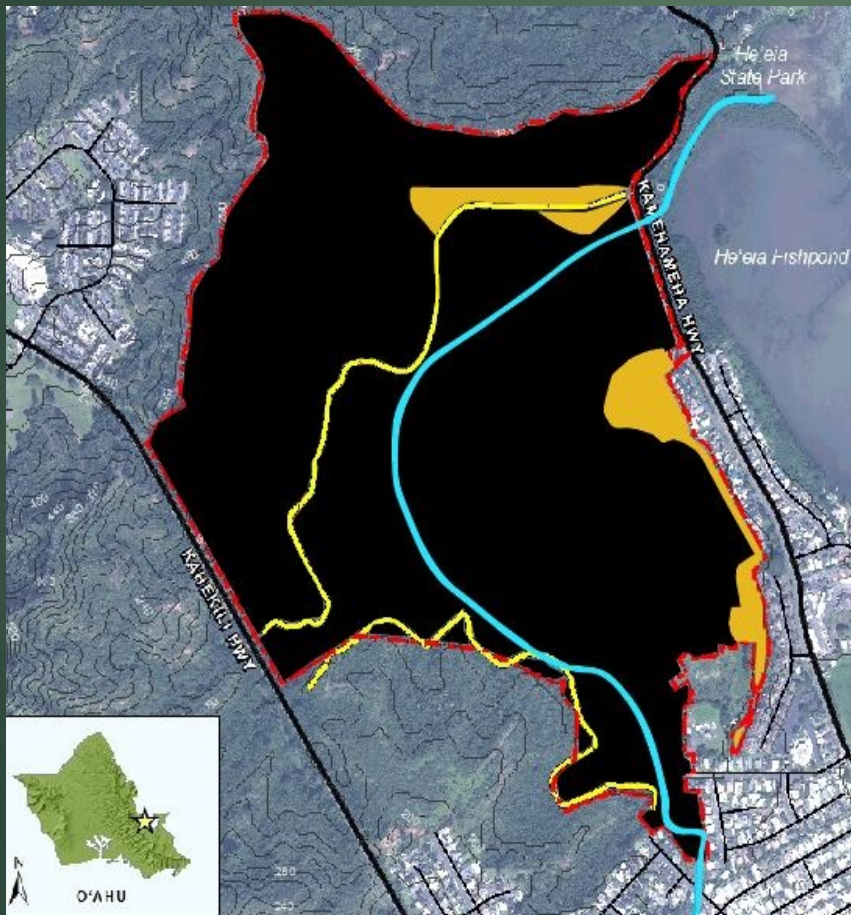


Kula Uka

Other Land Types

Kula Kai (Lowlands)

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Land Characteristics

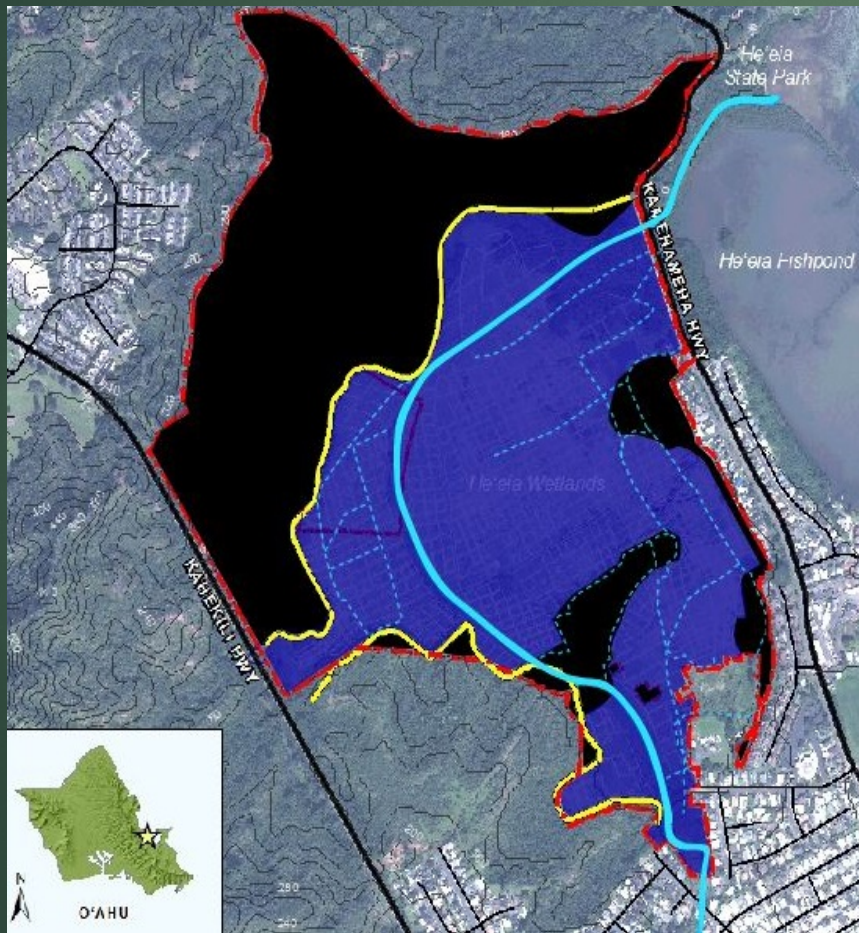
- ❖ Lands lower in elevation (<5 feet)
- ❖ Low lying lands on either side of the stream channel
- ❖ Completely within the 500-Year Flood Zone
- ❖ Lands entirely within Urban District
- ❖ Predominantly alien forest vegetation

Land Uses

- ❖ Dryland Agriculture
- ❖ Restoration Activities
- ❖ Education & Research
- ❖ Cultural Practices
- ❖ Ancillary Facilities for Agriculture, Restoration, Education, and Cultural Practices.

Loko I`a Kalo (Wetlands)

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Land Characteristics

- ❖ Lands inundated by water from He`eia Stream, `auwai, springs, & Kāne`ohe Bay
- ❖ Generally lower in elevation than the other land types
- ❖ Almost all of land is within the 100-Year flood Zone
- ❖ Lands entirely within the Urban District
- ❖ Predominantly alien grasslands & wetland vegetation

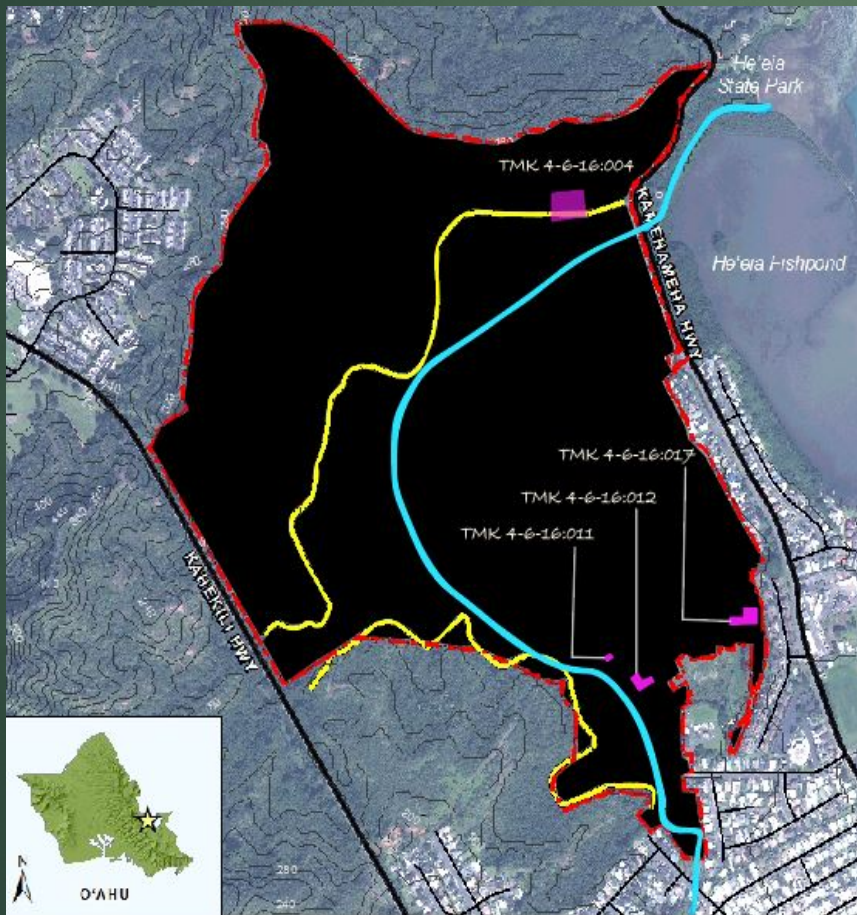
Land Uses

- ❖ Wetland Agriculture
- ❖ Restoration Activities
- ❖ Education & Research
- ❖ Cultural Practices
- ❖ Ancillary Facilities for Agriculture, Restoration, Education, and Cultural Practices.

ʻĀina Kuleana

(Kuleana Lands)

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Land Characteristics

- ❖ Kuleana lands awarded in the Great Māhele (1850)
- ❖ Consists of Tax Map Key (TMK) Parcels:
 - ❖ 4-6-16:004
 - ❖ 4-6-16:011
 - ❖ 4-6-16:012
 - ❖ 4-6-16:017

Land Uses

- ❖ Privately-owned lands that will be subject to the Heʻeia CDD Plan & Rules



Mahalo