

# East Honolulu Watershed Management Plan Phase 1 Stakeholder Consultation Notes

MAY 2019

Prepared by SSFM International for the City and County of Honolulu Board of Water Supply in support of the East Honolulu Watershed Management Plan



## TABLE OF CONTENTS

Overview of Consultation Process .....	3
Potential Projects Identified for the EHWMP .....	3
City and County of Honolulu (CCH), Department of Planning and Permitting (DPP), Planning Division .....	6
East Honolulu Farmers .....	9
Hawai'i Kai NHB #1 .....	13
Kuli'ou'ou – Kalani Iki NHB #2 .....	16
Wai'alae – Kāhala NHB #3 .....	18
Hui o Ko'olaupoko (HOK) .....	21
CCH Department of Design and Construction, Division of Facilities Maintenance (DFM) .....	23
Kem Lowry .....	27
Mālama Maunaloa (MM) .....	29
Maunaloa Watershed Hui .....	34
University of Hawai'i (UH), Department of Urban and Regional Planning (DURP) & UH Sea Grant .....	36
CCH Office of Climate Change, Sustainability & Resiliency (CCSR) .....	38
Dept. of Land & Natural Resources (DLNR), Division of Forestry and Wildlife (DOFAW).. .....	40
DLNR Nā Ala Hele (Statewide) .....	41
Hawai'i Kai Strong .....	42
808 Cleanups .....	44
Water.App .....	46
'Āina Haina Prepared .....	47
DLNR Nā Ala Hele (O'ahu) .....	48
Sierra Club .....	51

## **OVERVIEW OF CONSULTATION PROCESS**

The initial consultation process for the East Honolulu Watershed Management Plan (EHWMP) involved small group and individual meetings with elected officials, various community organizations, land owners, government agencies, and individuals who are active in and/or knowledgeable about water resources in East Honolulu. The purpose of these meetings was to inform people about the plan and the planning process and to identify community values and issues.

The following community organizations and government agencies were included in the stakeholder consultation process:

1. City and County of Honolulu (CCH), Department of Planning and Permitting (DPP), Planning Division;
2. East Honolulu Farmers;
3. Hawai'i Kai Neighborhood Board (NHB) #1;
4. Kuli'ou'ou – Kalani Iki NHB #2;
5. Wai'alae – Kāhala NHB #3;
6. Hui o Ko'olaupoko (HOK);
7. CCH Department of Design and Construction, Division of Facilities Maintenance (DFM);
8. Kem Lowry;
9. Mālama Maunaloa (MM);
10. Maunaloa Watershed Hui;
11. University of Hawai'i (UH), Department of Urban and Regional Planning (DURP) & UH Sea Grant;
12. CCH Office Of Climate Change, Sustainability & Resiliency (CCSR);
13. Dept. of Land & Natural Resources (DLNR), Division Of Forestry And Wildlife (DOFAW);
14. DLNR Nā Ala Hele (Statewide);
15. Hawai'i Kai Strong;
16. 808 Cleanups;
17. Water.App;
18. 'Āina Haina Prepared;
19. DLNR Nā Ala Hele (O'ahu); and
20. Sierra Club

## POTENTIAL PROJECTS IDENTIFIED FOR THE EHWMP

An important outcome of the initial stakeholder consultation process was to identify ongoing or future projects to address critical water resource issues in East Honolulu. Potential projects identified during initial stakeholder consultations are listed in the table below. These projects will be further investigated and during later phases of this planning process and potentially incorporated into the EHWMP.

Project / Program	Description	Potential Champion(s)	Status
Stream restoration	Dechannelization of certain streams in East Honolulu	Mālama Maunaloa; Sierra Club	Interest
Increased hunting permits	Increase hunting permits for certain ungulate species in East Honolulu	DLNR Nā Ala Hele	Interest
Trail educational program	Outreach and educational signage to increase awareness about the impacts of trail use on watershed health	DLNR Nā Ala Hele	Interest
Replacing trail ropes with steps	Replace ropes along popular hiking trails with steps to prevent trail erosion	DLNR Nā Ala Hele	Interest
Xeriscaping at the Hawai'i Kai Golf Course	Increase the amount of xeriscape landscaping at the Hawai'i Kai Golf Course to decrease the area's water usage	Livable Hawai'i Kai Hui	Interest
Kuli'ou'ou Ridge Trail and parking improvements	Implement pilot projects along the Kuli'ou'ou Ridge Trail to address issues such as spread of invasive species, overuse of resources, erosion, and others; consider trail entrance parking improvements	DLNR Nā Ala Hele	Interest
"Specific Area Plans"	Develop community-level planning process which would identify resources impacted and adaptation measures	Sierra Club	Interest
Agricultural Water Use Plans	Develop water use plans for individual farms	CTAHR; DOA	Interest
Wastewater recycling program	Recycle water from the East Honolulu WWTP as a source for irrigating golf courses and other compatible uses	ENV	Planning
Detention basins	Build detention basins in the upper watershed of certain stream basins to mitigate flooding during heavy rains	DFM	Interest

Water quality phone app	Create phone app that allows for community monitoring of surface water and drinking water quality	808 Cleanups; Water.App	Planning
Stream Debris Educational Program	Outreach and educational signage to increase community awareness about whose responsibility it is to clear debris from stream channels	Hawai'i Kai Strong; 'Āina Haina Prepared; 808 Cleanups	Interest
Watershed protection fences in Pia and Hawai'i Loa	Implement watershed fences in the upper watershed to mitigate the impacts of ungulates	DOFAW	Planning
Green infrastructure design guidelines	Document green infrastructure to guidelines to incorporate into future development standards	DFM	Planning
Stormwater public school curriculum	Curriculum for students to develop stormwater management plans for their school	DFM	Ongoing
Tree plantings project	Plant 400 trees in urban areas within East Honolulu	Mālama Maunalua	Ongoing
Coral colonies project	Plant new coral colonies in Maunalua Bay that are able to withstand higher water temperatures due to climate change	Mālama Maunalua; Hawai'i Institute of Marine Biology	Ongoing
Watershed boulder basins	Enhance the boulder basins located where streams meet developed areas to catch boulders and large debris	DFM	Ongoing
Drainage system infrastructure upgrades	Upgrade the drainage system in East Honolulu to include features to mitigate stormwater pollution, such as: <ul style="list-style-type: none"> <li>- Baffle boxes</li> <li>- Retractable screens</li> <li>- Centripetal separators</li> </ul>	DFM; Mālama Maunalua; Hui O Ko'olaupoko	Ongoing
Maunalua Fishpond Restoration	Restore the Kalauha'iha'i Fishpond and the Kānewai Spring for environmental, cultural, and educational purposes	Maunalua Fishpond Heritage Center	Ongoing
Keawāwa Wetland Restoration	Restore the Keawāwa Wetland for environmental, cultural, and educational purposes	Livable Hawai'i Kai Hui	Ongoing
Ka Iwi Coast Preservation	Preserve Ka Iwi by protecting its natural resources and cultural sites	Livable Hawai'i Kai Hui	Ongoing

## CITY AND COUNTY OF HONOLULU (CCH), DEPARTMENT OF PLANNING AND PERMITTING (DPP), PLANNING DIVISION

December 19<sup>th</sup>, 2018, 9:00 am

Attendees: Thomas Blair (DPP); Melissa White, Abbey Seitz (SSFM)

### Notes:

#### **Major updates from the 1999 EHSCP:**

- Changes are summarized in the status report available online:
  - Aging population (projected to have 40% of population 65 and older)
  - In-depth discussion of climate change and sea level rise (SLR)
  - Shoreline access
    - Portlock & Paikō Beach landowners blocked access by moving boulders (mainly State Issue)

#### **Critical Water Resource Issue Discussed:**

- Access to Mauka and Makai Areas
- Flooding and Drainage
- Water Conservation

#### **Projects to Further Investigate:**

- Hawai'i Kai Golf Course water recycling
- Restore channelized streams
- Enhancing low impact development standards

#### **Relevant EHSCP Issues and Recommendations:**

- Community Issues:
  - Climate Change (Workshops held in 2016)
    - Morphed into discussion about runoff
    - UH SeaGrant was involved
  - Mālama Maunalua concerned about water quality in the Bay
    - Shoreline is not within County jurisdiction, but the City is looking at policies to mitigate inland runoff
    - Improve Conservation Land – addressing upland erosion and feral animals
- Land Use/Development:
  - Talk of eventually redeveloping the shopping centers– Costco, and the one on Lunalilo Home Rd (KS owns)
  - KS wants to develop the “Great Lawn” where the fairs are held (currently open space, makai of highway)
    - Hawai'i Kai NHB pushed back against this
    - Great Lawn is close to shoreline – could be used for flood retention purposes
  - East Honolulu is a food desert
  - Issues with shopping center in 'Āina Haina
    - Part of commercial zoned shopping center is occupied by a Church
    - City wants to develop more housing along the highway – consider this a potential site

- Demographics:
  - Population growth: There has been no community pushback on population projections because there is almost no growth anticipated for population or housing
    - Some policies recommending allowing residences above businesses, has potential to allow for ADUs
    - Identified potential for developing 1.5 ADUs each year (minimal)
  - Almost no residential growth projected
  - Shrinking household sizes in the district due to the aging population – now appx. 2.7 per household in Hawai'i Kai
- Flooding and drainage:
  - Some community groups working on flooding issues, such as 'Āina Haina Strong (works mostly on disaster preparation)
  - No major infrastructure changes envisioned in EHSCP
    - Maintaining two drainage ditches (USACE is looking to improve)
  - EHSCP discusses increased drainage and retention improvements along the highway, including landscaping
    - No improvements have been made in this area since the 1999 EHSCP that Thomas knows of
  - Includes policy recommendation to identify repetitive loss areas from flooding and implement greater rebuilding restrictions
    - Extends to areas affected by 3.2 ft of SLR (part of the Mayor's Directive)
    - Kuli'ou'ou area is heavily impacted by flooding – highway becomes flooded in this area
  - The EHSCP includes recommendations to increase short and long term resiliency
- Watershed Issues/Projects:
  - Language about Golf Course water reuse project will stay in the EHSCP
    - Hawai'i Kai is so close to the wastewater treatment plant that it would not take significant amount of infrastructure to implement this
  - Kalama Valley center
    - Guiding hiking trails
    - Native plant nursery
    - Working on recreation and restoration
  - State owns highways and lookouts
  - Need for maintaining trails
    - City Parks not maintaining Koko Head stairs
    - EHSCP recommends City Resource Management Agency to help maintain trails
  - Policy recommendation for local Watershed Partnerships to manage the ahupua'a

- Policy recommendation to restore channelized streams – some pushback on this from affected landowners
- Two agricultural areas in East Honolulu
  - Agricultural uses have downstream impacts – EHSCP will have policy to address this
- Some people were interested in completing the Hawai'i Drive Loop – not great community support for it because of potential traffic impact
- Community was excited about restoring ecological functions through low impact development (LID) standards
  - Difficult to implement as a retrofit because area is already heavily developed
  - The only large infrastructural changes might be made to the roadways – potential LID opportunity
  - Kuapā Pond
    - Once a nearly 600 acre fishpond that was dredged to develop Hawai'i Kai
    - Private waterway operated by marine management agency
    - Owners need to dredge the entrance every few years
    - Boat cleaning has attracted sharks into the marina
- Cultural Elements of the EHSCP:
  - The updated EHSCP will not have table of historic and cultural resources included in the 1999 version
  - There is a Heiau near the wetlands in Hawai'i Kai
  - Kānewai Spring (near Paikō loop) was acquired and restored – community groups want to bring school groups there as field trips



## **EAST HONOLULU FARMERS**

January 8th, 2019, 4:00 pm  
Mariner's Cove Bay Club

### **Attendees:**

#### ***BWS:***

- Barry Usagawa
- Kathleen Pahinui
- Joe Cooper

#### ***SSFM:***

- Melissa White
- Abbey Seitz

### ***Community Members / Farms and Organizations Represented:***

- Alan Hoeft, Island Manaia LLC
- Bill Paisens, Wally's farm
- Carol Jaxson, Hawai'i Kai NHB rep for Kamilo Nui Valley
- Chris Harris, CDM (Consultant on the Water Master Plan)
- Daniel Smith, Lunalilo Home
- Edward Otsuji, Otsuji Farm
- Elizabeth Reilly, Kamilo Nui Farmers / Livable Hawai'i Kai Hui / Hawai'i Kai NHB
- Glenn Nii, R&S Nii Nursery
- Heather Mohv, Keiki and Plow
- Iris Iwami, O'ahu Soil and Water Conservation Districts (SWCD)
- Karen Paisens, Wally's farm
- Kimo Franklin, Island Soil Testing Service
- Mary Lou Toyoma, Koko Farm
- Judy Nii, R&S Nii Nursery
- Michael Tsuruda, AJA Nursery
- Richard Ogoshi, SWCD
- Sergio Vasquez, Tropical Tree Nursery
- Stacy Enomoto, Doris Enomoto Farm
- Stephen Raffets, Trust for Public Lands (TPL)

### **Notes:**

#### ***BWS Rate Updates (Barry Usagawa and Joe Cooper, BWS):***

- Increased water rates were adopted in August
- Impact fees for new meters have not yet impacted users
- BWS acknowledged that farming is important and they want to support food security
  - Important to keep local produce affordable

### **Priority Critical Water Resource Issue Discussed:**

- Water conservation
- Wildfires

### **Projects to Further Investigate:**

- Develop water use plans for individual farms
- Fire reservoir above Kamilo Nui Valley

- BWS aims to promote conservation - increased water rates support that
- BWS created an “essential needs” tier of rates to acknowledge most people need to meet basic needs
  - Residential users - beyond 6,000 Gallons per month the rates go up
  - Ag Users - rates are subsidized:
    - Currently, above 13K gallons per month, rates go down
    - With approved rate changes, discounts start at 6,000 gallons
    - Monthly service charge is going up
- Hawai‘i Kai has a different sewer system - American Water owns and operates it
- Increased rates are attributed to increased maintenance costs and conservation efforts:
  - BWS has a lot of piping and mains to replace in Hawai‘i Kai from salt water damage
  - BWS is expanding conservation and watershed management program funding - increasing from \$1.5 million to at least \$3M
  - Increased funding to help devise incentives for water efficiency - such as sub-meters
  - Providing funding to the Ko‘olau Watershed Partnership for:
    - Forest conservation
    - Invasive species
    - Erosion management

***Managing Costs and Encouraging Conservation for Ag Users (Barry Usagawa, BWS):***

- High metering costs: New 2” meters have one time impact fee of \$65K (BWS is trying to decrease the costs of new meters for Ag users)
- BWS is considering asking for an Ag water use plan as part of application for new meter – this will help people right size their meters and not overpay
- BWS will also support soil and water conservation - CTAHR, DOA, RC&D could help create water use plan template for farmers
- BWS wants to engage the SWCDs ( via Michelle Burnham) to consider ways to use water more efficiently on farms and explore how BWS could support that through subsidizing or purchasing equipment for conservation and monitoring
- BWS provides rebates for rain barrels, water efficient washers, weather based irrigation controllers, etc.
- There is limited access to wells and stream diversions in East Honolulu
  - BWS is asking Legislature for funding to build a new well
- Low water pressure can be an issue in the valley - booster pumps are needed in some areas
  - Some farmers expressed concern that downsizing their meter would make water pressure worse – BWS responded that they could change the meter on a trial basis
- Food safety modernization act (FSMA) requires washing produce with treated water – this will increase potable water demand

- BWS could consider supporting food hubs and shared processing facilities to help farmers comply with FSMA

**Questions and Comments:**

- Q: Is there a different water use rate for food processing?
  - A: It will be the same rate.
- Q: Where will the new well be located?
  - A: Kunia - next to Waiahole ditch – a State Ag park is being planned next door. From there it can be transported to other systems.
  - A: The Central O’ahu water system supplies Wai’anae and East Honolulu
- Elizabeth Reilly knows Michelle Burnham - represents the West SWCD.
  - Can work with soil conservation districts on programs and projects that can be incentivized
- Mary: We are trying different irrigation systems since water is so expensive
- Mary: We have gone to hand watering in some areas – in low pressure areas, we still use drip irrigation
- In the back of the valley and behind Kaiser High School, farmers all lease from KS:
  - Usually have 20-25 year lease
  - There is generational turnover in farming right now - most children do not want to continue farming, so the future is uncertain once the lease expires
  - Barry: Walter Thoemmes from KS is joining the Water Plan stakeholder advisory group
- Elizabeth: The East Honolulu SCP says Kamilo Nui will remain Ag land
- Elizabeth: We need to recognize mauka land uses are very important to water quality in Maunalua Bay
- Barry: This extends to forest conservation, fire prevention and management:
  - May need to consider fire management facilities for HFD in East Honolulu (dip tanks- portable tanks next to hydrants that helicopters can pickup)
  - Elizabeth: There were 19 fires two years ago – some neighborhoods are working on being the first O’ahu Firewise communities
  - Look at feasibility of fire reservoir above Kamilo Nui Valley
    - This may be on the site of proposed cemetery
- Q: Can we get a small irrigation reservoir here like the one they have in Waimānalo?
  - A: Other solutions are easier – there are some in Hawai’i Kai already – they require a certain elevation and might not solve the water pressure issues
- Barry: Access to mountains and associated impacts are an island-wide issue
- Barry: Restoration of lo’i is happening on other areas of O’ahu and on BWS land:
  - A constant challenge for BWS is how to manage recreational access and control environmental impacts
  - When you have educational facilities near lo’i areas it helps control undesired uses and educate people

- Q: Will there be classes and information on the BWS conservation program?
  - A: We can put together talks and classes on different technologies, erosion, etc.
  - NRCS goes out to individual farms and does walkthroughs
- One new farmer behind Kaiser High School says KS won't send her the landowner authorization letter to approve conservation measures they want to implement
  - Steve from Trust for Public Land (TPL): Not sure farms on KS owned land can get federal funding
- To NRCS: What kind of soil do you recommend for water retention?
  - A: Compost – let it sit on top of soil, don't mix it in
  - A: Cover crops are also effective (between rows, in fallow fields)
- Q: If rates go up and we have to replace the meter, what will it cost?
  - A: BWS owns the meter, so they replace it at no charge
- Q: What will new user impact fees be?
  - A: BWS' actual cost doubles (from 65K to 140K)
  - A: BWS is trying to identify ways to keep cost the same for ag users through efficiencies and right sizing meters
- Steve from TPL (discussion with SSFM after the meeting): We are not active in managing Ka Iwi coast lands, and don't have any other lands in mind for East Honolulu
  - Most Urban land is already developed
  - Steve would like to see State/County pool resources and help fund watershed councils for watershed management

## **HAWAI'I KAI NHB #1**

January 29th, 2019, 7:00 pm  
Haha'ione Elementary School Cafeteria

### **Critical Water Resource Issue Discussed:**

- Water conservation

#### **Attendees:**

##### ***BWS:***

- Barry Usagawa

##### ***SSFM:***

- Abbey Seitz

#### ***Neighborhood Board Representatives:***

- Roberta Mayor, Chair
- Elizabeth Reilly, Vice Chair
- Rene Garvin
- Maxine Rutkowski
- Natalie Iwasa
- Greg Knudsen
- Robert Clark
- Katie Scott
- Carol Jaxon
- Herb Schreiner
- Lasha Salbosa
- Paige Altown

#### **Notes:**

##### ***City/State Report:***

- HFD: No new fire reports, with the exception of a cooking fire
- BWS:
  - BWS will be offering rebates for conservation mechanisms (water efficient washing machine and rainbarrel)
  - You must submit a copy of receipt to BWS online
  - BWS is supporting a video contest for youth to express their concerns for Oahu's water
  - BWS: There are new main breaks to report

##### ***Community Announcements:***

- Issues with abandoned cars left at the beach parks
- Livable Hawaii Kai Hui has planned a community event for World Wetland Day
- Ka Iwi Explorations has different planned hikes in the Ka Iwi mauka lands during 2019

- The O’ahu Metropolitan Planning Organization is looking for public input for the O’ahu Regional Transportation Plan
  - Susan Shen (UH DURP): We are conducting a survey about how resident’s transportation options and mobility has been impacted by sea level rise and other climate change hazards - we will be sharing the survey results with government agencies

***Public Issues:***

- People (and sometime unpermitted tour buses) park illegally along Kalaniana’ole Highway; they cause issues and block driveways
- Michelle (lives near Nawiliwili St) – I will second that there are a lot of issues with people parking too close to the driveways; this also brings speeding issues, which causes it to become a dangerous street

***Presentations:***

- Cynthia King (DLNR): Yellow Faced Bee Habitat Restoration at the Ka Iwi Scenic Shoreline State Park
  - Defined as “invertebrate conversation” which is extremely difficult, but important to retaining ecological functions
  - Yellow faced bees are native to Ka Iwi, and once provided bulk of pollination services to the State
  - Currently augmenting existing habitat and developing a breeding program
  - Recently put up fencing at Ka Iwi, providing a barrier to protect forest
  - Many of the bees nest in coral rubble along the beach among other areas along the shoreline – maintaining coral health is extremely important to conservation of this species

***EHWMP Question and Answer:***

- Elizabeth: Thank you for taking the time to set up meeting with Kamilo Nui farmers and holding a joint meeting with DPP
- Resident: Glad you are looking at land use and water planning together
- Bob Stanfield (formerly with DPP): I’m concerned about vulnerability of infrastructure to sea level rise and roadways threatened by climate change. How will the EHWMP address this?
  - Barry: We are working closely with Chip Fletcher to model sea level rise; high tide flooding will increase the current sea level rise predictions; coastal homes in East Honolulu will be impacted; BWS has identified 21 bridges that will be impacted by sea level rise; sea walls will impact beaches; there is no clear answers to solve this; we are already starting to see “sunny day” flooding; we need to plan to prepare for this

- Barry: East Honolulu uses about 9 million gallons a day; it primarily “borrows” water from other areas; other planning districts want to make sure East Honolulu is conserving their water; water efficient clothes washers has been a popular rebate in the BWS conservation rebate program
- Elizabeth Reilly: We will have one or two board members work with BWS on the EHWMP approval process

## **KULI'OU'OU – KALANI IKI NHB #2**

March 7th, 2019, 7:00 pm  
Grace Chapel of Honolulu

### **Critical Water Resource Issue Discussed:**

- Water conservation

#### **Attendees:**

##### ***BWS:***

- Barry Usagawa

##### ***SSFM:***

- Abbey Seitz

##### ***Neighborhood Board Representatives:***

- Heather Lum, Chair
- Paula Carroll
- Joshua Greig
- Daniel Harris-McCoy
- Jeannine Johnson
- Kevin Mulkern
- Sheridan Spangler
- Linda Starr
- Melvin Yap

#### **Notes:**

##### ***EHWMP Question and Answer:***

- Resident: I'm concerned that BWS is supplying water to for-profit bottled water manufacturers; I do not believe it is fair that residents are being encouraged to conserve water when water is being sold to for-profit companies
  - Barry: Businesses pay higher than residential rates – we will document your concerns
- Sheridan: I'm concerned about East Honolulu's water rates being based on home size without taking lawn size and necessary water consumption into consideration; homes in East Honolulu have large lawns that require water, but the homes that are used to determine rates have little to no lawns
  - Barry: Rates are based on water consumption and not lot size; we developed an essential needs tier, designed for ensuring affordable rates for low-income residents to ensure they have access to at least 2,000 gallons of water per month
  - Barry: Rate prices rise with consumption to encourage conservation; larger lots can hinder conservation efforts.
- Sheridan: I'm concerned about the water misuse that happens occurs at beach showers and water fountains, breaking and wasting water
  - Barry: If you see water not being used properly, you should contact the BWS hotline



- Linda: What is the purpose of linking sewage and water rates?
  - Barry: Bills are based on a flat rate; there have been concerns with sewage fees being disproportionately high when more water is used for non-sewage purposes
  - Barry: There are efforts to rebate sub-meters to track and charge accordingly for outside water usage
  - Heather: BWS should consider separating sewer and water bills
  - Barry: BWS is looking at additional rebate programs, including potential rebates for sub-meters; rebates would only be for the sub-meters and not for labor/installation costs
- Sheridan: How is BWS preparing for population growth?
  - Barry: BWS has adopted waivers for impact fees for affordable housing and homeless, including waivers for high-rise sprinkler system costs.
  - Barry: The Primary Urban Center Watershed Management Plan is examining how high-rise developments can be water efficient through measures such as rain-water catchment
- Linda: How is water carried up larger buildings, and how does this work for emergency sprinklers?
  - Barry: Pumps are used, however emergency sprinkler systems may have tanks installed at the top of buildings in case pumps go offline during a power outage

## **WAI'ALAE – KĀHALA NHB #3**

January 17th, 2019, 7:00 pm

Wesley United Methodist Church

### **Critical Water Resource Issue Discussed:**

- Water conservation

#### **Attendees:**

##### ***BWS:***

- Barry Usagawa

##### ***SSFM:***

- Melissa White
- Abbey Seitz

#### ***Neighborhood Board Representatives:***

- Richard Turbin, Chair
- Sylvia Himeda
- Brian Wong
- Arnold Brady
- Naomi Hanohano
- Peter Dudgeon
- Kenneth Chang
- Gay Gayle

#### **Notes:**

##### ***Elected Officials Report:***

- Governor's Rep: The governor will be providing State address to discuss the rapid responses to hurricanes and floods, and homelessness; the Governor's office knows that homelessness is especially important to this NHB
- Community Concerns for Mayor's Rep:
  - The Kāhala Community Association was recently notified of a proposed developed on Kāhala Ave next to Hunakai Beach Access – it is zoned R 75; the proposal is for two connected dwellings; dwelling B has 13 full bathrooms; we need to protect the neighborhood from this type of development.
  - There is vacant lot on Kāhala Ave that is overgrown with vegetation; it is a fire hazard

##### ***East Honolulu Watershed Management Plan Question and Answer:***

- Brian: Are these plans already in place?
  - Barry: No, these are completely new; we have had previous watershed plans made for the entire island, but they are not as useful because we

need more watershed-specific detail; on the BWS website you can view the watershed management plans that are already adopted

- Brian: Is there an opportunity to review the plan on an ongoing basis and update it, i.e., will it be a living document?
  - Barry: Yes, the EHSCP and EHWMP are meant to be updated in tandem, this means they should be reevaluated every 5-10 years
- Resident: What is the difference between the pumpage versus net demand shown on the fact sheet?
  - Barry: The map on the fact sheet shows how much water is pumped in each district versus how much water demand there is in each district; we pump very little water within East Honolulu, as most of it is piped in from other areas of the island
- Resident: Do we have enough water?
  - Barry: Not in East Honolulu, that is why East Honolulu relies upon the Urban Center and Pearl Harbor sources; generally speaking, on O'ahu we have enough water for current and future populations, but climate change may impact this; our water table is steady and we monitor it daily; O'ahu is using less water today than we were 28 years ago; the biggest residential water use are toilets; we have cut down water use by improving toilet efficiency; we also have increased water rates to incentivize residents to use only what they need
- Sylvia: We use a lot of water to irrigate our yard and pay a very high rate for it
  - Barry: If you live West of Kuli'ou'ou, then you are on the City system – East of Kuli'ou'ou to Hawai'i Kai, you are on American Water System; you have to assume 20% of your costs are going towards irrigation; there is a way to decrease these costs; one way is to sub-meter it;
    - Barry: BWS will have rebates soon on weather based irrigation controls, sub-meters, and rain barrels; the BWS Conservation program can fund up to \$3 million a year
- Resident: 10 years ago I read in a newsletter that to have a sub-meter installed, you need to hire a contractor. Is this still a requirement?
  - Barry: It's always better to have a contractor if you are touching plumbing, but I don't think it is a requirement to hire a contractor; you do need to apply through ENV to have a sub-meter installed and call them monthly for a read to receive the financial benefits

- Resident: To install a sub-meter it once cost \$2,000 then went up to \$10,000 – this is not feasible for the average person
  - Barry: You should revisit the requirements, I do not think it is as difficult now; Wastewater falls under ENV, a different department than BWS; we can talk to them to discuss the requirements and how to make it more feasible for the average person to implement
  
- Arnie: Does “irrigation” costs cover swimming pools?
  - Barry: If you tie your fill line to your pool then yes

## HUI O KO'OLAUPOKO (HOK)

February 19<sup>th</sup>, 2019, 10:00 am

Conference Call

Attendees: Kristen Nalani Kane (HOK); Abbey Seitz, Melissa White (SSFM)

### Notes:

#### ***Program Activities / Partnerships:***

- Stormwater management
- Low Impact Development (LID)
  - LID is the biggest priority
- He'eia estuary restoration
- HOK works mostly in habitable areas, some makai work in fishponds
- HOK has worked with Mālama Maunalua (MM) on past projects
  - MM does not work on many LID projects – they are more makai based
  - Open to future collaboration
- MW: BWS has recently doubled funding for watershed partnerships
  - Ko'olau Mountain Watershed Partnership (KMWP) works in upper watershed with larger landowners
  - KMWP tends to focus on restoration and monitoring activities.
  - HOK has partnered with KMWP but haven't established ongoing formal collaborations

#### ***Past, Current & Future MM Watershed Projects:***

- HOK has matrix of potential projects based on “priority” – lists number of years it would take to complete projects
- Projects have come up that would have been beneficial, and there was funding in place, but they were not implemented
  - HOK was advocating for centripetal separators in storm drains that would have removed oils and other pollutants from runoff
    - Was put out for bid by the City for new construction in Enchanted Lakes and new areas in Mililani
    - Was eventually terminated – HOK felt it was due to lack of understanding of the technology and how to apply it
- HOK looks to rain gardens and green streets practices in the Pacific Northwest as potential models
  - Green streets are particularly difficult to implement
- HOK's LID projects are very small and focused, examples:
  - Kailua beach parking lot and others with private landowners

#### **Critical Water Resource Issue Discussed:**

- Flooding and Drainage

#### **Projects / Partnerships to Further Investigate:**

- HOK – MM partnership. There is potential for HOK to assist with LID projects in East Honolulu (part of the East Honolulu district is within the Waimānalo ahupua'a, and traditionally within the Ko'olau Poko Moku)
- Centripetal separators in storm drains

- Windward Mall
- Removal of mangroves at He'eia State Park (enhanced the viewplane of the fish pond)
- Popoi Street Stormwater Retrofit
  - Retrofitted existing parking lot
  - Pervious pavers were installed in the parking area to capture stormwater runoff and reduce the amount of pollution reaching the stream
  - Installed native plants to allow for additional infiltration
  - Relatively easy to maintain

***Issues and Needs:***

- Implementation of projects is dependent upon:
  - Funding
  - Ability to easily implement
  - Partners ability to assist in maintenance
- Long term maintenance of LID projects is large barrier
  - Maintenance is not usually included in grant funds
    - Need to earmark money for maintenance in the future
  - Considering fee-for-service for HOK to maintain LID projects
- Some HOK rain garden sites are still theoretically working, but not to their full potential because of buildup of debris (maintenance issue)
- Helps to have language surrounding stormwater issues in policy documents – beneficial to receive grants
- HOK has tried to work with the City in the past
- HOK typically works with small, private landowners – has not worked much with the City

## CCH DEPARTMENT OF DESIGN AND CONSTRUCTION, DIVISION OF FACILITIES MAINTENANCE (DFM)

February 20<sup>th</sup>, 2019, 3:30 pm

Kapolei Hale

Attendees: Randall Wakumoto, Russell Leong, Thomas Quaccia (DFM); Abbey Seitz, Melissa White (SSFM)

### Notes:

#### ***Program Activities / Partnerships:***

- DFM administers nonpoint source (NPS) permits and City MS4.
- DFM focuses on “low hanging fruit” stormwater management projects:
  - Trash and sediment removal, etc.
- DFM has not yet begun to address metals, nutrients, pollutants in stormwater
- Green infrastructure for stormwater infiltration:
  - Now included in the zoning code for new developments
  - Tied to grading permits
  - Separate from water quality rules
- DFM is focused on technical design guidance for low impact development:
  - Creating detail of what rain gardens and other green infrastructure should look like (design guidelines)
  - Exploring different types of green infrastructure
  - Working with UH (WWRC) to tweak designs to maximize effectiveness
  - G70 is working on the design guidelines
  - Will release to the public soon
- Current DFM priority areas:
  - Wailupe / Kuli‘ou‘ou area and Kuapā Pond and DOH go out for public notice – community doesn’t see anything for Maunaloa area
  - Program that drives this is the Total Maximum Daily Load (TMDL) plans, which are more focused on perennial streams like Ala Wai
  - No current TMDL plans for East Honolulu
- Ongoing education efforts
  - Working with public schools to empower students to create stormwater plan for their schools
  - Working with Lauren Roth to support her phone app
    - App shows stormwater management can be most beneficial in improving water quality

### **Critical Water Resource Issues**

#### **Discussed:**

- Flooding and drainage
- Nearshore water quality

#### **Partnerships / Projects to Further Investigate:**

- Retractable screens
- Boulder / detention basins
- Baffle boxes
- Public school education program (working with students to develop stormwater management plans for their school)

### ***Relevant Plans and Research:***

- Monitoring is indicating that the predominant pollution source is runoff from conservation areas, including sediment, animal waste, and others
  - Runoff from Ag lands are also a significant source of pollution
  - Need for coordination with Koolau Mountains Watershed Partnership (KMWP)
  - Kamehameha Schools (KS) also needs to be a partner (currently KS focuses on funding)
  - Fences or gates that prevent hunters from going into certain mauka areas are useful
- Cesspools are another another prominent pollution
  - Cesspools exist in the very far reaches of the valleys
  - Sampling is indicating effluents are going from cesspools into the streams
  - Homeowners often are not aware of cesspool impacts
- DFM is working with USACE on flood protection
  - No work has come out of it
  - Cost-benefit analysis is a requirement for USACE to proceed on projects
  - The Wailupe USACE project did not meet the cost-benefit criteria and did not go forward – this is likely to be true for other projects in East Honolulu
- State is considering work plan for larger monitoring plan for Malama Bay
  - Would include the areas from Maunalua Bay to Pearl Harbor
  - Driven by DOH who has new water quality standards to reduce pollutants

### ***Past, Current & Future DFM Watershed Projects:***

- Currently working on projects at to improve water quality and capture and treat runoff at:
  - Kuli'ou'ou
  - Kuapā Pond
- Current stormwater mitigation tools in use by DFM:
  - Automatic retractable screens in storm drains
    - Have the capacity to remove some organics the storm drain system
    - Captures a lot of kukui nut trees
    - Screens in Kailua, Waikiki, Downtown areas
  - Baffle box – first one to implement (SSFMS would like to see plans and photos)
    - Piloting this technology – need more funding to scale up
  - Bioretention
  - Permeable pavers
- DFM prefers to roll out projects in incremental stages
- DFM outreach specialists helping with stormwater management programs
  - Adopt a block & adopt a stream are the most prominent programs



- DFM holds an annual volunteer award ceremony
- DFM is one of the key implementers for green infrastructure in the public right of way
  - Often need to partner with the Division of Road Maintenance
- DFM has experimented with rain gardens
  - Success depends on maintenance as well as how close the garden is to the water table
  - The water table is too high in many coastal areas
- Bioretention project at Koko Head District Park
  - Partnership between Mālama Maunaloa and Dept. of Parks and Recreation
  - Malama Maunaloa eventually took over maintenance
- Rain gardens at Koko Marina
  - AECOM did the public awareness boards
- Some current regulations do not allow for green infrastructure
  - Talking with DTS and DDC to support green infrastructure projects, but most agencies are lacking technical guidance
- There are concrete lined boulder basins along every stream before it enters the developed area
  - Managed by DFM
  - Intent is to prevent large debris and boulders from going down concrete stream channels
  - Environmental groups want natural streambeds
    - Concrete is the preferred alternative from DFM's perspective because Hawai'i has high velocity streams and this prevents erosion
  - There is an opportunity to partner with BWS to expand boulder basins and create detention areas which could further slow the water
- Looking at establishing a Stormwater Fund
  - Stormwater fee will be established as part of it
  - Working with the Hawai'i Community Foundation for the stakeholder engagement process
  - BWS recently justified increased water rates (introduce FUND, then FEE)
  - Need to involve more private property owners in the process
  - This will be a driver to incentivize property owners to install more LID/ green infrastructure and to retrofit their properties

***Issues and Needs:***

- People expect clean streets but don't take responsibility to reduce runoff
  - Education is needed to help convince people to take responsibility
- City is always blamed for flooding and drainage issues, when in reality the City does not have much control over these issues

- It is a City ordinance that homeowners should be maintain the frontage of their properties, including grass clippings
  - Ordinance often not followed
- Heavy rainfalls overwhelm existing systems
- DFM wants to see more green infrastructure projects in mauka areas, but it is not part of DFM's jurisdiction
- Highways are designed to be resilient to 50 year flood events (recent events were 100-yr flood events)
- Green infrastructure comes down to funding
- There are opportunities to update aging infrastructure
- It took decades for chlorine to subside, it is going to take at least 2 -3 permit cycles for stormwater to be properly managed
- It comes down to regulations, we need rules need to be more stringent and better enforcement
- Greatest DFM priority should be on Central O'ahu where water sources are concentrated
- Almost no water is brought from Ko'olau Poko to East Honolulu because of recent law suit

## KEM LOWRY

February 20<sup>th</sup>, 2019, 9:00 am

Conference Call

Attendees: Kem Lowry; Abbey Seitz, Melissa White (SSFM)

### Notes:

- 2016 workshops
  - Workshop goals included incorporating climate change language into the East Honolulu Sustainable Community Plan update
  - Not successful in including real estate stakeholders in the workshops
  - One representative from Kāhala hotel
  - Main issue that was raised was flooding and drainage
  - Not much discussion of sea level rise impacts (SLR-XA maps not yet released)
- Not much consideration of watershed remediation
- Sea level rise – concerned about housing and commercial development surrounding Kuapā Pond
  - Area behind Costco already floods
- Little interest from the neighborhood boards (NHBs) concerning climate change and sea level rise
- Strong presence of disaster management groups in East Honolulu
  - 'Āina Haina Prepared & Hawai'i Kai Strong
  - Strongly involved in household-level preparation
  - Hawai'i Kai Strong has regular workshops (sea level rise is not necessarily of interest to the group)
- Interest in detention basins in East Honolulu
  - Not much room for expanding drainage ways in East Honolulu
  - Would need to relocate large properties in order to make room for parkways
  - Opportunity to consider different models of green infrastructure
  - Lots of talk about how to undo channelization and create parkways, but the area is very constrained. Channelization of streams leading to too much velocity and carrying debris/sediment
  - Mitch D'Olier (Malama Maunaloa) was calling for detention basins in upper watershed to reduce flooding
  - Ala Wai project could serve as detention / green infrastructure model for East Honolulu
- Wai'ālae – Kāhala NHB has issues with shoreline access fronting the Kāhala Hotel

### Critical Water Resource Issues

#### Discussed:

- Flooding and drainage
- Sea level rise
- Climate change
- Access to mauka and makai areas

#### Projects to Further Investigate:

- District disaster preparedness groups
- Detention basins (upper watershed)
- Constructed wetlands

- Moderate to severe erosion is present along many of the district's hiking trails
  - Heavy sediment loads transfer into the Bay following heavy rains
- District's trails are heavily used – particularly on the Hawai'i Kai side
  - Unclear how to manage illegal hiking
  - Jurisdictional issue
  - Costly to maintain
- State stormwater management reports identify a matrix of different stormwater management tools that can be applied in Hawai'i
  - Constructed wetlands and converted parklands seem to be feasible options in some locations in the district

## MĀLAMA MAUNALUA (MM)

February 22<sup>nd</sup>, 2019, 9:00 am

Mālama Maunalua Office (Waldorf High School)

Attendees: Doug Harper, Pam Weiant, Emma Shelly, Alex Awo (Mālama Maunalua); Abbey Seitz, Melissa White (SSFM)

### Notes:

#### ***Program Activities / Partnerships:***

- MM primarily receives grants for invasive algae removal
  - Invasive algae removal evolved into the huki program
  - “Huki” are community volunteer days in which invasive algae is removed from the Bay
  - Huki plots are selected along Paiko Beach
  - Plots allow for scientific research and transplanting of native species
- MM’s education focuses on:
  - Culture and history
  - Ecology
  - Runoff
  - Participating school’s needs and interests
  - Sustainability
  - Invasive species
  - “It all comes to the Bay”
- MM is working with UH, DOH, and Surfrider to get a better handle on the Bay’s water quality through data collection and monitoring
- Partnerships are project based – they have worked with different partners in the past based on where the project is located:
  - Nature Conservancy
  - Ko’olau Mountains Watershed Partnership (some coordination)
  - DOFAW
  - Kona Brewing Company
  - East Honolulu Chamber of Commerce
- Strongest partnership has been with Pono Pacific
- Good partnership with the Hawaii Kai Homeowners Association
  - Easier to work with small groups of people
- Limited partnership with local businesses
  - It is always best when approached as a business proposition
  - Some companies are willing to work with MM if there is a good marketing opportunity

#### **Critical Water Resource Issues Discussed:**

- Nearshore water quality
- Flooding and drainage

#### **Partnerships / Projects to Further Investigate:**

- MM Tree Project
- MM Coral Colonies (with HIMB) project
- Projects listed within the Wailupe Watershed Plan

- MM does not do work in Kuapā Pond – the Marina Association handles data collection in that area

***Relevant Plans and Research:***

- Community Action Plans identify various pollutants coming in the Bay including terrestrial runoff, overfishing, and invasive algae
  - Currently those are internal plans – can be shared with SSFM
- MM has a database on Maunalua Bay’s water quality (available via an ArcGIS map)
  - Currently the data map is piece meal and not up to date
- Wailupe Watershed Plan
  - Chosen because it is the only unlined stream
  - Plan priorities are addressing upland areas prone to erosion and filtering debris from upper watershed
  - Exploring baffle boxes at key locations, an issue of funding
  - Working with the City for implementation and maintenance of proposed projects
  - Issues addressed in the Wailupe Plan are fairly similar across East Honolulu
- Looking to make inventory of watersheds publicly available
  - MM is conducting internal assessments of needs by watershed
- SSFM should look at OpenNSPECT modeling of stormwater runoff modeling
  - Developed by NOAA
- Active studies on cesspools
  - Can possibly extrapolate data on cesspools from other areas to Maunalua Bay
- Dr. Bob Richman with UH is a researcher studying swimming pool chlorine affects on coral in Maunalua Bay
  - Need to be aware of that different watersheds have different components – how pollutants are reaching the Bay is different for each Watershed
- Habitat restoration monitoring
  - Has helped to understand how big a problem sediment is

***Past, Current & Future MM Watershed Projects:***

- Planting new coral colonies in the Bay that are able to withstand higher water temperatures due to climate change
  - Working with Kira Hughes from the Hawai’i Institute of Marine Biology
  - Studying fragmented coral spawning
- Rain gardens
  - Partner with schools and parks primarily
  - Pulama Wai – mimics how a huki is done on land

- 2 rain gardens implemented in partnership with DOE (at Kaiser High School and the Holy Navity School)
- 2 rain gardens implemented in partnership with DOH
- Rain garden implemented at Koko Head District Park
- DOH requires management plans for rain gardens
- MM currently has a grant for two new rain gardens
  - The school would maintain it – this type of partnership is best for MM
- Tree project:
  - Project led by Alex Awo
  - Planting around 400 trees within urban areas
  - Being used to address runoff
  - Sierra Club, Pono Pacific, Biz Genetics are project partners
- Pulama Wai:
  - Effort led by community members and supported by MM
  - Project includes rain gardens, parking lot cleaning, and adopt a stream
  - Partners include DOE, DOH, CCH Parks, Koko Head Park, and Dept of Urban Forestry
  - Included the Healthy watersheds demo project at the Koko Marina shopping center
    - Showcased rain garden, downspouts, etc.
    - Brought community attention to stormwater management
    - Kona Brewing was a major supporter
- MM is considering how to retrofit channelized streams
- MM is supporting more stringent regulations for green infrastructure – particularly on private property

***Issues and Needs:***

- MM must focus on small projects due to small staff size and grant restrictions
- Stormwater is the hardest to address
  - Many players involved
  - High costs associated with addressing it
- Issues working with private property owners
  - MM would like to work with shopping centers more
  - MM has never worked with Kahala Mall
- Need more stringent regulations for green infrastructure
  - ‘Āina Haina shopping center was repaved four years ago (there was an opportunity for LID)
- Nearest rain gage is near the airport – it can only provide a high level view of rainfall, not specific to East Honolulu
- Challenges with monitoring effects/benefits of green infrastructure
  - MM knows green infrastructure is beneficial, but it is difficult to quantify the improvement in water quality without monitoring

- Lots of people drain their pool into the storm drain
- MM hears about a lot of flooding issues in the 'Āina Haina area
  - Issues with stream bank destabilization
- City's first response to flooding is always hardening
  - There are more environmentally sound ways to address the flooding
  - Difficult to address because homes are already existing in the riparian areas
  - Should look at options to reduce stream velocity and remove debris
- Challenges of addressing longer term maintenance of green infrastructure
  - Whose responsibility/liability is it?
  - What happens when funding ends?



## UNIVERSITY OF HAWAI‘I SEA GRANT (UH SEA GRANT)

February 22<sup>nd</sup>, 2019, 2:00 pm

SOEST Office

Attendees: Bradley Romine (UH Sea Grant/ORMP Working Group); Abbey Seitz (SSFM)

### Critical Water Resource Issues Discussed:

- Climate change
- Sea level rise
- Nearshore water quality

### Notes:

- UH Sea Grant is working on a white paper regarding incorporating climate change policy into the Primary Urban Center Development Plan (PUC DP) (can find on DPP website)
- PUC DP is the first DP / Sustainable Community Plan (SCP) that is working with UH Sea Grant to incorporate climate change language
  - Similar work is being done with the West Kaua‘i Community Plan
- NOAA Resilience Planning project is focused on providing guidance for the community level planning framework to integrate climate change / sea level rise (SLR) policy
- Key recommendations:
  - Use NOAA SLR Viewer to map 3.2 ft of SLR on the district by mid-century
  - For 20 year scenario, 1 ft of SLR (plus high tide) is more realistic
  - Mayor’s directive recommends using 6 ft bench mark for critical infrastructure (includes State highway)
- Consider groundwater inundation
  - When pipes become damaged they contribute to nonpoint source pollution
- Seawalls and armoring in East Honolulu would likely not be able to deal with 1-2 ft of sea level rise and high tide flooding

## **MAUNALUA WATERSHED HUI**

February 25th, 2019, 6:30 pm

Hawai'i Kai Marina

Attendees:

- Elizabeth Reilly (Aloha Kamilo Nui/Livable Hawai'i Kai Hui)
- Doug Harper, Pam Weiant (Mālama Maunalua)
- Bruce Tsuchida (Townscape)
- Barry Usagawa (BWS)
- Abbey Seitz, Melissa White (SSFm)
- Kimo Franklin (Island Soil Testing Service)
- Judy Nii (R&S Nii Nursery)
- Judy A.
- Kim Falinski (The Nature Conservancy)
- Bob Stanfield (Resident / formerly at DPP)

### ***Question and Answer:***

- Q: I understand you are presenting from a technical aspect, but I why you are not reaching out to the community until later in the process?
- A: We begun with the technical aspect but are conducting stakeholder interviews throughout this process. Local knowledge is essential to understanding the district's "hot spots." All of this information will be converted into the watershed profile. The next steps of the process will be to analyze water demand; after that we will be developing solutions – the policies, projects, and strategies. For each of these activities we will be having a community meeting to gather input. We will also be working with the NHBs to endorse the final plan.
  - Elizabeth Reilly: We are forming a permitted interaction group as part of the Hawai'i Kai NHB to work with DPP and BWS to provide feedback on their plans. It is best if you allow us at least 3 months to review the plans. Kuli'ou'ou will also have a similar group to provide feedback. We are still waiting to hear back from the Wai'alaie-Kāhala NHB.
- Q: How involved is BWS with other departments? We have had sewage problems in 'Āina Haina for long time, but have received no help.
- A: BWS can reach out to ENV to help address the sewage issue.
- Q: There are more cultural and traditional sites than listed on your map – it looks like you are only mapping coastal resources. I know there are mauka sites in upper Wailupe.
- A: We will also map mauka sites. Please share with us any important sites that should be included.

### ***Comments:***

- Bob Stanfield: If the EHSCP is in its public review draft stage, and the plan is updated every 10 to 15 years, it doesn't seem like the timing will align to make sure the land use and watershed plans will be aligned in policies.

- Bruce Tsuchida: There is an opportunity to have a meaningful interaction between the EHSCP and EHWMP. You should consider holding off on the EHSCP to better meld the two processes.
- Kimo Franklin: I would like to see more data and information on: septic and sewer systems, ecological health, how old inlets are, erosion and nutrient models.
- Barry Usagawa: East of Kuli'ou'ou, the water system is privately owned by the American Water System - we don't have access to their data.

## UNIVERSITY OF HAWAI'I (UH), DEPARTMENT OF URBAN AND REGIONAL PLANNING (DURP) & UH SEA GRANT

February 26th, 2019, 2:00 pm

DURP

Attendees: Daniele Spirandelli (UH Sea Grant / DURP);  
Abbey Seitz (SSFM)

### Notes:

#### ***Relevant Plans and Research:***

- Studies centralized water and wastewater systems – not necessarily divided by watershed or planning district
- Working with a student who is doing her dissertation on Maunalua Bay
  - Estimating subsurface pollution entering the Bay
  - Where concentrated nutrient areas are in the Bay
- Research on subsurface pollutants
- May be useful to look at studies done at Black Point
  - Estimated nutrient spikes
- Look at Brown & Caldwell study on wastewater
- Working on paper that examines per capita water usage (primarily using BWS data)
  - Broken down by climate, built environment, socio economic factors, and others to determine correlation between per capita water usage
  - Climate is the biggest driver of per capita water usage (i.e. drier areas have higher usage)
  - This is likely why usage is so high in Wai'anāe
  - Climate correlation with water use is somewhat well established in other studies

#### ***Issues and Needs:***

- Most strategies focus on addressing surface pollutants, but do not address sub-surface pollutants (ex: nutrients in the groundwater)
- The watershed management plan is the mechanism the County has to address wastewater and cesspools
- Everyone is interested in wastewater recycling
  - Being talked about at treatment plant-level, but not at a decentralized scale
- There is a large push for green infrastructure
  - Need to consider the microclimates within East Honolulu, and what types of strategies are more applicable to drier versus wetter areas

### Critical Water Resource Issues Discussed:

- Nearshore water quality
- Water conservation

### Partnerships / Projects to Further Investigate:

- Xeriscaping at the Hawai'i Kai Golf Course
- Green infrastructure strategy recommendations (water quality + water retention practices)

- Consider green infrastructure in this district that can conserve water, improve water quality, disconnect impervious surfaces, and other factors related to climate
- Golf courses serve as flood retention areas in some ways, but are extremely resource intensive
  - Look at landscaping alternatives that can conserve water
- Would be beneficial to support stormwater fees
  - Can look at San Francisco as a model, and how stormwater fees and green infrastructure are specific to built environment typology
- Many people often don't see their water bills (especially renters) – this impacts their water usage and habits
- DOH does not keep an updated inventory of cesspools – the GIS layer available online is updated
  - Daniele can send SSFM data source of map if we follow up with her (believes it is a 2011 study)
  - The map is misleading because many of the septic systems are now connected to a sewer line

## **CCH OFFICE OF CLIMATE CHANGE, SUSTAINABILITY & RESILIENCY (CCSR)**

February 28th, 2019, 1:30 am

Conference Call

Attendees: Matt Gonser (CCSR); Melissa White, Abbey Seitz (SSFM)

### **Notes:**

- In regards to the EHWMP, the Resilience Office's main interests are in water resource sustainability and flood risk resilience, considering:
  - Could the per capita water consumption targets identified in the BWS Water Plan be more ambitious?
  - What policies could encourage the capturing and slowing of stormwater?
  - What are the opportunities for water reuse?
- Interested in bringing coastal concerns and whole watershed considerations into the EHWMP
- 2016 DPP Workshops
  - Risk perceptions of flooding have likely increased since the workshops, April 2018 floods, and busy hurricane season of 2018
  - 'Āina Haina Prepared and other community disaster preparedness groups continue to build community knowledge
- Capital Improvement Projects to consider:
  - Flood mitigation
  - Retention basins
- Flood hazard zones in East Honolulu:
  - Large swath of East Honolulu is classified as Zone D (FEMA Flood Insurance Rate Map [FIRM]), which has no regulatory guidelines
  - Some areas within Zone D in this district likely experience flooding
  - Due to "undetermined risk," flood insurance premiums may be higher than warranted within Zone D
  - It is important to rectify this and improve risk mapping to support those interested in proactive measures to buffer against the impacts from their residual flood risk
  - This could either clarify that the risk is low OR it may become a mapped Special Flood hazard Area, and appropriate insurance and design regulations would be applied
- City's Hazard Mitigation Plan – there may be applicable policy for the EHWMP to consider
- Resiliency Strategy is considering participating in FEMA's Community Ratings System (to be released sometime later this spring)

### **Critical Water Resource Issues Discussed:**

- Flooding and drainage
- Water conservation & recycling

### **Future Policies to Further Investigate:**

- Updates to "Zone D" in East Honolulu's Flood Insurance Rate Maps

- DFM is exploring the establishment of a stormwater enterprise fund to better manage rainfall and runoff
- UH Sea Grant, in collaboration with Mālama Maunalua, published *E Mālama I Nā 'Āina Kumu Wai O Maunalua, A Watershed Handbook for the Residents of Maunalua* in 2011 (see <http://online.fliphtml5.com/rblc/bmcx/>)
- Current plumbing codes not supportive of onsite capture and reuse as both a conservation and runoff management strategy

## DEPT. OF LAND & NATURAL RESOURCES (DLNR), DIVISION OF FORESTRY AND WILDLIFE (DOFAW)

February 28th, 2019, 9:30 am

DOFAW Conference Room

Attendees: Leah Laramie, Emma Yuen (DOFAW); JC Watson (Ko'olau Watershed Management Partnership (KWMP)); Melissa White, Abbey Seitz (SSFM)

### Notes:

#### ***Partnerships / Program Activities:***

- KWMP primarily works with four major landowners
- KWMP priority activity is weed control
- DLNR has some work in coastal areas working with invertebrate species
  - Bee restoration project at Ka Iwi State Shoreline
- DLNR is not actively managing of a lot land in East Honolulu
  - Primarily work within Honolulu Forest Reserve areas of East Honolulu
  - Has more active management in Central O'ahu (where water sources are located)
- Many public trails are on land owned by Kamehameha School (KS)
  - KS primarily provides funding and plays management role
  - KWMP acts as the conservation arm of KS
- KWMP works with HECO, as they have many upland utility lines
- USGS has a spreadsheet of water quantity and quality studies

#### ***Past/Current/Future Watershed Projects:***

- Small watershed fence in the back of Wailupe
- Wiliwilinui – has smaller scale management plan
- Looking at future fencing projects within upper Pia and Hawai'i Loa
- DNLR is acquiring a small parcel at Paiko Lagoon
  - Land is rockfall liability
- Interested in projects to control the spread of invasive species

#### ***Issues and Needs:***

- Southern Ko'olau Mountains suffer from widespread invasive species
- Challenges controlling invasive palm grass
- Not all watershed have management plans in place
- Seeing more tourist traffic, particularly in Kuliouou
  - May need to look at parking lot solutions
- Most valleys have a trail, whether or not they are properly managed
- Interest in better understanding how mauka areas impact makai areas

### Priority Water Resource Issues Discussed:

- Access to mauka and makai areas
- Nearshore water quality

### Projects to Further Investigate:

- Future watershed protection fences in Pia and Hawaii Loa



## **DLNR NĀ ALA HELE**

February 28th, 2019, 10:00 am

DLNR Nā Ala Hele Conference Room

Attendees: Mike Millay (DLNR Nā Ala Hele); Melissa White, Abbey Seitz (SSFM)

### **Notes:**

#### ***Partnerships / Program Activities:***

- Mike is the Statewide administrator of DLNR managed trails
- DLNR involved in hiker education:
  - Large inventory of closure and educational signs
  - Trying to crack down on social media posts of illegal trails, although it is difficult to enforce
- Many of the trail access points are on BWS land
- Have reached out to Hawaiian Airlines to include educational videos on flights
  - Tourism organizations don't want to talk about the dangers of exploring Hawai'i
- Nā Ala Hele is working with a cultural practitioner – may be good for SSFM to talk to
- Nā Ala Hele does not handle facilities improvements – they are under the jurisdiction of State Parks

#### ***Past/Current/Future Watershed Projects:***

- Wiliwilinui trail has a controlled parking lot that has a limited number of permitted vehicles allowed
  - Seems to help with overuse of trails, and erosion issues
- Would like to explore implementing pilot trail improvement projects on Kuliouou
- Looking at a potential greenway project along the H-3

#### ***Issues and Needs:***

- At the capacity “threshold” for nearly every trail
  - No capacity studies have been done, but DLNR knows where the issues are
  - Kuli'ou'ou is probably the highest used trail in East Honolulu
- There are hundreds to thousands of trails that are not managed on O'ahu
- Program funding is provided by Federal grants
  - There are no dedicated operating funds
  - The program barely has capacity to manage trails, let alone enhance the trails
- Existing trails are steep and not well designed
- Nā Ala Hele uses professional contractors for involved in trail improvements (they keep an internal list of them)

#### **Critical Water Resource Issues Discussed:**

- Access to Mauka and Makai Areas

#### **Projects to Further Investigate:**

- Kuli'ou'ou trail improvements (Mike will reach out to BWS to discuss further)

## **HAWAI'I KAI STRONG**

March 13th, 2019, 9:00 am

Conference Call

Attendees: Matt Gleib (Hawai'i Kai Strong); Melissa White, Abbey Seitz (SSFM)

### **Notes:**

#### ***Partnerships / Program Activities:***

- Dedicated to making the community prepared for hazards of all kinds
- Began in September 2014
- Partners with the Hawai'i Hazards Awareness and Resilience Program, a program of Hawai'i Emergency Management Agency
- Hosts four public presentations each year to discuss the four major types of disasters Hawai'i experiences: flooding, tsunamis, hurricanes, and earthquakes
  - They have approx. 350 people on their mailing but typically ~25 people attend their quarterly presentations
  - They bring in subject matter experts to help present disaster topics
- Very active during the April 2018 flood event – they helped homeowners assess their damage and collect debris
- Provides general information to homeowners about what they need during natural disasters, including 14 days of food and water and medications
- Focuses on disaster preparedness, but also supports long-term hazard mitigation planning
- Support members of the community becoming trained in Community Emergency Response Team training, which is supported by the City
  - Training in field first aid and minor search and rescue techniques
  - Requires three full days and 22 hours of training
- Many Hawai'i Kai Strong members are also Red Cross volunteers
- Collaborates with other disaster preparedness groups on O'ahu
  - West Side, Kailua, Mānoa, and 'Āina Haina are the most active
- Hosts some presentations about sea level rise and climate change
  - Often extreme tsunami zone maps are similar to the extent of 6 ft of sea level rise
- Works with the Pacific Disaster Center to map hazards in Hawai'i Kai
  - Maps are helpful as they depict streams and drainage

#### ***Past/Current/Future Watershed Projects:***

- Interested in projects to educate the community concerning whose responsibility it is to clear debris from stream channels

#### **Priority Water Resource Issue:**

- Flooding and Drainage
- Sea Level Rise
- Climate Change (because of links to hazards)

#### **Projects to Further Investigate:**

- Potential projects to educate the community concerning whose responsibility it is to clear debris from stream channels

### ***Issues and Needs:***

- Most people don't know what an extreme tsunami evacuation zone is and if their residence is in one
- According to Matt Glej, there are some bridges in East Honolulu that aren't marked on the State's GIS maps
  - This is important because bridges are where most debris collect and blocks streams
  - The 2005 flooding in Mānoa was attributed to debris getting clogged in the stream's bridges
- Biggest problem associated with flooding is roads being blocked
- Aging infrastructure presents opportunities to upgrade development to be more resilient
- There are 30,000 people and 23 different neighborhoods in Hawai'i Kai – it is a very suburban area and many community members aren't well connected
  - Lot of people don't know Hawai'i Kai Strong exists
- Most of Hawai'i Kai is in an undefined hazard zone (Hazard Zone "D") on Flood Insurance Rate Maps (FIRMs)
  - Hawai'i Kai Strong encourages community members to talk to their insurance agent about the specifics of the hazard zone they live in
  - Being in an undefined hazard zone can create a large financial barrier to receiving flood insurance – according to Matt Glej it can be up \$4,000 in an undefined hazard zone and \$400 in a defined hazard zone
- Hotspots for flooding issues in East Honolulu:
  - Haha'ione
  - 'Āina Haina – streams are more like rivers when it floods, debris piles up
  - Kuli'ou'ou
  - Western part of Hawai'i Kai
  - Kamilo Nui – farms were hard hit during April 2018 flooding
- FEMA report identifies areas that were impacted by the April 2018 flooding
  - Available in a GIS layer
  - Depicts level of damage
- Much of the community doesn't understand that it's often the property owner's responsibility to clear debris from the stream
  - Need some type of public service announcement to help educate people about this
  - According to Matt Glej, Kamehameha Schools owns a lot of mauka land, but does not take responsibility for clearing stream debris
- Many community members are concerned about Red Hill, as most of East Honolulu's water supply comes from the Pearl Harbor aquifer

## 808 CLEANUPS

March 15th, 2019, 9:00 am

Conference Call

Attendees: Michael Loftin (808 Cleanups, Executive Director);  
Abbey Seitz (SSFM)

### ***Partnerships / Program Activities:***

- Nonprofit that began in 2014
  - Primarily volunteer led
  - Currently two full time staff – planning to expand in the near future
- Organization’s goal is to promote land stewardship, mauka to makai
- Organization focus areas: Beach and park cleanups, underwater cleanups, hike and stream cleanups, graffiti removal, invasive plant removal, outreach and education
- Cleanups along the Ka Iwi Coast are held weekly
- “Adopt a Site” program empowers community members to coordinate and host their own cleanups
- Statewide organization, but most of their work is focused on O’ahu
- Partners with groups such as Hui O Ko’olaupoko to engage in stream and native species restoration
- Partners with schools to host cleanups and conduct outreach
  - Recently partnered with Blanche Pope Elementary in Waimānalo
- Partners with Surfrider Foundation, Sustainable Coastlines, and other nonprofits to conduct water quality testing
- 2017 impact – they collected 83,000 pounds of trash and nearly 15,000 pounds of marine debris
- 808 Cleanups volunteers report illegal dumping.

### ***Past/Current/Future Watershed Projects:***

- Currently developing an app for the community to report litter, debris, and water quality issues
  - Interested in working with groups such as Water.App to collaborate on this process

### ***Issues and Needs:***

- Relies primarily upon “word of mouth” and social media forums to identify areas with the heaviest amounts of debris – this is not always a reliable source of information
- According to Michael, Wai’alae Beach is notorious for its debris – particularly after heavy rainfall

### **Priority Water Resource Issue:**

- Flooding and Drainage
- Nearshore Water Quality

### **Projects to Further Investigate:**

- Potential projects to educate the community concerning whose responsibility it is to clear debris from stream channels
- App to demonstrate water quality issues with the community

- Most people are unaware of the regulations surrounding dumping debris into streams, and the responsibility of private property owners to clean the stream channels abutting their properties
  - Interested in supporting the City and County to help educate the public about how to collect debris, and where to bring it after it is collected

## **WATER.APP**

March 15th, 2019, 10:00 am

Mānoa Starbucks

Attendees: Harvy King (Water.App/Windward Community College); Abbey Seitz (SSFm)

### ***Partnerships / Future Program Activities:***

- Water.App is not yet launched
- Water.App goals:
  - Launch iPhone app within the next year that visually depicts water quality issues, mauka to makai
  - Employ individuals to do conduct water quality testing, as to provide data for the app
  - Allow community members to report water quality issues
  - Help in empowering the green work force
- The app will be focused on measuring water quality, but there is also interest in using the app to track water consumption rates
- They are currently collecting data and refining what metrics will be used to measure water quality in the app
- Planning to establish a Hydrology Lab at Windward Community College to serve as “workforce arm” of the app
  - Looking to employ students
- Interested in incorporating community reporting in the app (to compliment data provided by the government)
- Interested in working with farmers to assist with water quality testing
- Interested in depicting water usage
- Would like to support government agencies and nonprofits by providing them with up-to-date data regarding water quality

### ***Issues and Needs:***

- They are hoping to collaborate with government agencies (primarily DOH and BWS) to access their data sources
  - Water source data is sensitive, and the Water.App has found some government agencies hesitant to collaborate with them
  - The project needs government support to succeed

### **Priority Water Resource Issue:**

- Nearshore Water Quality
- Water Conservation and Recycling

### **Projects to Further Investigate:**

- App to demonstrate water quality issues with the community

## 'ĀINA HAINA PREPARED

March 18th, 2019, 3:30 pm

Conference Call

Attendees: Danny Tengan ('Āina Haina Prepared); Abbey Seitz (SSFM)

### Priority Water Resource Issue:

- Flooding and Drainage
- Climate Change (linked to disasters)

### Notes:

#### ***Partnerships / Program Activities:***

- Volunteer led nonprofit
  - No plans to increase the organization's capacity
- Focused on educating citizens about natural disasters
  - Hosts informational sessions
  - Sends out educational emails
  - Some outreach presentations focus on what property owners should know about filing disaster claims
- Does not work on sea level rise or climate change efforts
- Has limited funding – they must solely focus on education and outreach
- Hosting an upcoming preparedness fair at Kāhala Mall
  - 30 government agencies are involved
- Works with disaster preparedness groups such as Be Ready Mānoa, Hawai'i Kai Strong, as well as the Lions Club
- Relies on the support of the neighborhood boards to help educate the public about natural disasters

#### ***Issues and Needs:***

- Believes a 20 year planning horizon is too short – would like to see long-term planning efforts
- It's difficult to predict where it's going to flood:
  - Areas flooded during the April 2018 flooding that had never flooded before
  - Decades before flooding occurred at the Kāhala mall
- Drainage ditches are always an issue, particularly along the Wailupe Stream
  - A project started a month ago to remove boulders and other debris near the stream bridge
  - According to the Danny, the only solution is to raise the bridge
- Every home should be prepared for natural disasters, but only 15% are prepared
  - Many people have the mindset say that they will not be impacted by disasters

## DLNR NĀ ALA HELE (O’AHU)

March 27th, 2019, 10:30 am

Nā Ala Hele Office

Attendees: Aaron Lowe (Nā Ala Hele, O’ahu Trail and Access Specialist); Abbey Seitz (SSFM)

### ***Partnerships / Program Activities:***

- O’ahu arm of the DNLR Nā Ala Hele program
- Sees an opportunity for collaboration with BWS
  - Trail access is often on or crosses BWS land
  - Would like to use trails to help people make the mental connection between the health of forests and water quality
- Primarily focused on the “people” perspective trail management, i.e., how people are accessing the trails, and its impacts to the surrounding communities
  - Interested in environmental management of trails (i.e. invasive species and erosion control), but is limited by program funding
- BWS had offered DLNR parcels of land nearly 10 years ago that could be managed by the Nā Ala Hele program
  - DLNR has been hesitant to accept the offer, because of liability issues
  - Recently starting up talks on this opportunity again, as a means to collaborate on enhancing trails
- The Hawai’i Trail and Mountain Club has taken a unique interest in helping to manage the trails in East Honolulu
- Interested in connecting with bicycle planning efforts as to better connect bike paths to trail entrances

### ***Past/Current/Future Watershed Projects:***

- Interested in the following trail projects in East Honolulu:
  - Increasing access to hunting areas to decrease erosion from pigs and ungulates – they have found this to be effective in other areas of O’ahu
  - Educational program to teach hikers about the importance of well managed forests and trails in a healthy watershed – including trail user etiquette and safety
    - The educational signs posted throughout the Mākiki Loop Trail are a good example of their outreach program (funding provided by USACE for the Ala Wai project)
  - Replacing ropes with steps where feasible
    - Steps need regular maintenance
- Interested in working with BWS on improving trail access and improvements

### **Priority Water Resource Issue:**

- Access to Mauka and Makai Areas

### **Projects to Further Investigate:**

- Increased hunting permits
- Trail educational program
- Replacing trail ropes with steps



### ***Issues and Needs:***

- All of East Honolulu's trails are heavily used – Kuli'ou'ou experiences the most traffic
- The Koko Head Trail has many issues, but this is difficult to address because it is owned by the City but do not have a "trails division" – Aaron believes the existing train tracks could be reinforced to solve most of the erosion issues
- All of the trails in East Honolulu they manage are "Ridge Trails"
  - Primarily used to summit the Ko'olau Crest
  - Not the preferred topography for hiking trails – typically prefer switch back trails but Oahu's steep mountains and soil type make it very difficult to create switchbacks
  - Very steep grade in some areas of the trails (nearly 30 to 40 %)
  - Referred to as "Fall Line" trails because the hiking ridge is also where rainfall collects
    - These types of trails are often the most associated with erosion and sediment transfers
- It is difficult to determine the extent to which trail erosion impacts nearshore water quality – there are a lot of factors in between the trail and the surface water that impact water quality
- Invasive pigs and ungulates are an issue across O'ahu
- The access points for the East Honolulu trails are located in once "sleepy neighborhoods"
  - They saw a sharp increase in trail usage in 2010, largely due to the internet and social media
- Frequently receives complaints about hikers not respecting the residents in neighborhoods adjacent to the trail
- You must enter gated communities to enter trail entrances for the Wiliwilinui and Hawai'i Loa
  - Wiliwilinui is a "good example" of a trail entrance that is well managed – it has a good amount of parking to afford access
  - Hawai'i Loa is a "bad" example of a trail entrance – you are required to have a Hawai'i State ID to enter the gated community to access the trail
    - Sierra Club tried fighting the gated community on this issue, but stopped their efforts after it sent to higher courts
- Parking near trail entrances is a problem throughout East Honolulu – particularly at Kuli'ou'ou
  - Building a parking lot doesn't necessarily solve all issues – in some cases parking lots can lead to increased trail traffic and capacity issues
  - They are looking at opportunities for multimodal access to trails (ex: having a Biki station at the trail entrance)
- Kamehameha Schools has not been very supportive in terms of trail management – they are mostly concerned about liability
  - Example: Mariner's Ridge – instead of improving the trail, they closed it

- Have received funding for Mānoa Falls trail improvements from Hawai'i Tourism Authority's (HTA) Aloha Aina program. However, broader funding for island wide trail maintenance would help offset negative impacts from the visitor industry.
  - HTA suggested Nā Ala Hele charge a fee for use of their trails

## SIERRA CLUB

April 3rd, 2019, 10:00 am

Kāhala Nui

Attendees: Dave Raney (Sierra Club); Abbey Seitz (SSFM)

### Priority Water Resource Issue:

- Climate Change
- Sea Level Rise

### Projects to Further Investigate:

- Specific Area Plans

### *Partnerships / Program Activities:*

- Historically, Sierra Club's main overarching focus has been on climate change mitigation. Recently, however the Board of Directors adopted the recommendations of the national task force on climate adaptation they had appointed, and have elevated climate adaptation and restoration (including measures to remove existing carbon dioxide from the atmosphere) to the same high level of national priority as mitigation.
  - While Hawai'i can only make a small impact on total global emissions, it can serve as a model for other states and communities to emulate. At the same time, it must also pursue climate adaptation strategies to deal with sea level rise and other climate change impacts due to the amount of greenhouse gases already in the atmosphere and the ocean. We must do both, plus also undertake projects, such as forestation and re-forestation, and renewing the health of our soils, as ways to remove and sequester carbon dioxide.
  - In regards to the organization's climate change efforts, Hawai'i is small but "can make big noise"
- At the National level, Sierra Club is focusing on activities to protect and promote forest restoration, healthy carbon rich soils, and climate restorative ecosystems
- Locally, Sierra Club is focused on promoting an ahupua'a approach to resource management and climate change adaptation
  - Interested in considering watershed-specific needs
- Sierra Club is reviewing the EHSCP
  - They have been impressed with the plan's environmental policies

### *Past/Current/Future Watershed Projects:*

- Sierra Club has interest in restoring channelized streams to their natural state and enhancing soil recharge capabilities where possible
- Sierra Club supports managed retreat efforts:
  - They have supported legislative bills that call for incorporating 3.2 ft of sea level rise into mandatory real estate disclosures
    - There was strong support for this bill but it was killed due to opposition from realtors
    - Some realtors think this bill places an unfair burden on the private owners
    - Realtors pushed for making disclosure voluntary and only incorporating 2 ft of sea level rise

- DPP has “property information sheet” for all parcels on O‘ahu – potential buyers can consult this document to learn about potential hazards on their property
  - Sierra Club is advocating to include information concerning if a property is within the SLR-XA on the property information sheet
- Sierra Club is urging communities to identify resources within the SLR-XA and develop an adaptation plan for those resources (referring to these plans as “Specific Area Plans”)
  - Sierra Club is hoping members of their Climate Change Committee can lead this charge within their respective communities
    - There are no Climate Change Committee members from Kaua‘i or Maui

***Issues and Needs:***

- The EHSCP has ambitious language concerning protecting beaches
  - Dave believes there should be priority placed on protecting lateral access and preventing future hardening
- Communities affected by USACE detention projects often approach Sierra Club for support
  - Sierra Club has remained “neutral” on recent contentious projects (such as the detention basin being planned for the Ala Wai flood mitigation project), but they are interested in addressing social equity concerns associated with these projects
- Cost benefit analyses used to compare climate change adaptation measures are too often skewed towards protecting private properties than protecting environmental features
  - It is still not understood how to value ecosystem services
- Need to better understand the mechanisms to implement climate change adaptations measures such as managed retreat
  - Dave believes buyouts will not be a feasible model to implement on a large-scale and the State should consider alternative approaches to buyouts, such as easements, which make it difficult to build in hazardous areas, and uses less public funds
  - Disasters are often the best opportunity for retreat, but the State needs to enhance its rebuilding guidelines first
  - There are many steps that need to be taken before managed retreat can be implemented on a community-wide scale, such as what coastal roads will need to be moved inland
- Need to consider the role of youth in the climate mitigation adaptation process
  - Look for opportunities to harness the advocacy power of the youth