

**Natural Energy Laboratory of Hawaii Authority  
Site Visit and Briefing**

Wednesday, September 17, 2014



Visitors: Commission on Water Resource Management

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8:10 – 8:15 am

**Welcoming**

Mr. Gregory Barbour  
NELHA Executive Director

8:15 – 8:30 am

**NELHA Briefing**

Mr. Keith Olson  
NELHA Water Quality Laboratory Manager

Mr. Alexander Leonard, PhD  
NELHA Administrative and Project Manager

8:35 – 8:50 am

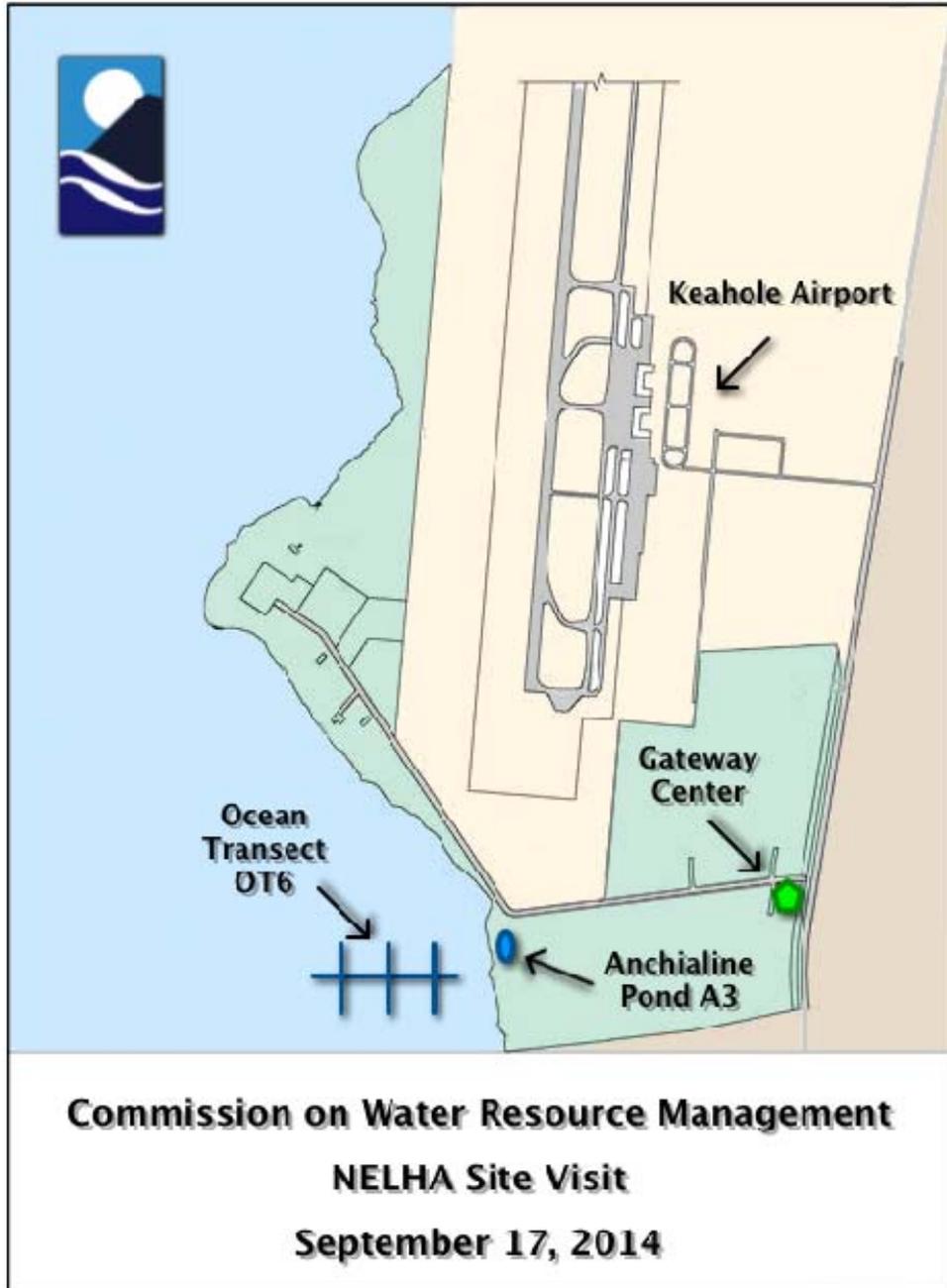
**Field Observations of NELHA Anchialine Pond A3**

8:55 – 9:15 am

**Field Observations of NELHA Ocean Transect OT6**

Visitors should bring sunglasses, hat and wear close-toed shoes

**Location Map showing NELHA Facilities at the  
Hawaii Ocean Science and Technology Park  
Kailua-Kona, Island of Hawaii**



**Commission on Water  
Resource Management  
NELHA Site Visit**

***September 17, 2014***

**Environmental  
Monitoring at the  
Natural Energy  
Laboratory of Hawaii  
Authority**





# ***“The Big Picture”***

- ✓ **NELHA is a state operated, master-permitted, zoned industry, ocean science and technology park on the Big Island of Hawaii**
- ✓ **NELHA has managed 870 acres and an ocean research corridor for 40 years with no significant impact to the environment**
- ✓ **NELHA’s tenants, scientists, government agencies and the public depend on pristine quality class AA ocean water for their operations, research projects, recreation and cultural practices**



# Seawater Pumping at NELHA

- NELHA pumps ~30Mgal/day of seawater to its clients for aquaculture, mariculture, alternative energy and water bottling activities
- ~ 30Mgal/day of seawater is discharged into onshore surface trenches throughout the 870 acre facility



# 32 Years of Monitoring Results

- NELHA's monitoring program has found ***no evidence of harmful change*** to its benthic, fish biota, and anchialine pond communities



# *NELHA's Been Provided Several Servings of Compliance Regulation Alphabet Soup*





## Monthly Pipeline Sampling

### Deep Seawater

3 pipelines, 3 sample locations

### Surface Seawater

3 pipelines, 3 sample locations

## Quarterly Environmental Sampling

### Groundwater Sample Locations

34 Wells

3 Anchialine Ponds

### Marine Water Sample Locations

30 Marine Transect Stations

1 Coastal Station

### Tenant Effluent Discharge Locations

54 Tenant Discharge Sites

## Annual Biota Surveys

### Marine Fish Species and Biomass

18 Marine Fish Survey Sites

### Coral Species Abundance

18 Benthic Community Sites

### Anchialine Pond Species Abundance

15 Anchialine Pond Survey Sites



# Environmental Monitoring Parameters at NELHA

## Surface Seawater Pipeline Monitoring (n=1282)

- ✓ NO<sub>3</sub> & NO<sub>2</sub>, PO<sub>4</sub>, SiO<sub>3</sub> (1982 – present)
- ✓ NH<sub>4</sub>, TDN & TDP (1986 – present)
- ✓ Salinity (1982 – present)
- ✓ Temperature (1982 – present)
- ✓ TOC (1986 – 2007)
- ✓ TSS (1986 – present)
- ✓ DO (1987 – present)
- ✓ Alkalinity (1987 – 2008)
- ✓ Vibrio & Marine Agar (2005 – 2007)
- ✓ Turbidity (2010 – present)

## Deep Seawater Pipeline Monitoring (n=986)

- ✓ NO<sub>3</sub> & NO<sub>2</sub>, PO<sub>4</sub>, NH<sub>4</sub>, SiO<sub>3</sub> (1988 – present)
- ✓ TDN & TDP (1988 – present)
- ✓ Salinity (1988 – present)
- ✓ Temperature (1988 – present)
- ✓ TOC (1988 – 2007)
- ✓ TSS (1994 – present)
- ✓ DO (1988 – present)
- ✓ Alkalinity (1988 – 2008)
- ✓ Vibrio & Marine Agar (2005 – 2007)
- ✓ Turbidity (2010 – present)

## Nearshore Transects Monitoring (n=2520)

- ✓ NO<sub>3</sub> & NO<sub>2</sub>, PO<sub>4</sub>, NH<sub>4</sub>, SiO<sub>3</sub> (1993 – present)
- ✓ TDN & TDP (2007 – present)
- ✓ Salinity (1993 – present)
- ✓ Temperature (1993 – present)
- ✓ DO (2007 – present)
- ✓ Chl-a (2007 – present)
- ✓ Turbidity (1993 – present)

## Groundwater Monitoring (n=6012)

- ✓ NO<sub>3</sub> & NO<sub>2</sub>, PO<sub>4</sub>, SiO<sub>3</sub> (1989 – present)
- ✓ TDN & TDP (1989 – 2007)
- ✓ Salinity (1989 – present)
- ✓ Temperature (1989 – present)
- ✓ TOC (1989 – 2007)
- ✓ DO (1989 – present)
- ✓ Fecal Col. & Entero. (1989 – 2007)
- ✓ Turbidity (2008 – present)

## Tenant Effluent Monitoring (n=954)

- ✓ TN (2010 – present)
- ✓ TP (2010 – present)
- ✓ TSS (2010 – present)
- ✓ BOD<sub>5</sub> (2010 – present)



# Conclusions

- ✓ *NELHA serves the public interest by balancing environmental concerns and economic development in energy generation, water desalinization, mariculture and aquaculture*
- ✓ *NELHA has an extensive environmental monitoring program to protect the pristine class AA ocean water*
- ✓ *NELHA's 32 years of environmental monitoring shows no significant impact on the environment*





**NELHA's historical monitoring data may be  
informative to help guide future direction**

COMP

MIRROR



Questions?