HAWAII STATE DEPARTMENT OF HEALTH

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Department of Agriculture STATE OF HAWAII

2018 JOINT GOVERNMENT WATER QUALITY CONFERENCE

WAILUKU, MAUI

AUGUST 7, 2018

INTERAGENCY COLLABORATIONS: ASSESSING PESTICIDE OCCURRENCE AND DISTRIBUTION IN HAWAII

FENIX GRANGE

HAZARD EVALUATION AND EMERGENCY RESPONSE OFFICE

HAWAII STATE DEPARTMENT OF HEALTH

A Little History

Public debate, County regulations, lawsuits, conflicts and widely differing perceptions about impacts of large agribusiness seed operations on health of local communities and ecosystems.

Are currently used pesticides moving off site at levels of concern?

CWB surface water monitoring program does not include currently used pesticides

USGS Studies on Oahu

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Ground-Water Quality and its Relation to Land Use on Oahu, Hawaii, 2000–01

U.S. Department of the Interior
U.S. Geological Survey
Water-Resources Investigations Report 03-4305

Distribution of volatile organic compound mixtures in ground water.

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

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Water Quality on the Island of Oahu

Hawaii, 1999–2001

U.S. Department of the Interior
U.S. Geological Survey

Circular 1239

USGS Studies on Oahu

Study on Oahu in 2000-2001 showed a clear connection between land use and pesticide detections in streams and ground water

Urban areas and agricultural areas had very different “fingerprints”

Residues of pesticides used on sugar cane, pineapple and golf courses detected in ground water and surface water

Multiple household pesticides detected in urban streams

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Initial Collaboration 2013

Sharing expertise and digging up resources

- DOH HEER Office and Clean Water Branch $25K
- Department of Agriculture $25K
- USGS Training, Technical Support and Laboratory Analyses $45K in kind

- 2013-14 Statewide WQ Snapshot Pilot Study

2013-14 Pilot Study Design

- 24 locations
- Compared land uses with differing pesticide uses
- Small perennial streams or water bodies
- Winter sampling, dry period
- One time “snapshot” sampling– not representative of average conditions or other times of year
- Looked for broad range of currently used pesticides– 136 different compounds in water, 121 in sediments
- Very low detection limits

Key Findings Statewide

- Atrazine in 23 of 24 locations tested
- Lots of trace level detections, few near benchmarks
- No currently used pesticide exceeded water quality standards
- No currently used pesticide exceeded drinking water standards.
- Clear land use fingerprints
- Urban streams and large agriculture

Maui Findings

- No perennial streams in target areas
- Black Rock Springs: Atrazine, simazine, diuron
- Kealia Pond – Atrazine, prometryn and fluometuron

Pilot Study Data Gaps and Findings

- Snapshot approach affected comparability and lack assessment of impacts over time
- Flow conditions not considered
- Sampling did not consider application periods
- Lack of perennial streams/suitable sites for key ag areas on Oahu and Maui
- Limited glyphosate sampling detected widespread, low concentrations - ubiquitous, but not a risk
- Sediment data less helpful than water samples

Evolution 2015 -18

- DOH & DOA chose ongoing collaboration
- Kauai Joint Fact Finding Group expanded focus
- 2016 & 2017 Legislatures funded work through 2019
- Expanded WQ partnership
  - USGS experts: primary study design, mgmt and field ops
  - DOA Pesticides provides focus areas, pesticides of concern
  - HEER provides toxicology and study design assistance
- Trends by site, land use, flow conditions, pesticide regs
- Follow up sampling where exceedances occur
  - ✓ Add assessments over time

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Pesticide-Monitoring Program of Surface Waters in the State of Hawai‘i

Steve Anthony, Director
USGS Pacific Islands Water Science Center

Briefing to the Hawai‘i State Legislature
December 11, 2017

U.S. Department of the Interior
U.S. Geological Survey

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USGS Water Mission

- Provide information to manage, protect, and enhance water resources
- Address water-related hazards
- Non-regulatory role
- Provide publicly accessible information that is actionable, reliable, impartial, and timely

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Program Objectives and Initial Scope

- Collaborative effort with HDOA and HDOH
- Assess the occurrence and distribution of current-use pesticides in surface water in Hawai‘i
- Collect water samples at targeted sites on Kaua‘i and O‘ahu, and eventually other islands, using nationally consistent protocols
- Provide quality-assured sample results to HDOA and public through USGS online data repository
- Compare results to established Federal and State human-health and aquatic-life benchmarks

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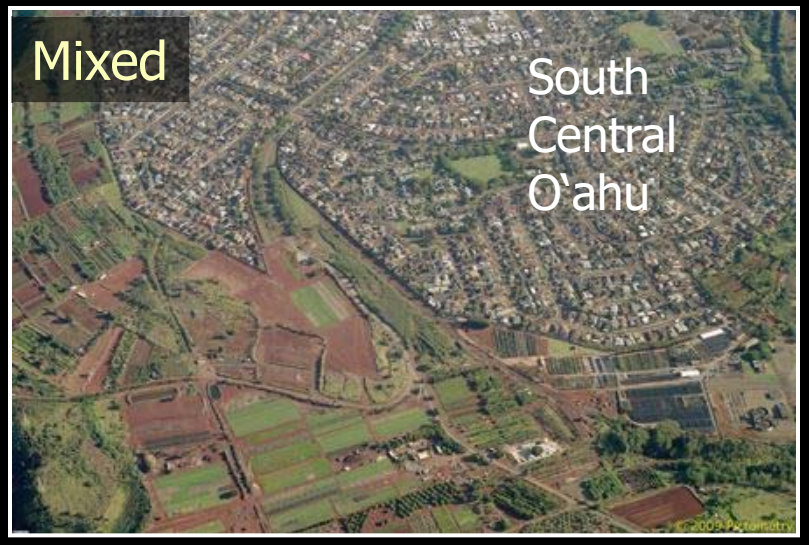
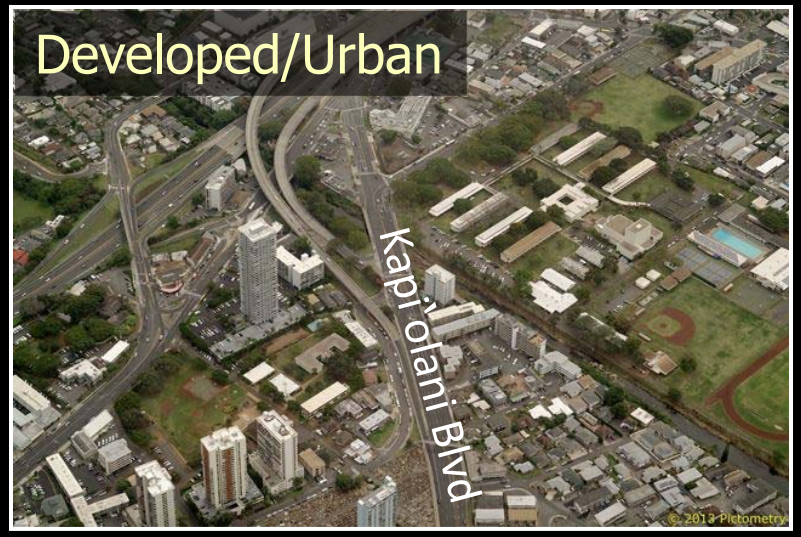
Program Objectives and Initial Scope—cont.

Collect samples at targeted sites that receive runoff from different types of land uses





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Program Objectives and Initial Scope—cont.

Collect samples during different flow conditions

Low-flow sampling

High-flow sampling

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✓ Compare flow conditions

2017 Samples Collected at 35 Sites

- 13 sites on Kauaʻi and 22 sites on Oʻahu
- Streams, ditches, a wetland, and coastal ocean
- Downstream or nearby areas with:
  - Agriculture (16 sites)
  - Developed/Urban land use (6 sites)
  - Mixture of agriculture and developed (13 sites)

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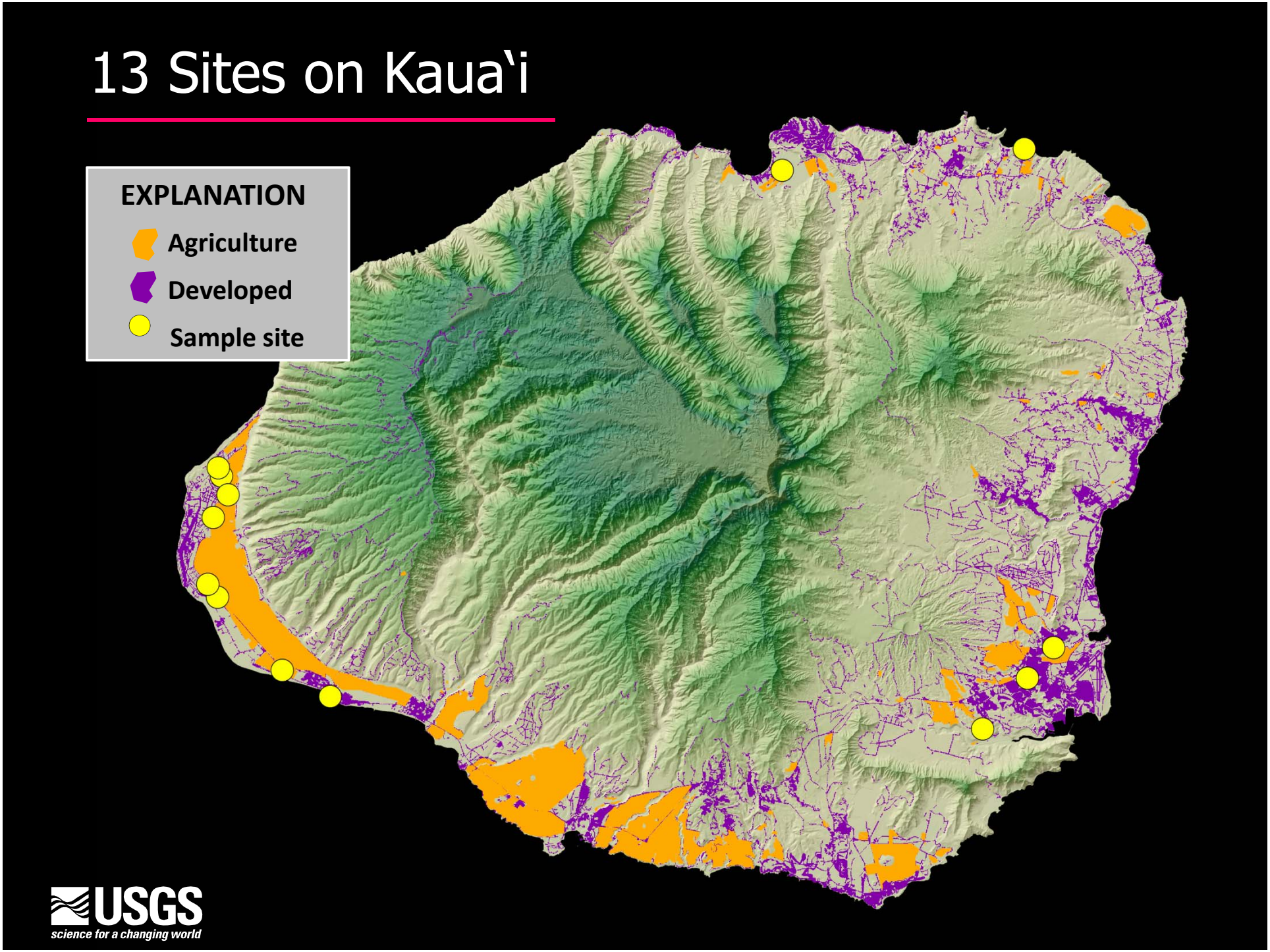
13 Sites on Kaua‘i



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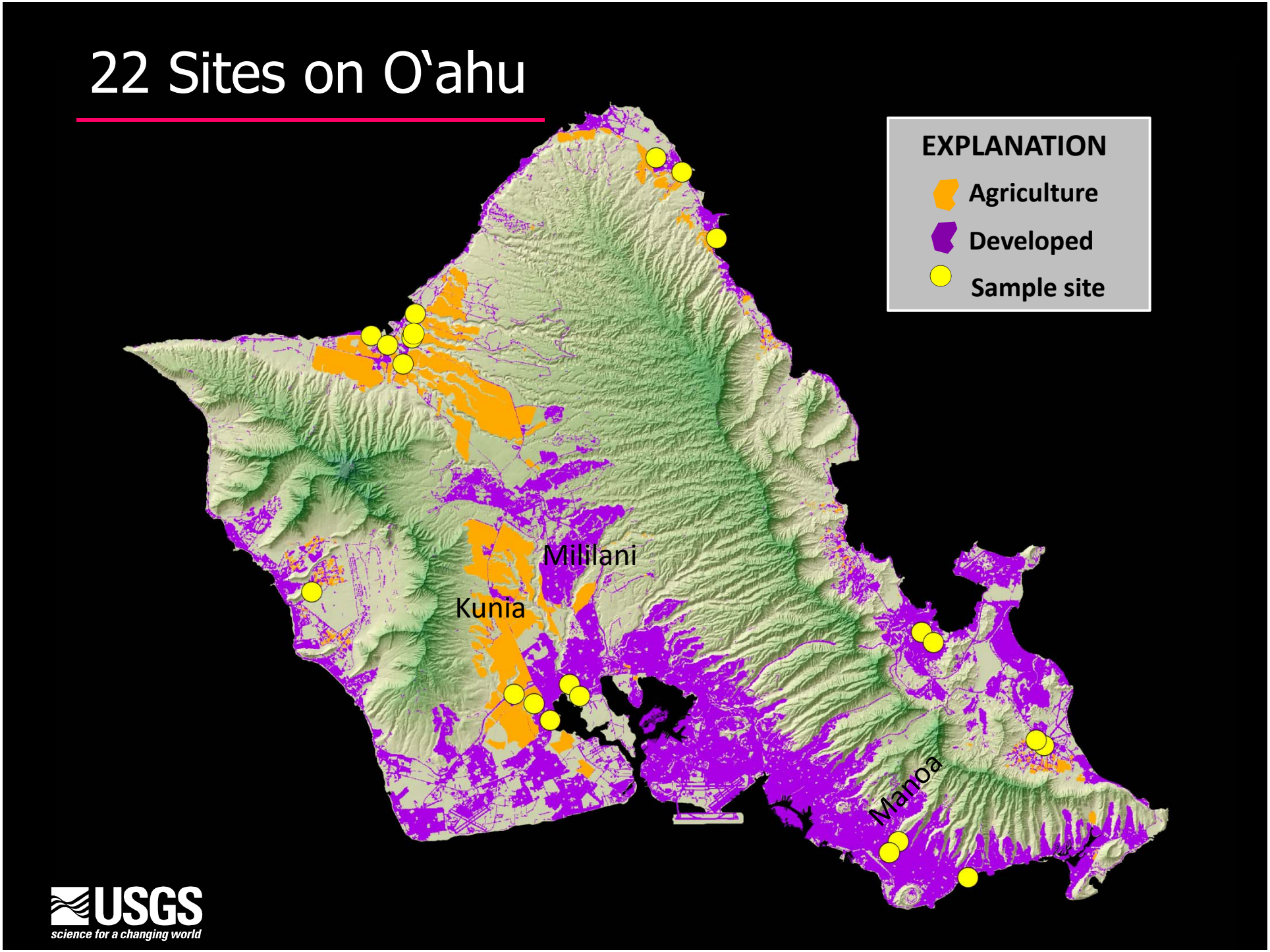
22 Sites on O'ahu



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51 Samples Collected

32 discrete samples
- 14 high flow
- 18 low flow

12 accumulation samplers
(passive samplers)

7 quality-control samples
- blanks
- replicates
- spikes

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Laboratory Analyses for Pesticides

- Samples analyzed at USGS National Water-Quality Laboratory
- 225 current-use pesticides
  - 123 herbicides
  - 87 insecticides
  - 15 fungicides
- Pesticides can be detected at trace levels (parts per trillion), commonly 10 to 10,000 times lower than human-health and aquatic-life benchmarks

1 part per trillion =
~1 water drop in 12 of these:

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2017 Findings

- Most samples contained a mixture of multiple pesticides
  - 0 to 33 pesticides detected per discrete sample
  - 2 to 51 pesticides detected per accumulation sampler
  - 37 pesticides and 24 pesticide degradates were detected at least once
- Concentrations of detected pesticides were low:
  - All were below current human-health benchmarks
  - Nearly all were below current aquatic-life benchmarks
  - Fipronil detected in 100% of developed land use category sites -- use as a termiticide and pet treatment
- Note: Some detected pesticides have no human-health or aquatic-life benchmarks

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2017 Findings of Interest Oahu and Kauai

Restricted Use Pesticides

- Chlorpyrifos and metolachlor
  - None detected on Kauai in 2017
  - 2 chlorpyrifos high flow hits at one site on Oahu
- Atrazine (parent) seen in low flow samples only
  - 3/32 samples total in 2017, vs. 18/24 samples in 2013-14
  - Detections 100X lower than MCL and strictest aquatic life benchmarks. Likely related to drop in sales and use
  - Degradates still frequently detected
- 2017 Kauai samples did not capture storm events

Johnson, A.G. and Kennedy, J.J., 2018, Summary of dissolved pesticide concentrations in discrete surface-water samples collected on the islands of Kauaʻi and Oʻahu, Hawaiʻi, November 2016–April 2017: U.S. Geological Survey data release, https://doi.org/10.5066/F7BG2N79.

2017 Findings

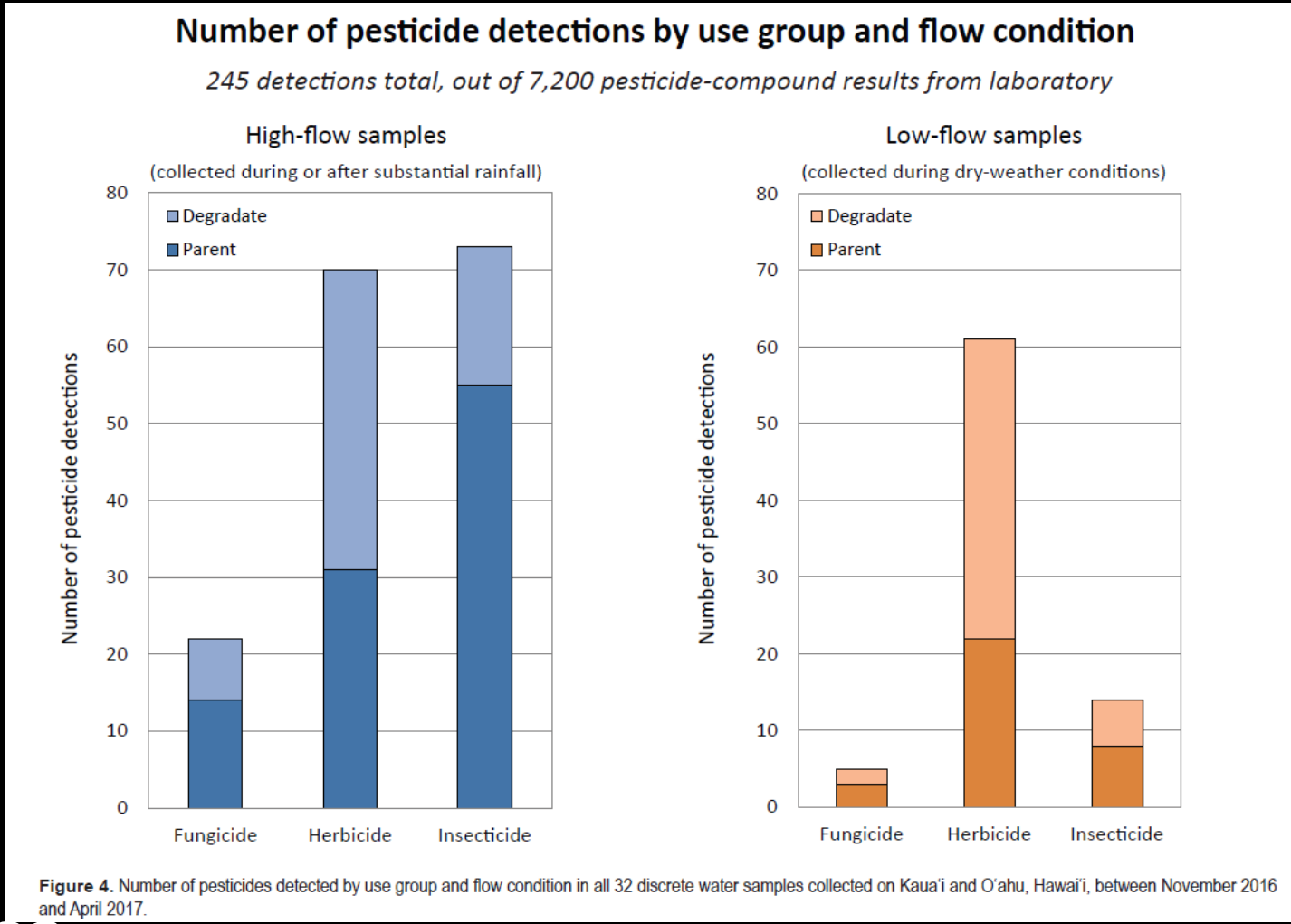

Figure 4. Number of pesticides detected by use group and flow condition in all 32 discrete water samples collected on Kaua'i and O'ahu, Hawai'i, between November 2016 and April 2017.

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2017 Findings

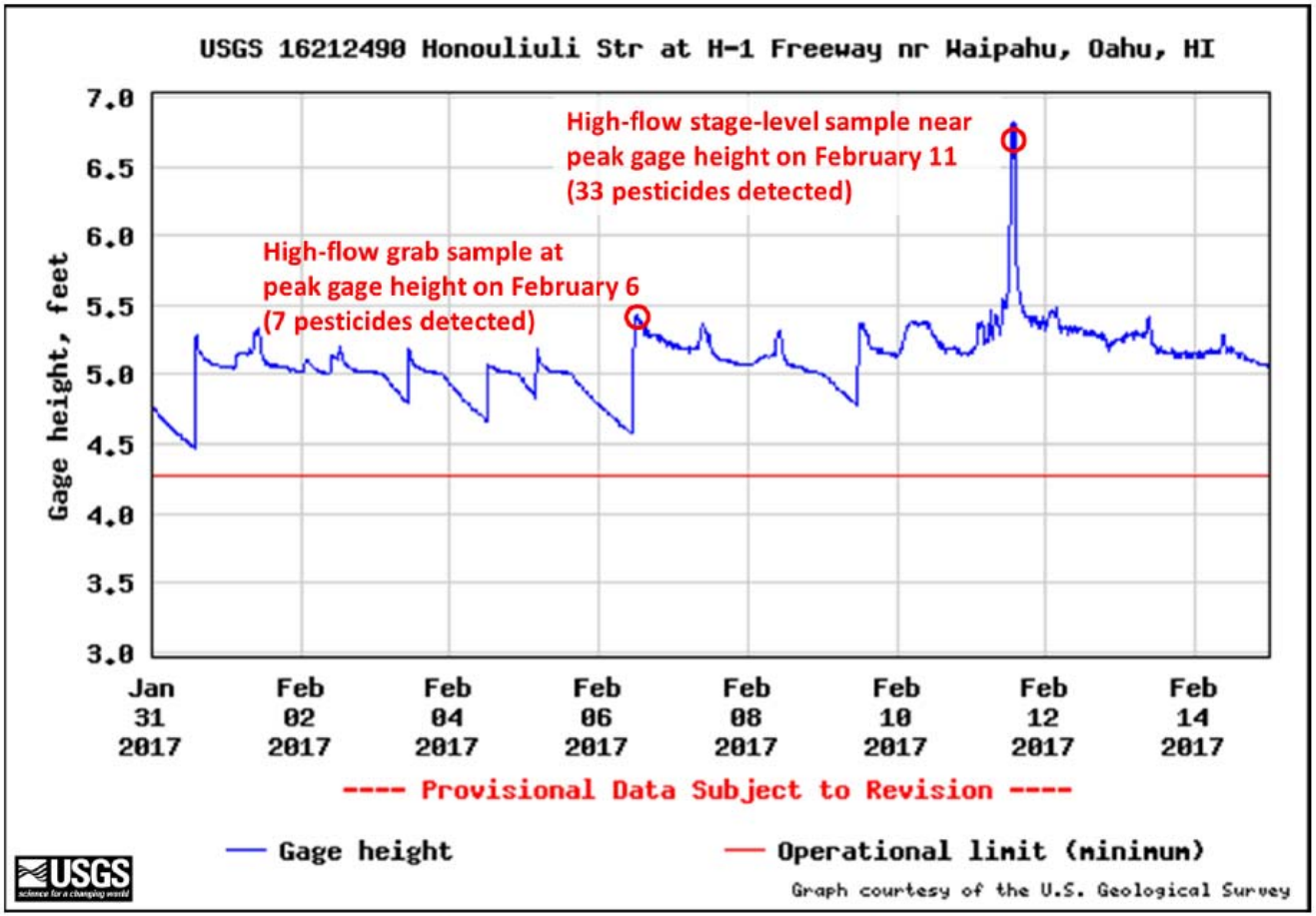

Figure 11. Graph of gage height (stream stage) measured at Honouliuli Stream at H-1 Freeway near Waipahu, O'ahu, Hawai'i (site 16212490) when high-flow samples were collected on February 6 and 11, 2017.

Pesticide-Monitoring Program of Surface Water in Hawai‘i: January-February 2018 Update for the Islands of Kaua‘i, O‘ahu and Maui

DRAFT

Joseph Kennedy
Rachel Heinz
USGS Pacific Islands Water Science Center

Pesticide-Monitoring Program Update Meeting
July 19, 2018

U.S. Department of the Interior
U.S. Geological Survey

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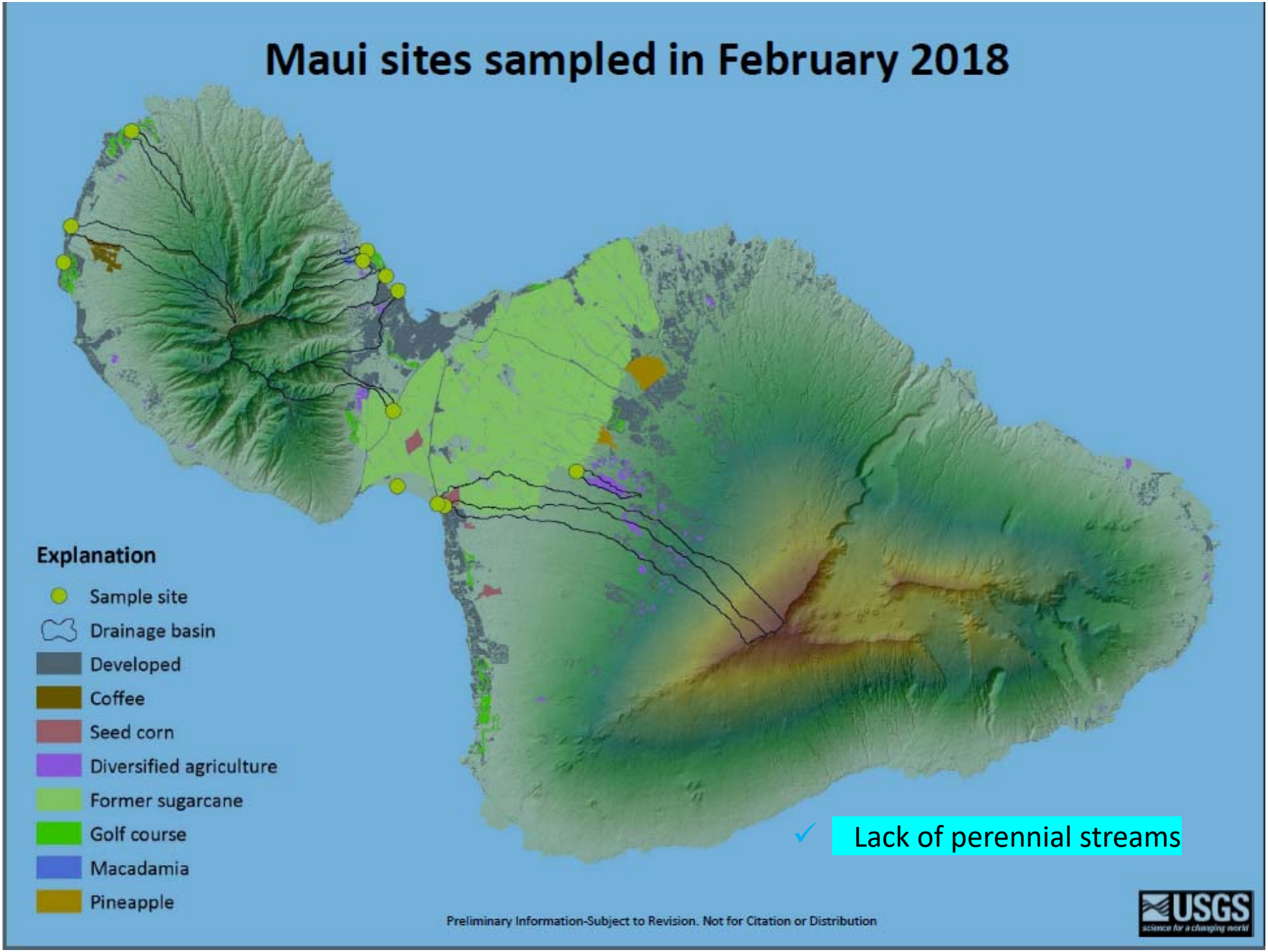
Maui sites sampled in February 2018



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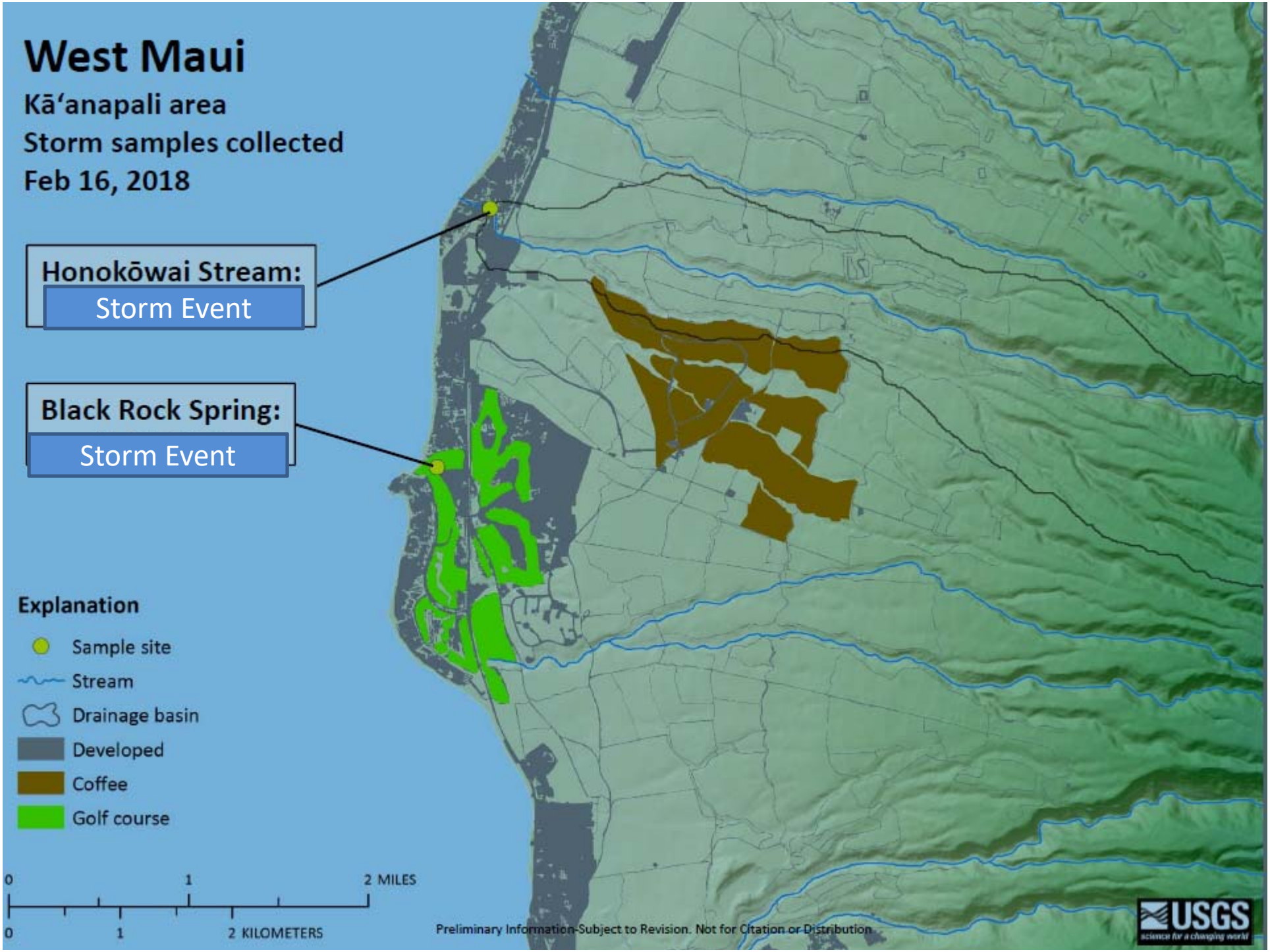
North Shore of Maui as we flew in to Kahului, Feb 15, 2018


West Maui
Kā'anapali area
Storm samples collected
Feb 16, 2018
Honokōwai Stream:
Storm Event
Black Rock Spring:
Storm Event
Explanation
Sample site
Stream
Drainage basin
Developed
Coffee
Golf course
0
1
2 MILES
0
1
2 KILOMETERS
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Honokōwai Stream near
Kā‘anapali, Maui, 16 Feb 2018
Storm Event
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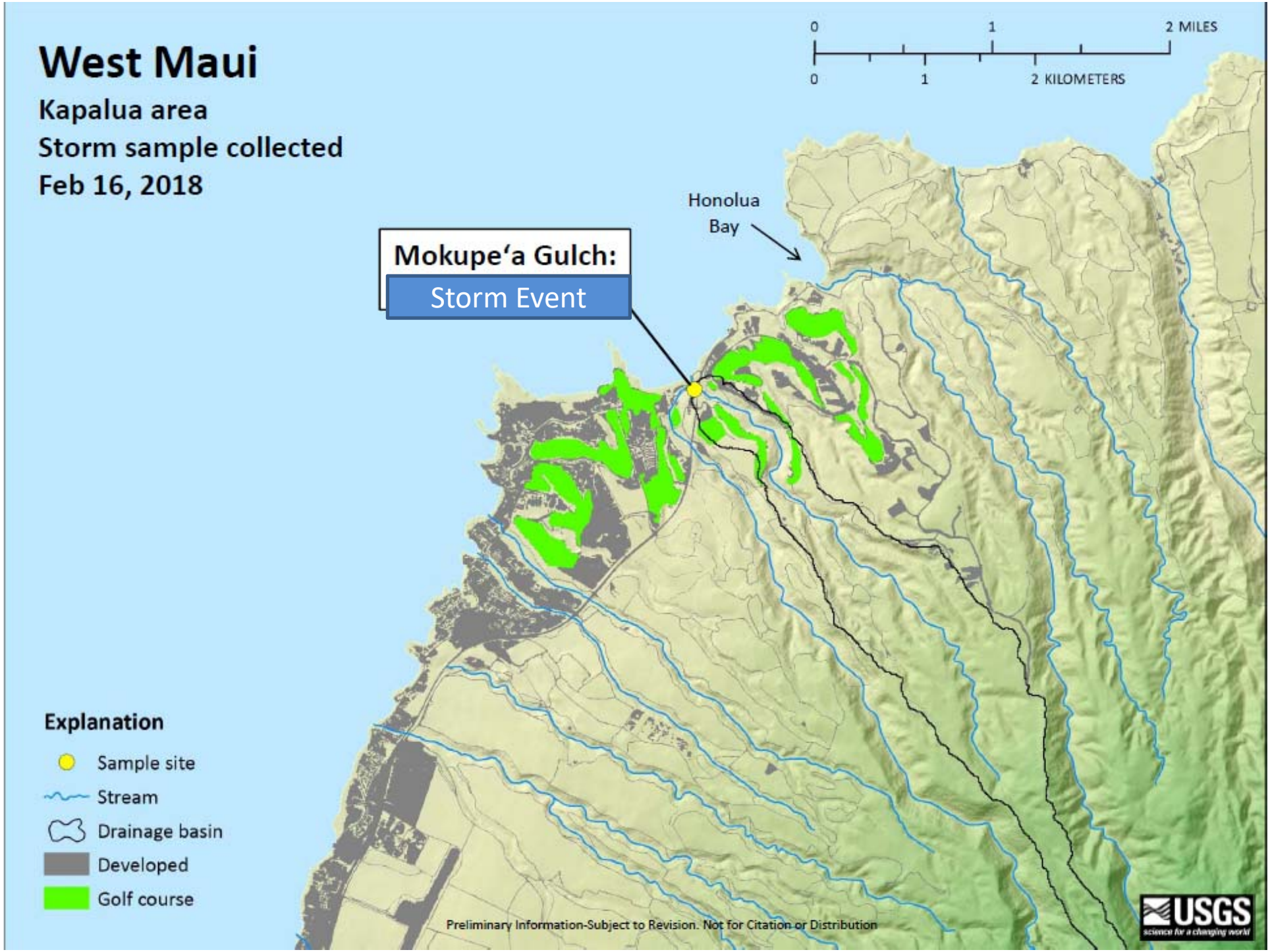
West Maui
Kapalua area
Storm sample collected
Feb 16, 2018
0
1
2 MILES
0
1
2 KILOMETERS
Honolua
Bay
Mokupe'a Gulch:
Storm Event
Explanation
Sample site
Stream
Drainage basin
Developed
Golf course
Preliminary Information-Subject to Revision. Not for Citation or Distribution
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Mokupe'a Gulch near
Kapalua, Maui, Feb 16, 2018
Storm Event
Collection site
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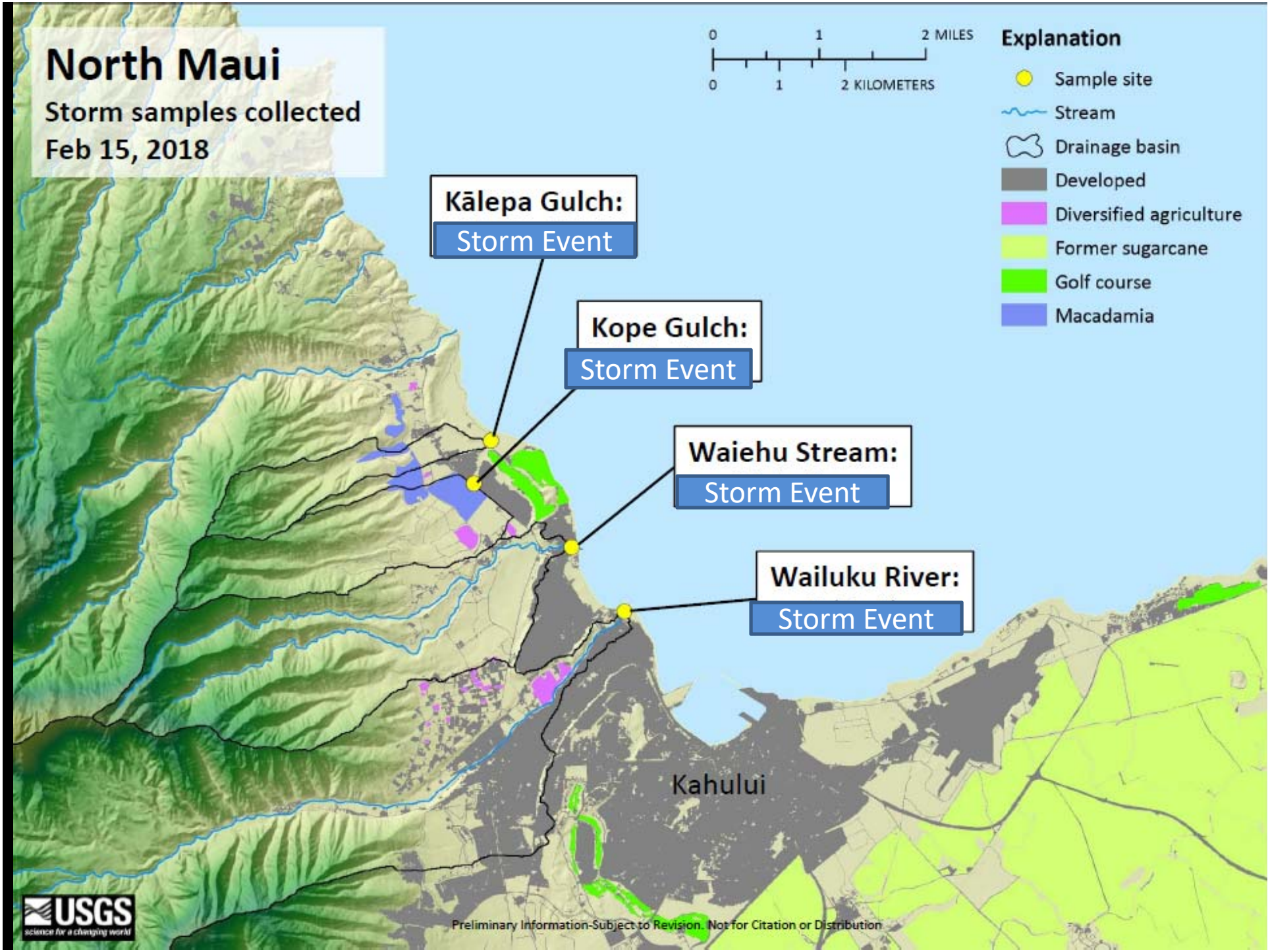
North Maui
Storm samples collected
Feb 15, 2018
0 1 2 MILES
0 1 2 KILOMETERS
Explanation
Sample site
Stream
Drainage basin
Developed
Diversified agriculture
Former sugarcane
Golf course
Macadamia
Kālepa Gulch:
Storm Event
Kope Gulch:
Storm Event
Waiehu Stream:
Storm Event
Wailuku River:
Storm Event
Kahului
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Collecting sample at Kālepa Gulch near Wailuku, Maui, Feb 15, 2018
Storm Event
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Kope Gulch near Wailuku, Maui, Feb 15, 2018
Storm Event
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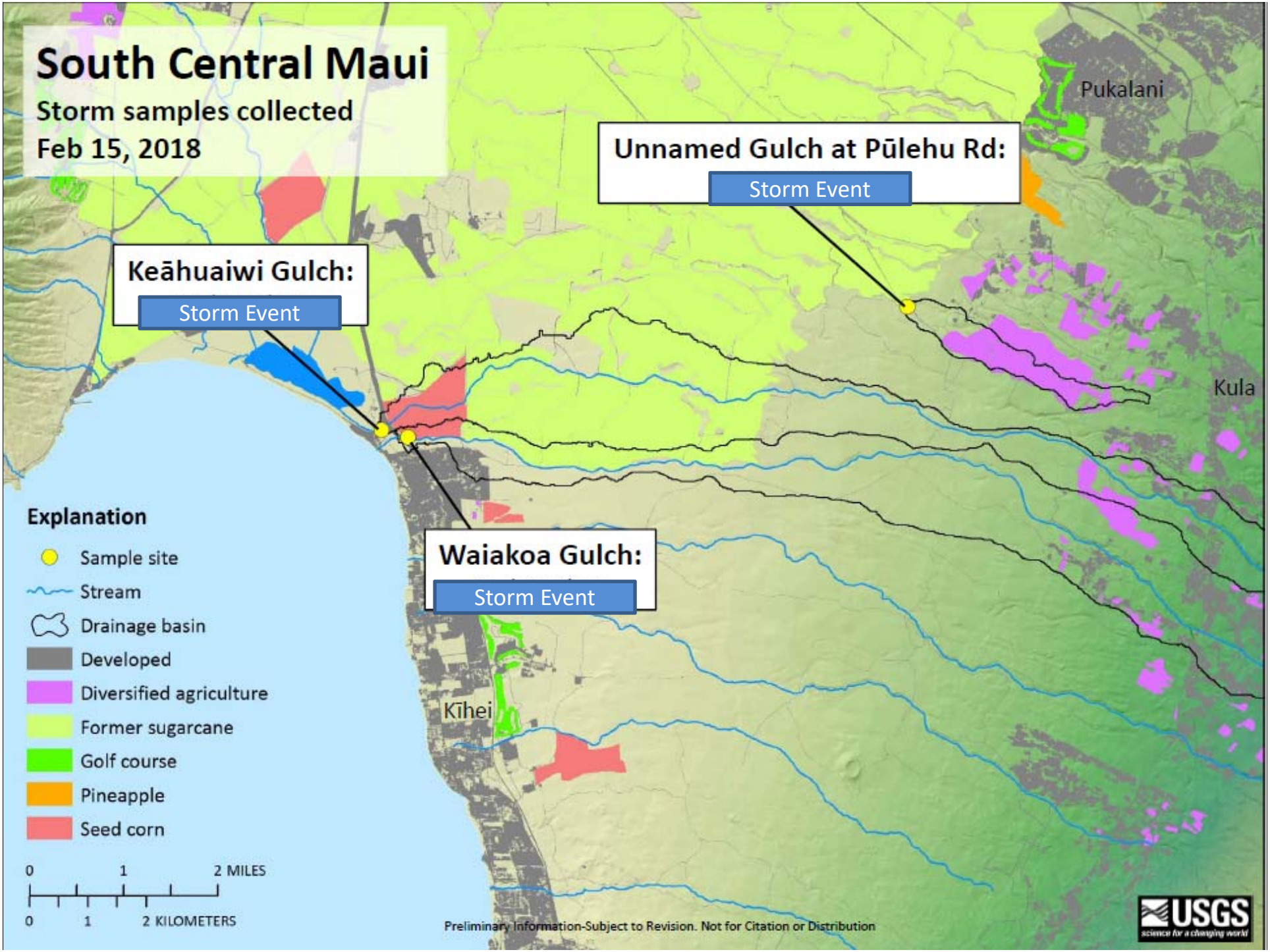
Wailuku River near
Wailuku, Maui, Feb 15, 2018
Storm Event
Collection site
USGS
Preliminary Information-Subject to Revision. Not for Citation or Distribution


South Central Maui
Storm samples collected
Feb 15, 2018
Unnamed Gulch at Pūlehu Rd:
Storm Event
Keāhuaiwi Gulch:
Storm Event
Waiakoa Gulch:
Storm Event
Pukalani
Kula
Kīhei
Explanation
Sample site
Stream
Drainage basin
Developed
Diversified agriculture
Former sugarcane
Golf course
Pineapple
Seed corn
0 1 2 MILES
0 1 2 KILOMETERS
Preliminary Information-Subject to Revision. Not for Citation or Distribution
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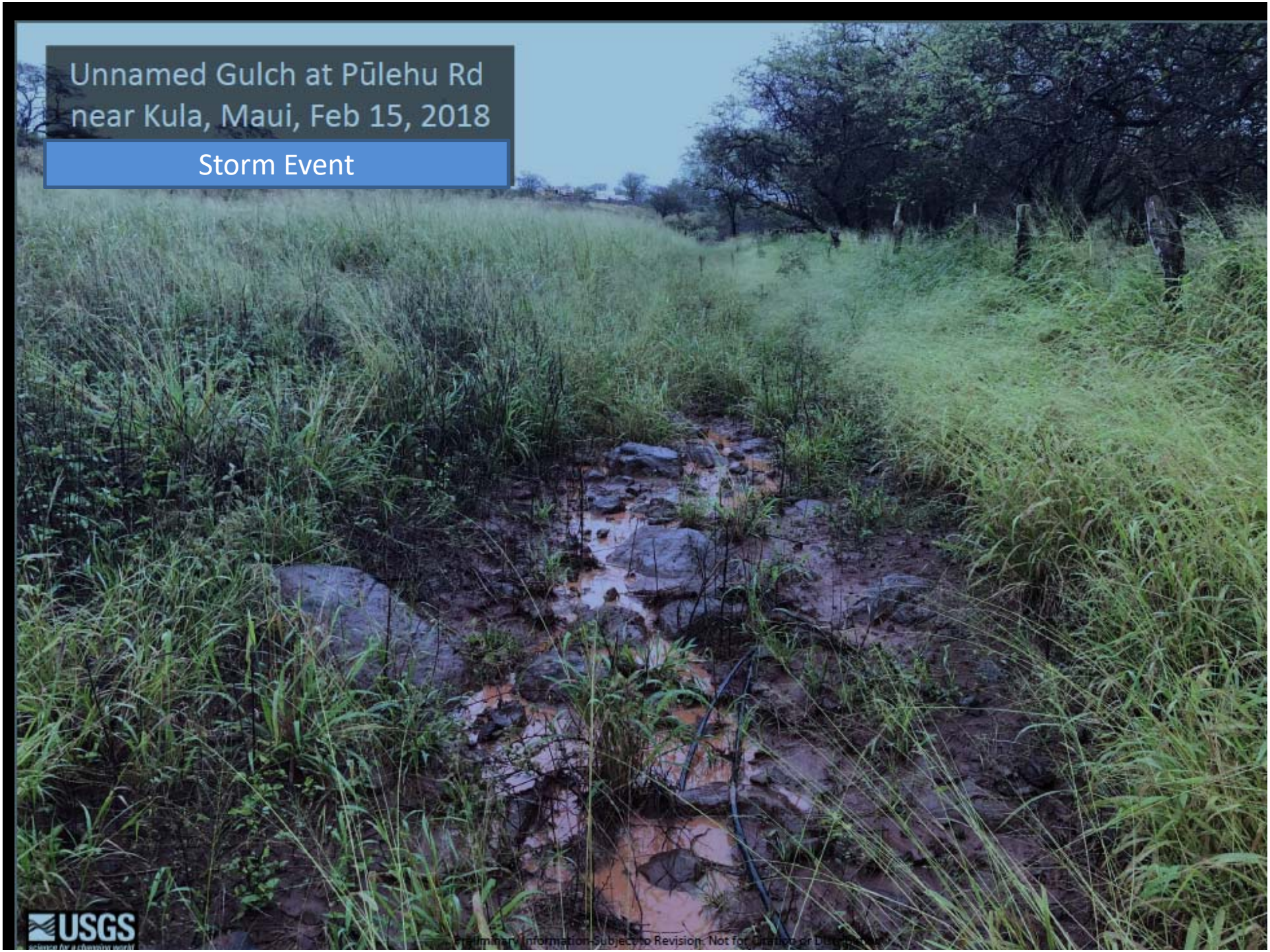
Unnamed Gulch at Pūlehu Rd
near Kula, Maui, Feb 15, 2018
Storm Event
USGS

Keāhuaiwi Gulch near
Kīhei, Maui, Feb 15, 2018
Storm Event
Collection site
Water flowing into
Keālia Pond
USGS
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Information-Subject to Revision. Not for Citation or Distribution

Waiakoa Gulch near
Kīhei, Maui, Feb 15, 2018
Storm Event
Direction of flow
Collection site
USGS
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Keālia Pond ocean outlet near
Mā‘alaea, Maui, Feb 15, 2018
Storm Event
Direction of flow
Sample collected further upstream, just out of frame
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Next steps

Analyze pending results for dry-weather samples collected at

- 15 sites on Big Island in June 2018
- 5 sites on Maui in May 2018
- 15 sites on O‘ahu in May and July 2018

Complete initial (phase 1) sampling at each targeted site

- Get a dry-weather sample if water is present and is mostly fresh
- Get a storm sample if possible
- Deploy passive sampler if feasible and logical

Continue follow-up (phase 2) sampling at sites where

- Chlorpyrifos was detected
- Other pesticides of concern to DOA and DOH are detected?
- Pesticide concentrations exceeded or were within 10 percent of Hawaii or Federal water-quality standards

Release results for passive samplers deployed 2015 - 2017

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Mahalo to our Collaborators!

USGS Pacific Water Science Center

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