USDA United States Department of Agriculture
Southwest Climate Hub

Hawai'i and Pacific Islands Climate Conversation

Sara Thompson, NRCS Climate Hub Liaison
Christian Giardina, Forest Service, Institute of Pacific Islands Forestry
Courtney Petersen, Colorado State University, Northern Institute of Applied Climate Science
Caiti Steele, Southwest USDA Climate Hub Coordinator

Natural Resources Conservation Service

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Today's Conversation

Climate 101
- Terminology
- Why these changes are occurring
- Local Climate Information

Available Resources

Climate Change and NRCS Planning

What's next for NRCS

Discussion/Feedback

What words come to mind when you think of Climate Adaptation/Resiliency?

Click on link in the Chat box

Terminology

Weather vs. Climate (Source: NOAA)

Weather reflects short-term conditions of the **atmosphere**

Climate is the average daily **weather** for an extended period at a certain location

Weather can change from minute-to-minute, hour-to-hour, day-to-day, and season-to-season. **Climate**, is the average of **weather** over time and space.

Climate is what you expect, weather is what you get.

Photo Credit: Travi

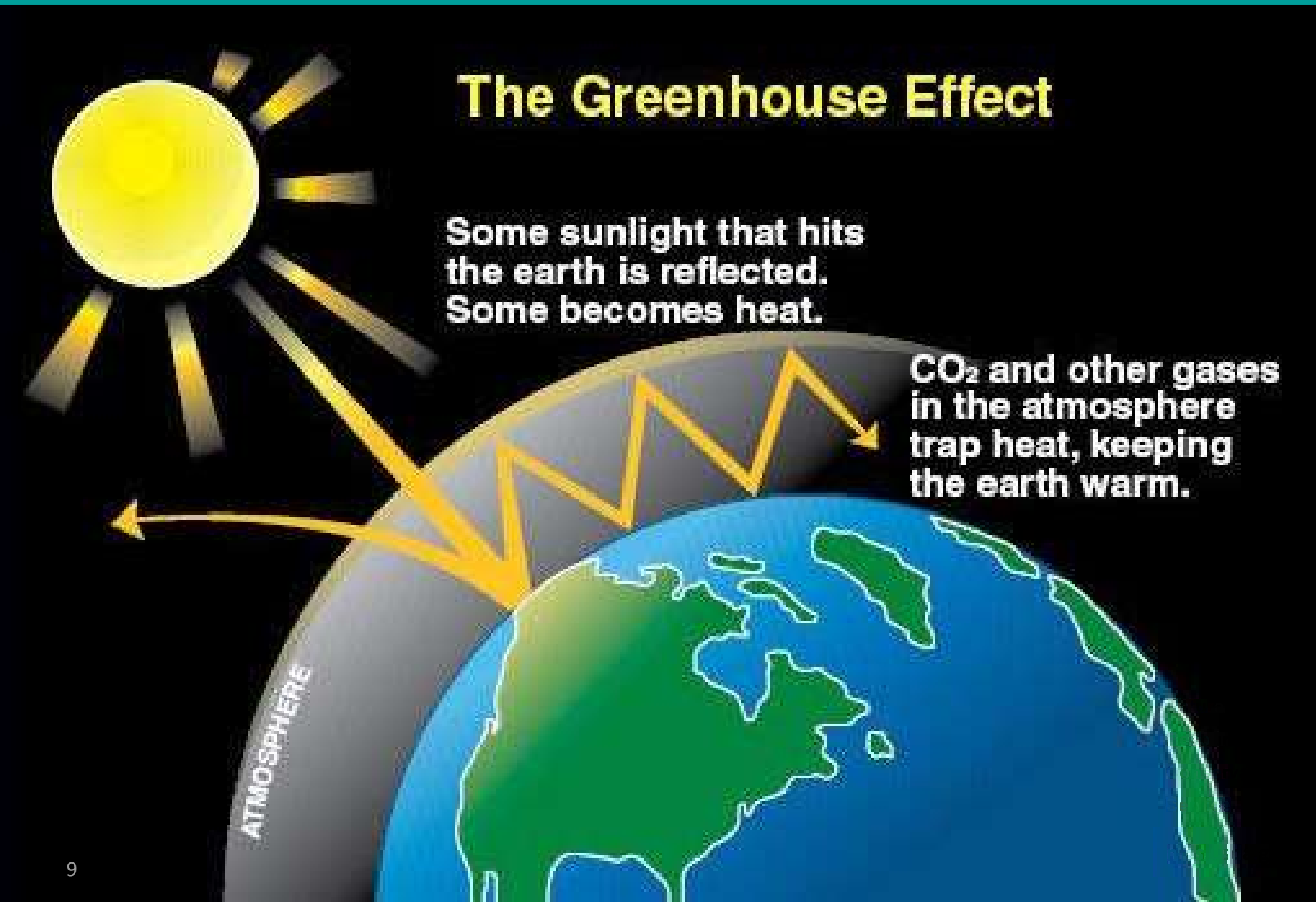
Climate Smart Agriculture

Definition: Agriculture that sustainably increases productivity, resilience (adaptation), reduces/removes GHGs (mitigation), and enhances achievement of national food security and development goals. (Source: Food and Agriculture Organization)

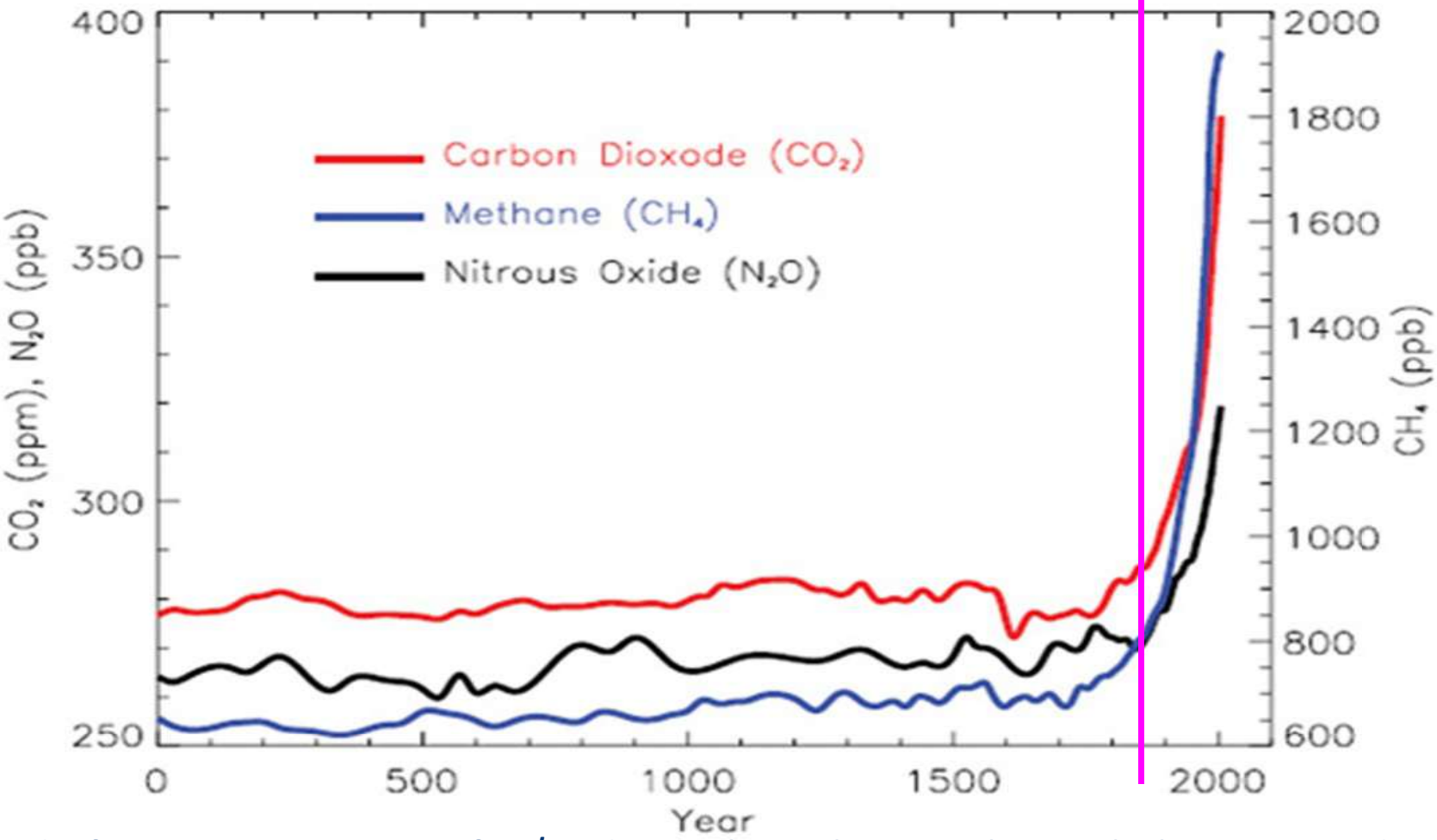
NRCS has been translating science into information and actions that agricultural producers can use since it's inception in 1935.

Hugh Hammond Bennett speaks to a farmer (left). Severe dust storm in the 1930s that was the result of sod busting and drought (right).

Why Are These Changes Happening?


The Greenhouse Effect
Some sunlight that hits the earth is reflected. Some becomes heat.
CO_2 and other gases in the atmosphere trap heat, keeping the earth warm.
ATMOSPHERE

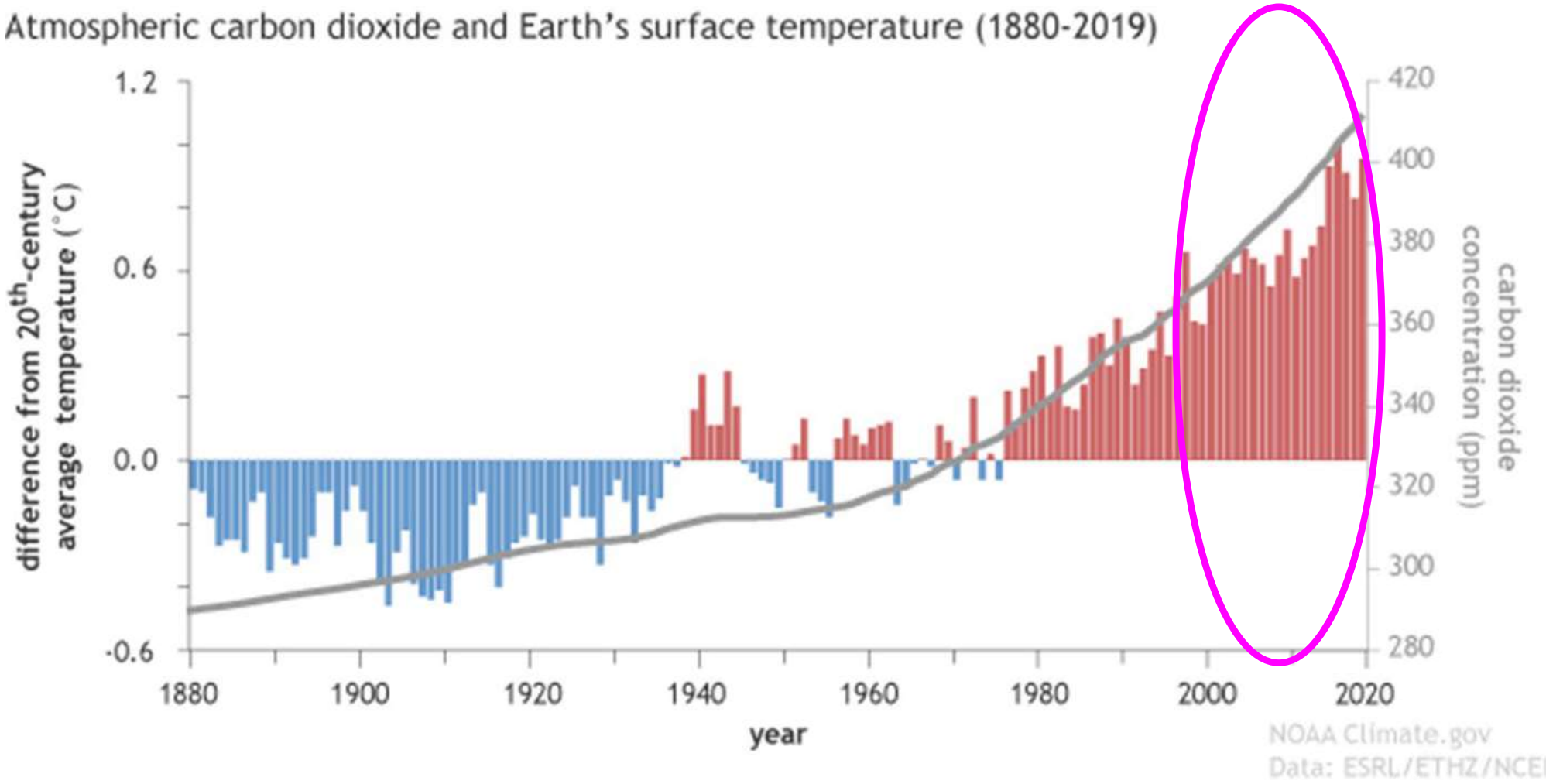
Concentrations of Primary Greenhouse Gases (year 0 – 2005)



End of 1800s: Beginning of 2nd industrial revolution, electric lights invented, and introduction of the automobile.

Source: Intergovernmental Panel on Climate Change Fourth Assessment Report 2007

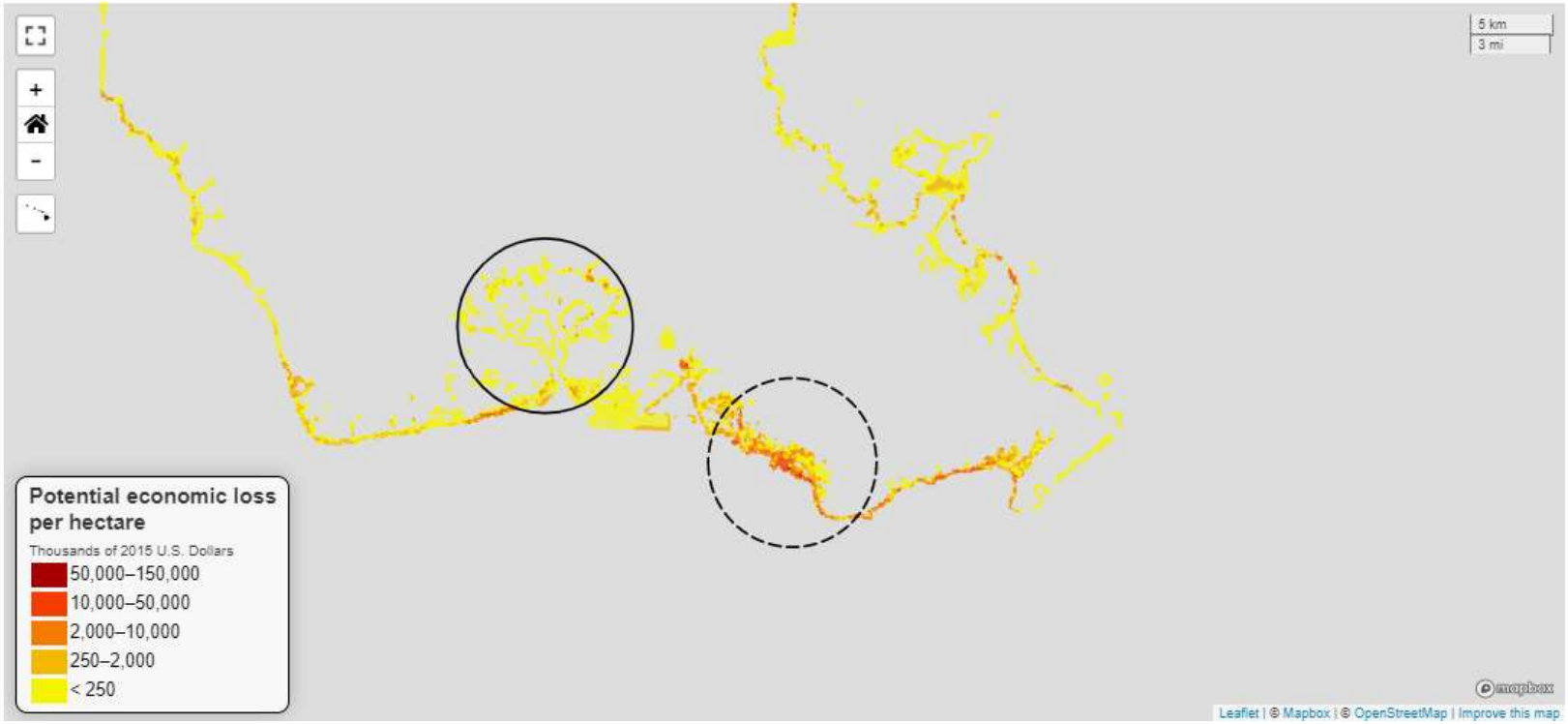
Temperature Has Risen Along With Levels of Greenhouse Gases



Rising sea level

Sea level could rise by as much as 1 foot by 2050 and by as much as 4 feet by 2100 – costing more than 19 Billion in impacts.

Figure 27.9: Potential Economic Loss from Sea Level Rise, O'ahu, Hawai'i

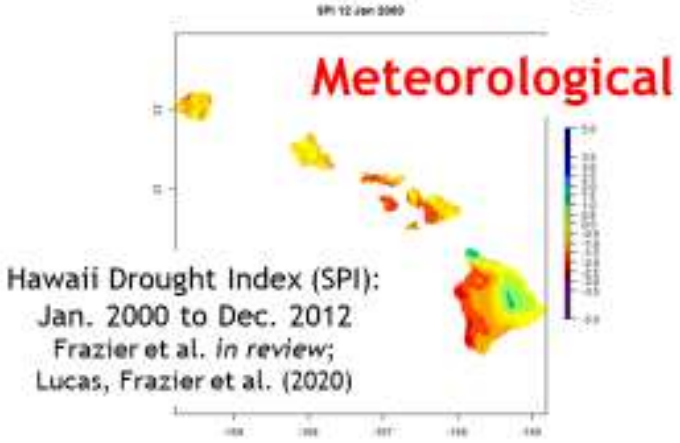


Source: Fourth National Climate Assessment

Local Climate Changes and Trends

Christian Giardina, Forest Service - Institute of Pacific Island Forestry

Drought has severe impacts across multiple sectors in Pacific Islands



Hawaii Drought Index (SPI): Jan. 2000 to Dec. 2012
Frazier et al. *in review*; Lucas, Frazier et al. (2020)

Lava-ignited **fire** burned over 3,000 acres of rain forest in **Hawai'i Volcanoes National Park** during 2002-2003 drought

Public Works in **Majuro, Marshall Islands**, established fresh water "filling stations" during the 2015-2016 drought

Frazier et al. *USDA Forest Service Report* (2019)

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What actions do resource managers take to prepare for & cope with drought?

Frazier et al. *USDA Forest Service Report* (2019)

CHAPTER 5

Managing Effects of Drought in Hawai'i and U.S.-Affiliated Pacific Islands

Abby G. Frazier, Jonathan L. Deenik, Neal D. Fujii, Greg R. Funderburk, Thomas W. Giambelluca, Christian P. Giardina, David A. Helweg, Victoria W. Keener, Alan Mair, John J. Marra, Sierra McDaniel, Lenore N. Ohye, Delwyn S. Oki, Elliott W. Parsons, Ayron M. Strauch, and Clay Trauernicht

Link to PDF here:

Drought Decision Making

What data resources are used? How do you get info?

What types of decisions are made?

Is drought considered in planning of new activities?

Need for a Knowledge Exchange:

- Resource managers seek to be more actively engaged in research
- Limited time/training to access info
- No centralized data clearinghouse
- Need formal communication mechs.
- Easier access to comprehensive data & technical assistance
- A model exists for Fire: PFX

Giardina et al. 2019

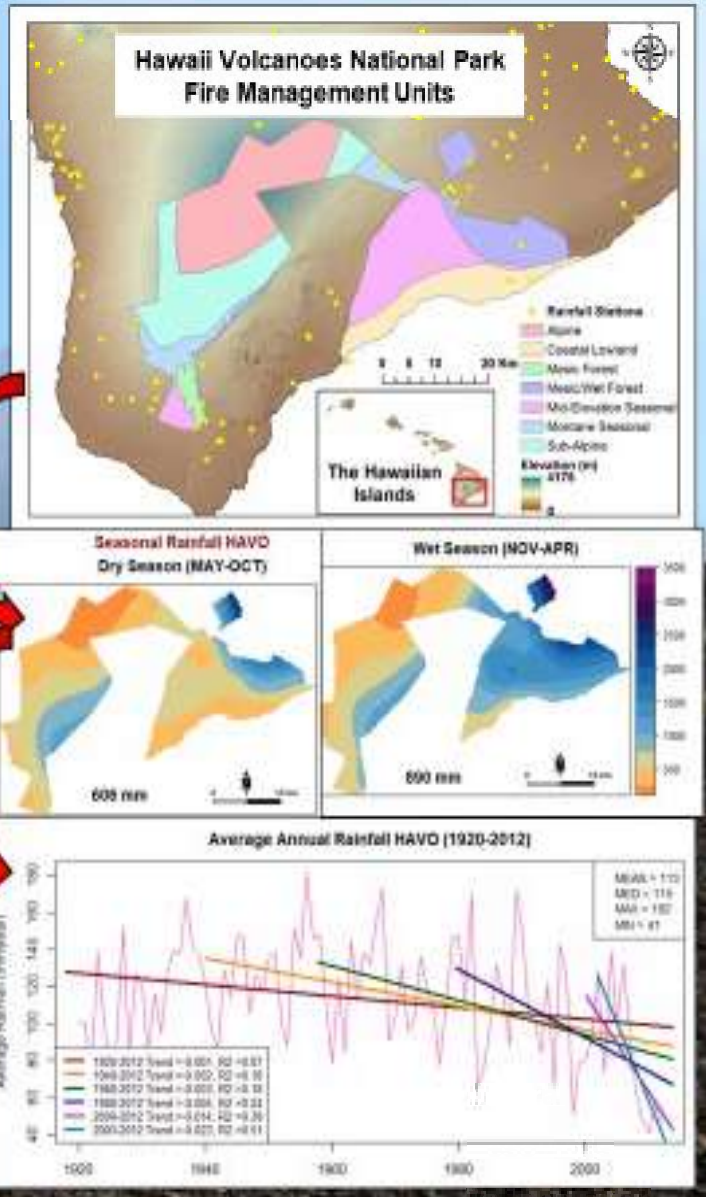
Pacific Drought Knowledge Exchange (PDKE) Pilot

- Work with 3 partners in Hawai‘i

Mauna Kahālāwai Watershed Partnership (MKWP)

Pu‘uwa‘awa‘a Forest Reserve (PWW)

Hawai‘i Volcanoes National Park (HAVO)



- **Co-produce** drought “Portfolios”, **site-specific** for each landscape (visualizations, statistics, etc.)
  - Synthesizing all Climate & Ecology data

Knowledge Exchange

Pacific Drought Knowledge Exchange

- Demonstrate four aspects of a knowledge exchange:

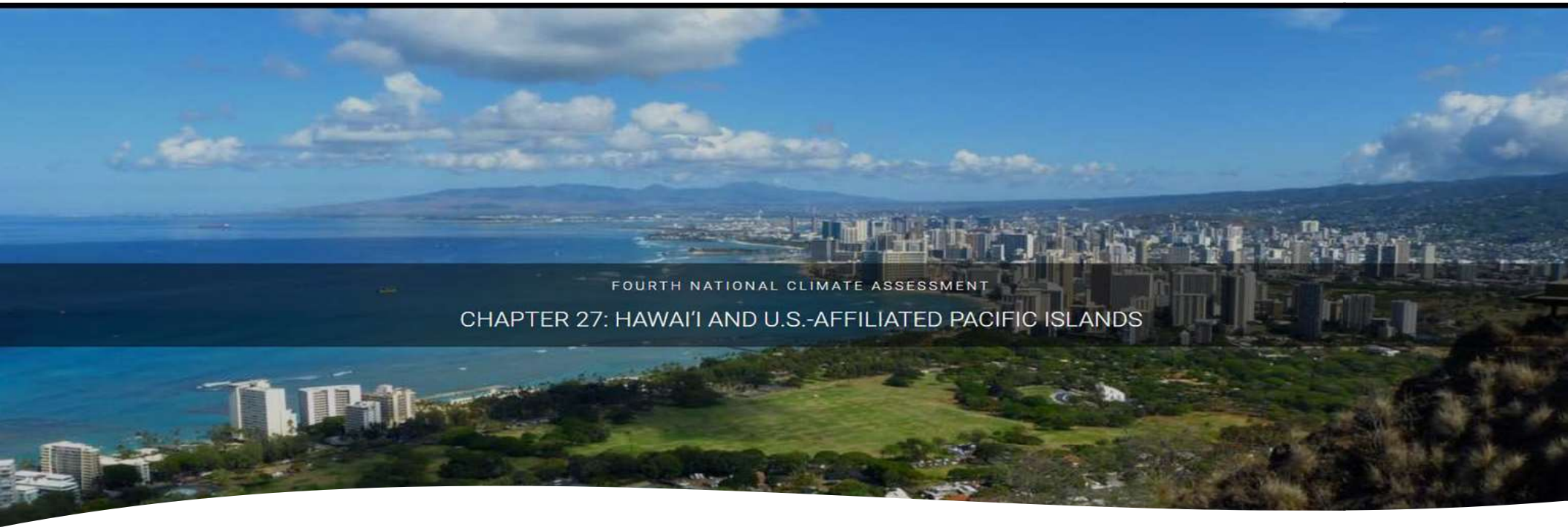
1. **Easier Access to Drought & Climate Information and Data Sources:** customized results for each mgmt. area
2. **Better & More Comprehensive Information:** synthesize existing information from multiple sources
3. **Improved Technical Assistance:** translated science summaries, offer hands-on training opportunities, develop decision support tools
4. **More Collaborative Information Transfer Environment:** improve communication mechanisms, develop a feedback process between scientists & managers (regular meetings, facilitated information transfer, etc...)

Giardina et al. 2019
doi:10.2737/NRS-GTR-P-185-paper22

What do you see as the biggest climate and weather-related challenges facing Hawai'i and the Pacific Islands?

Available Resources


Photo: Jenna Dunn



Fourth National Climate Assessment 2018

- 1,500 page congressionally mandated report done every four years by the US Global Change Research Program (federally funded).
- Lead agency: National Oceanic and Atmospheric Association (NOAA), many other partner contributors including USDA
- Official data source for USDA climate change information

USDA Climate Hubs

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Southwest USDA Climate Hub

- Headquartered at the USDA-ARS Jornada Experimental Range on the New Mexico State University campus in Las Cruces, NM
- Provide information and technology to guide climate-informed decision making by farmers, ranchers, forest landowners, Native American tribes and indigenous peoples, natural resource managers and technology transfer specialists
- Science driven, stakeholder centered, efficient, cooperative partnerships with federal, state and local organizations
- Partners with USDA, UH and others in Hawai'i to support Hawai'an and USAPI stakeholders

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Increase partnership reach and science connections

- Drought Learning Network (focus on ***how*** not ***what***)
- Peer-to-peer knowledge transfer
- Tribal and indigenous engagement (e.g., Clay Trauernicht Extension Climate Workshops)
- Seek and secure funding to extend reach (e.g., NIFA-funded projects)

Provide access to Tools to inform Decision-making

- Grass-Cast
- AgRisk Viewer
- CocoRahs
- Beef Decision Toolshed

Available Resources:

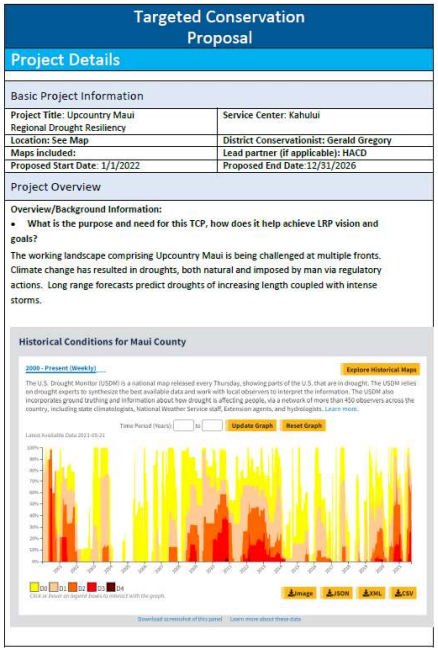
- Southwest Climate Hub
- Climate Change Response Framework Resources for Hawai‘i and Pacific Islands Northern Institute of Applied Climate Science:
- Pacific Islands Climate Adaptation Science Center
- Hawaiian Islands Climate Vulnerability and Adaptation Synthesis
- State of Hawaii Climate Change Portal - Find climate change tools, adaptation and mitigation reports
- Pacific Fire Exchange
- Climate change impacts in Hawai’i: University of Hawai'i Sea Grant College Program
- Climate Change in the Hawai'ian Islands Hawai'i Conservation Alliance:
- NOAA State Summaries of climate
- Drought.gov
- Drought Monitor
- AgRisk Viewer Risk Management Agency Data visualized by the Southwest Climate Hub
- Climate Smart Restoration Tool
- Fourth National Climate Assessment
- EPA Climate Scenarios Map

What have you seen producers and agencies doing to adapt to changes?

Climate Informed Agriculture and NRCS

Planning

Intentional planning with climate change impacts is part of the forward-thinking HI/Pacific Islands approach for voluntary conservation - this makes sense


Targeted Conservation Proposal

Project Details

Basic Project Information

Project Title: Upcountry Maui Regional Drought Resiliency	Service Center: Kahului
Location: See Map	District Conservationist: Gerald Gregory
Maps included:	Lead partner (if applicable): HACD
Proposed Start Date: 1/1/2022	Proposed End Date: 12/31/2026

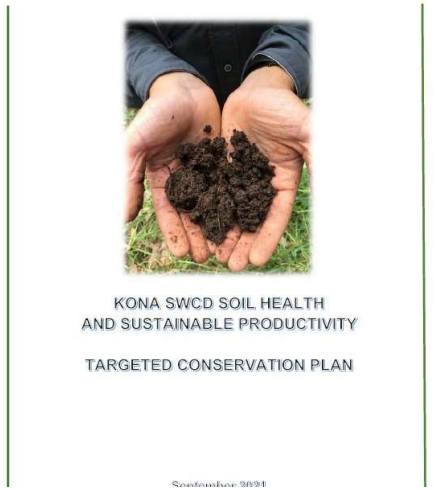
Project Overview

Overview/Background Information:

- What is the purpose and need for this TCP, how does it help achieve LRP vision and goals?

The working landscape comprising Upcountry Maui is being challenged at multiple fronts. Climate change has resulted in droughts, both natural and imposed by man via regulatory actions. Long range forecasts predict droughts of increasing length coupled with intense storms.

Historical Conditions for Maui County


KONA SWCD SOIL HEALTH
AND SUSTAINABLE PRODUCTIVITY

TARGETED CONSERVATION PLAN

September 2021

Targeted Conservation Plan:
Building Soil Health to Improve Water Quality on O'ahu

Developed for
USDA-Natural Resources Conservation Service, Pacific Islands Area

September 2021

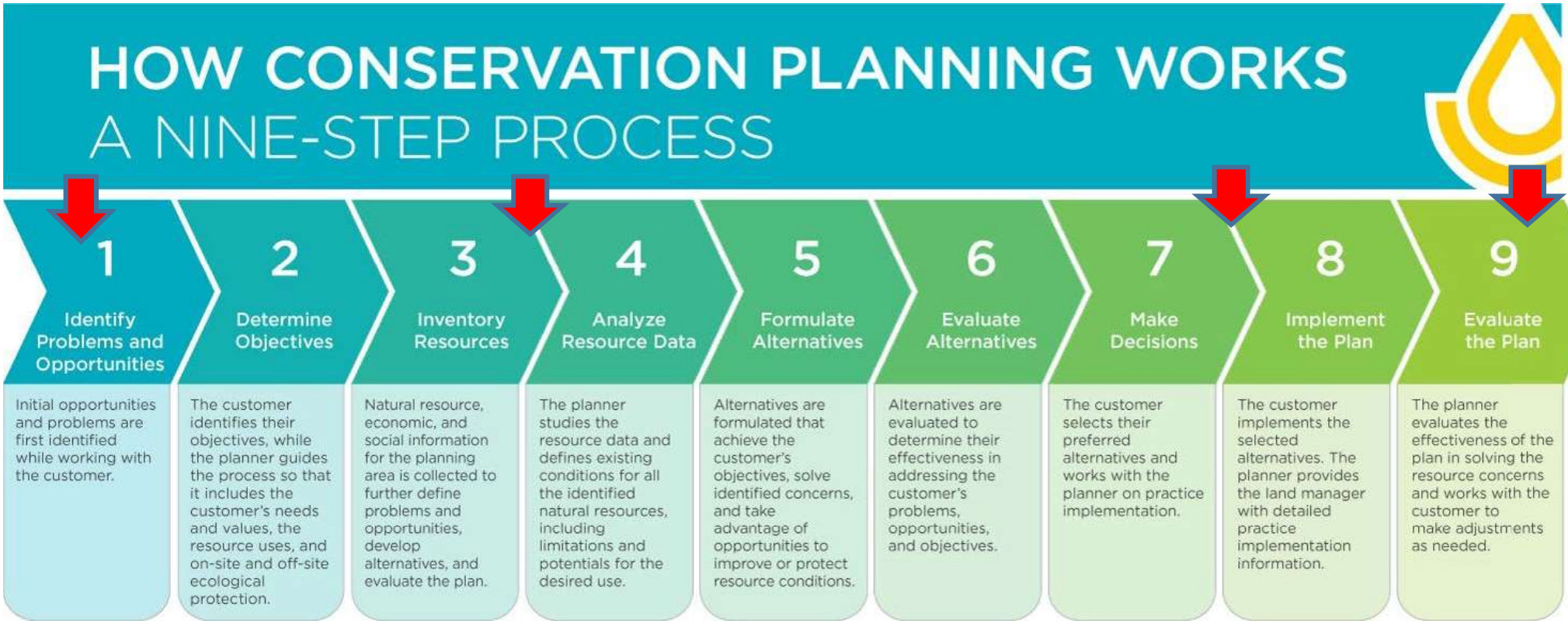
by O'ahu Resource Conservation & Development Council
Jean Brokish (consultant)
Miranda Foley (EcoLOGIC Consulting LLC)
Dave Elliott, Executive Director

O'AHU RC&D

Where can climate change information fit into NRCS Processes?

- What are the customer's objectives?
- What are NRCS's objectives?
- How long do we want our efforts to last?

Where can climate change information fit into NRCS Processes?



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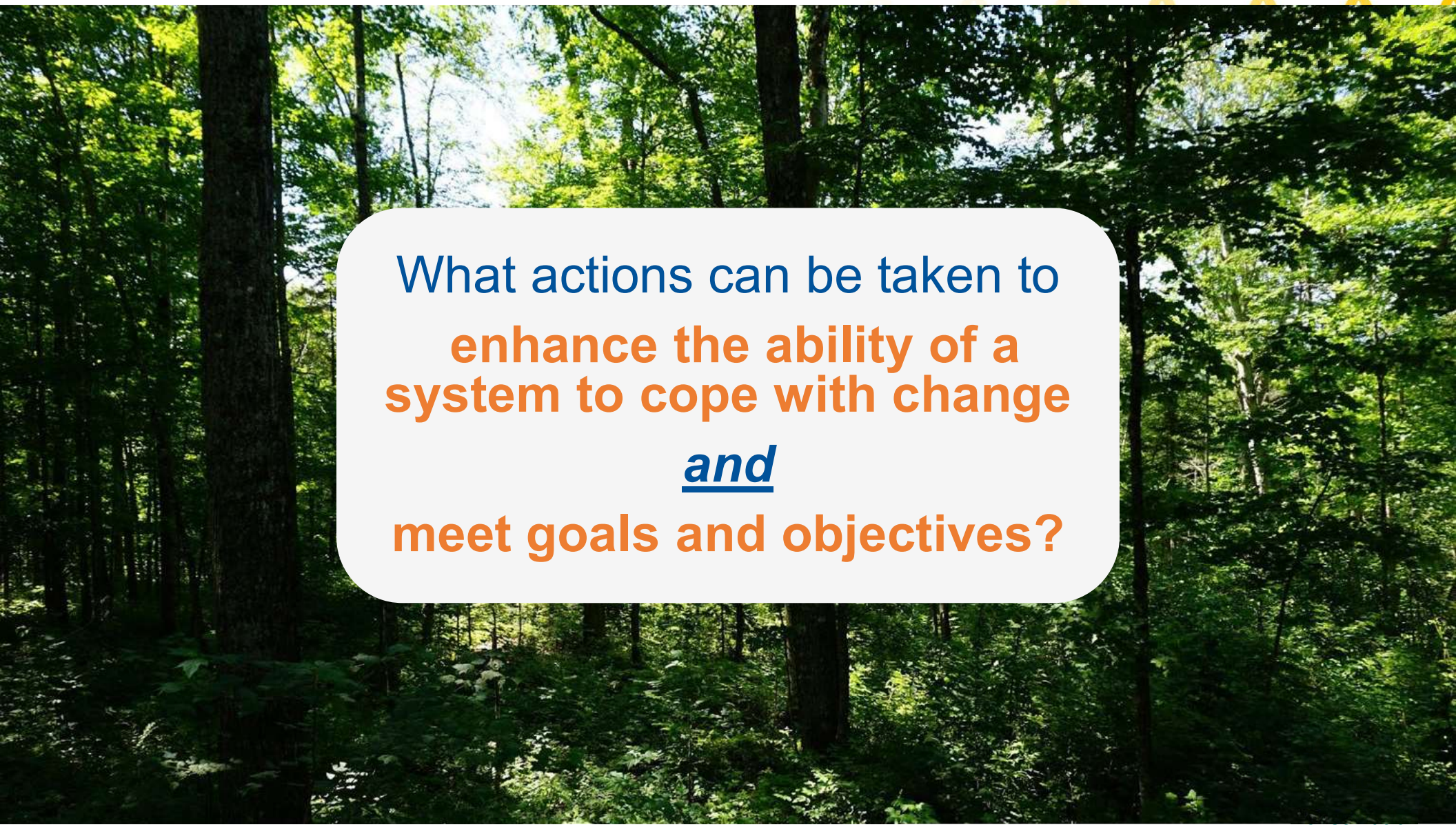


What actions can be taken to

enhance the ability of a system to cope with change

and

meet goals and objectives?

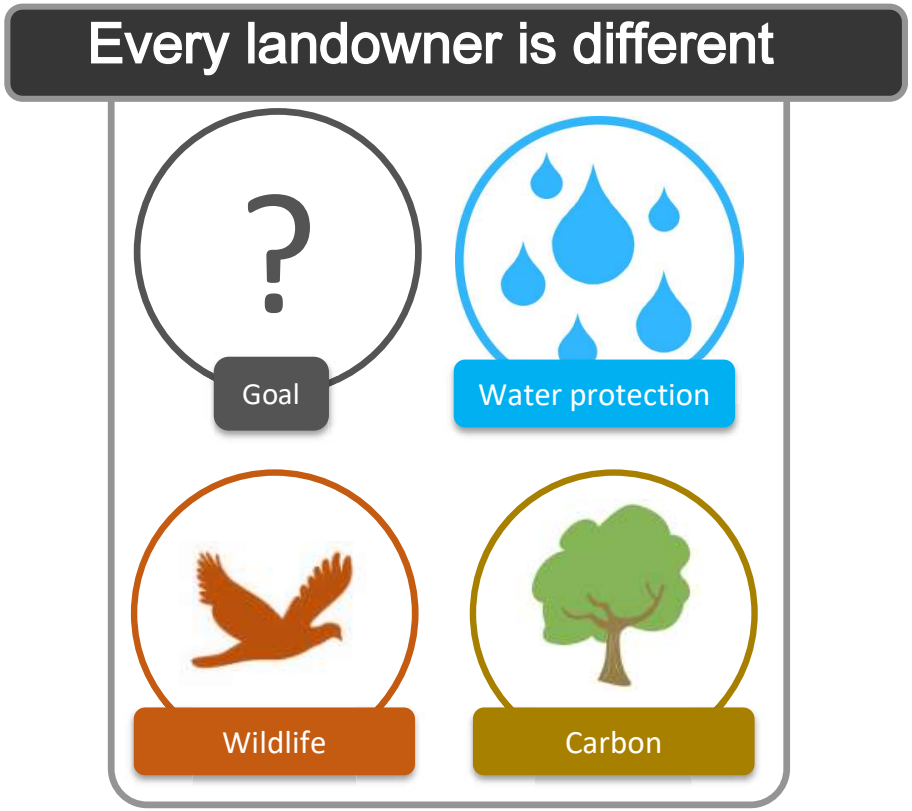
Adaptation - the adjustment of systems in response to climate change.




Ecosystem-based adaptation activities build on sustainable management, conservation, and restoration.

- What do you value?
- How much risk are you willing to tolerate?

Adaptation: there is no single answer



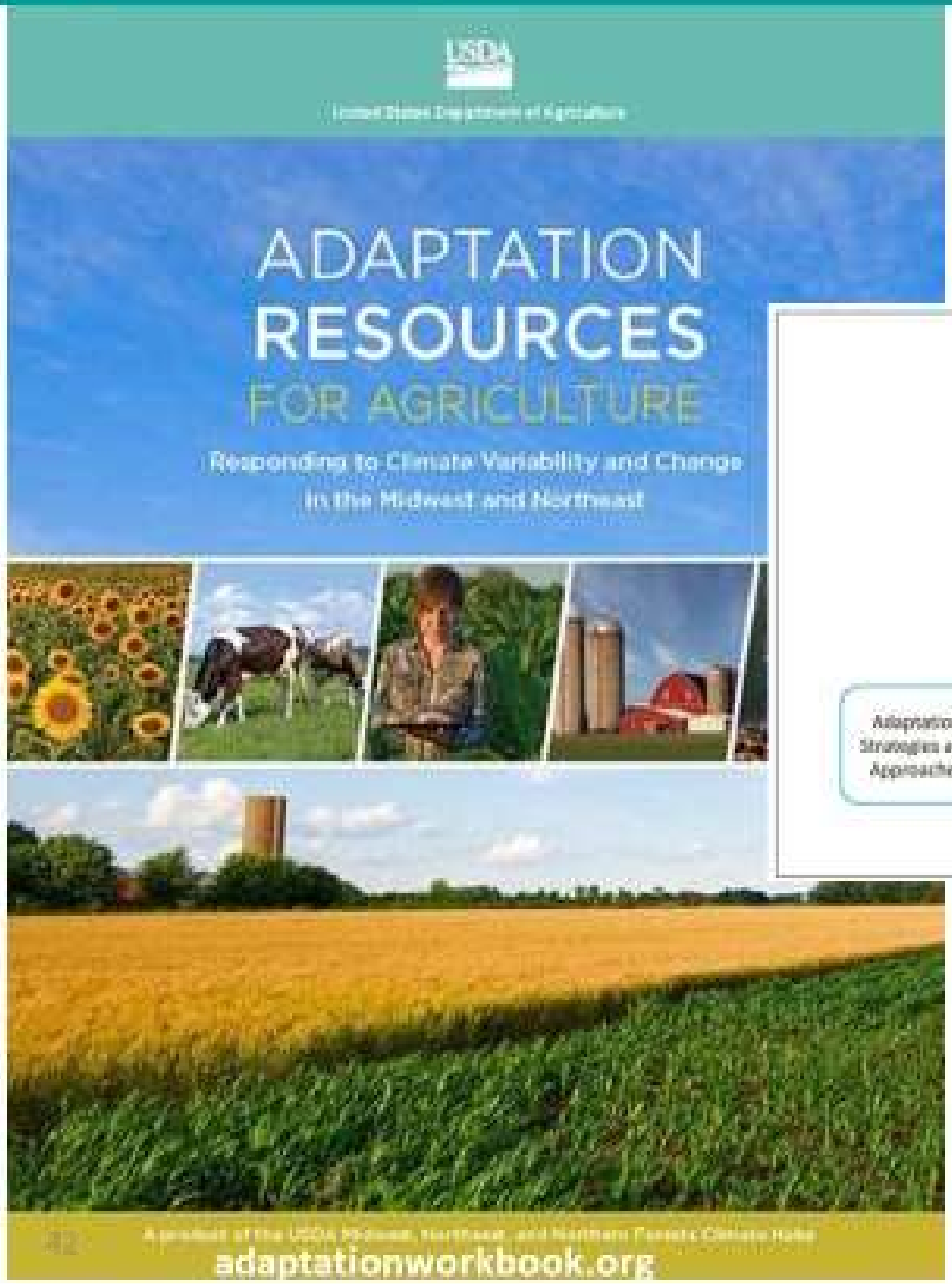
Each decision is unique and will vary based upon:

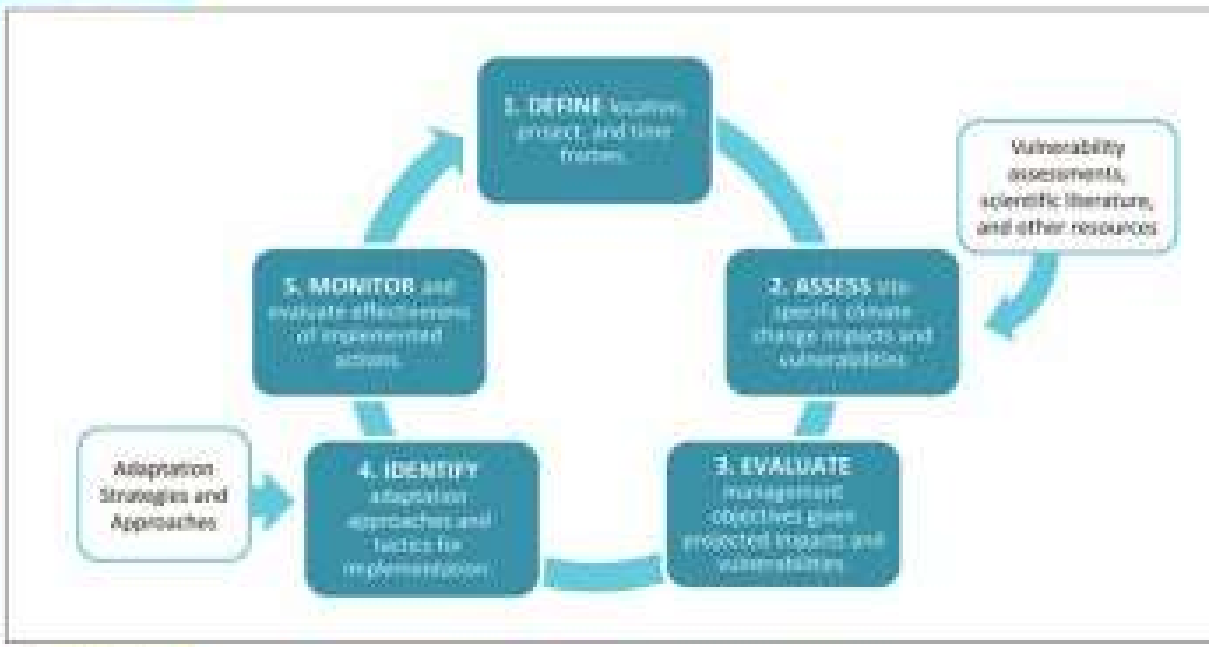
People: Values, Culture, & Resources

Place: Location & Site Conditions

Purpose: Goals & Objectives

Practices: Equipment, Procedures, & Methods





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Adaptation Workbook = Climate Change Filter

You DON'T need to include 'climate change' or 'resilience' in your management goals or objectives.
Use the Adaptation Workbook to ensure ALL of your goals and objectives are <u>robust</u> to climate change impacts.

Adaptation Workbook Outcomes

Custom adaptation plans for a project or property.

- Considering **climate vulnerability in planning** may increase the effectiveness of our management actions.
- Considering **extended time scales** can clarify climate challenges, opportunities and connections to robust adaptation actions.
- Provides a platform to make connections between goals, climate risks, to desired benefits of adaptation actions in natural resources management.

Can be used independently or combined with other management documents, such as long-range plans or TCPs.

Food security, climate change, adaptation?

Climate impacts:

Significantly drier - pronounced spatial variation: "*Since 2008, overall, the islands have been drier, and when it does finally rain, it rains a lot.*" - https://climate.hawaii.gov/hi-facts/rain/

April 2018 - mesoscale convective system produced almost 50" in 24 hours near Hanalei - washed out the iconic wetland kalo fields

Drought an issue for upland farms

Inherent vulnerability

Taro was once grown over 1000s of acres in the islands, acreage at 495 in 2017 in 207 farms (NASS Census 2017)... taro is severely underproduced in the State

Farms are often small and leasehold - "average small-scale farmer in Hawaii makes less than $40k per year, with losses of almost $10k annually due to the high costs of farming, including land and water."

Disease and pests

State-level risk - How well-distributed are farms raising taro?

Scale for action?

State-wide measures for protecting taro production, supporting farmers, increasing food security?

Watershed-scale responses?

Farm-scale adaptation measures versus recovery? Kauai Farm plans recovery from third flood in three years (Hanalei Taro)

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We need your feedback!

Please complete 2-minute survey
by following the link in the chat box.

Photo: Jason Hew

Aligning priorities with NRCS and PIA

- **FY 2022 Agency Priorities**
  - Ensure equity in the delivery and implementation of all NRCS programs and services.
  - Increase assistance for climate-smart agriculture and forestry to support producers in building resiliency across their operations.
  - Expand conservation tools and support to address the unique needs of urban farmers and communities nationwide.
  - Cultivate a complete and diverse workforce that has the right tools, technologies, and training to uphold the scientific integrity of NRCS.
  - Leverage innovative partnerships to expand NRCS's ability to get conservation on the ground effectively and efficiently.

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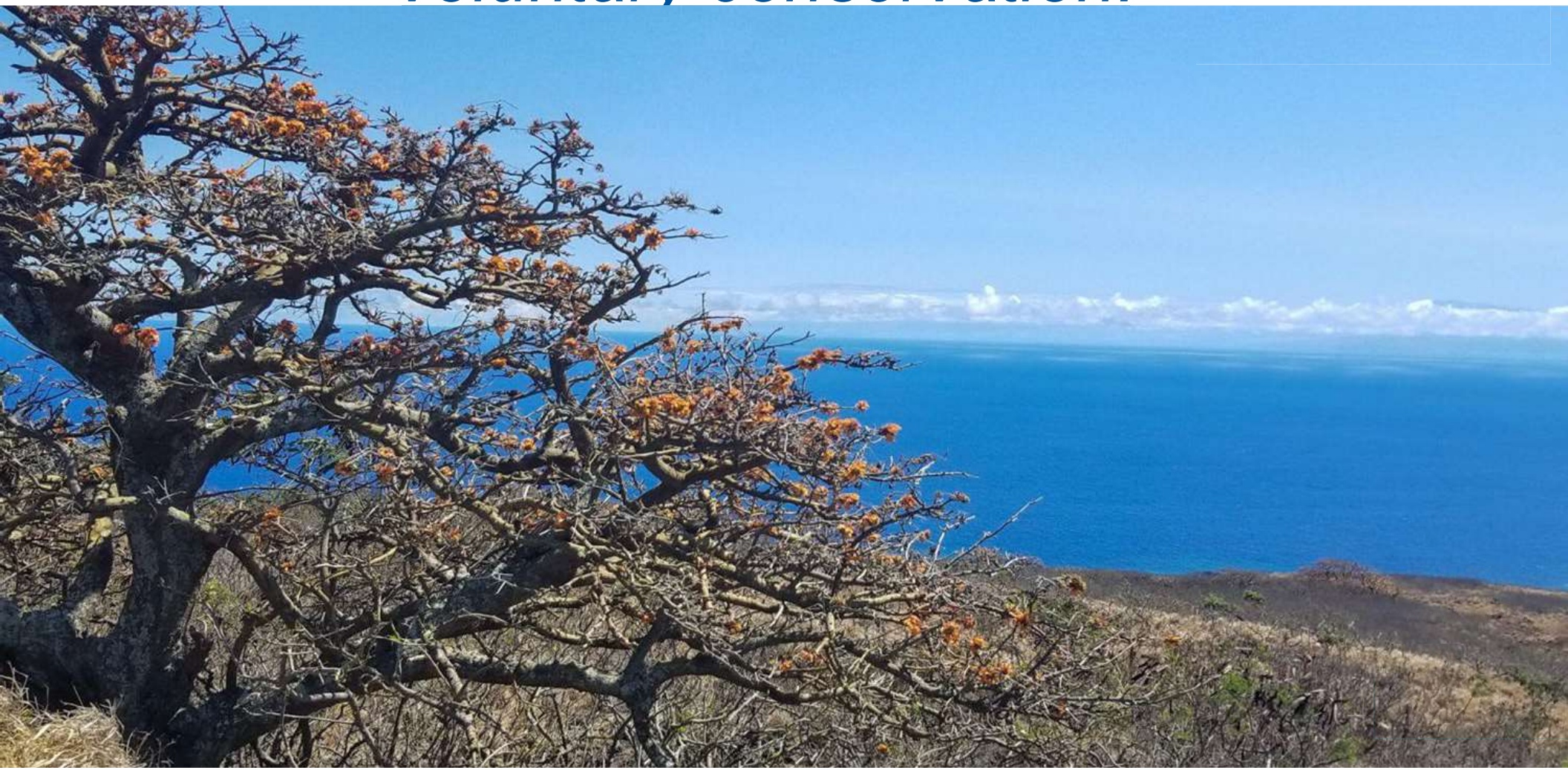
What's Next

- January sessions
  - Facilitated sessions to integrate climate adaptation planning into NRCS planning process
  - Using Long Range Plans to make the Targeted Conservation Planning more targeted for adapting to climate changes.

NRCS Vision: *A world of clean and abundant water, healthy soils, resilient landscapes, and thriving agricultural communities through voluntary conservation.*



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