

Association of Conservation Engineers (ACE)

September 23, 2014

USDA Forest Service Climate Change and Sustainable Operations

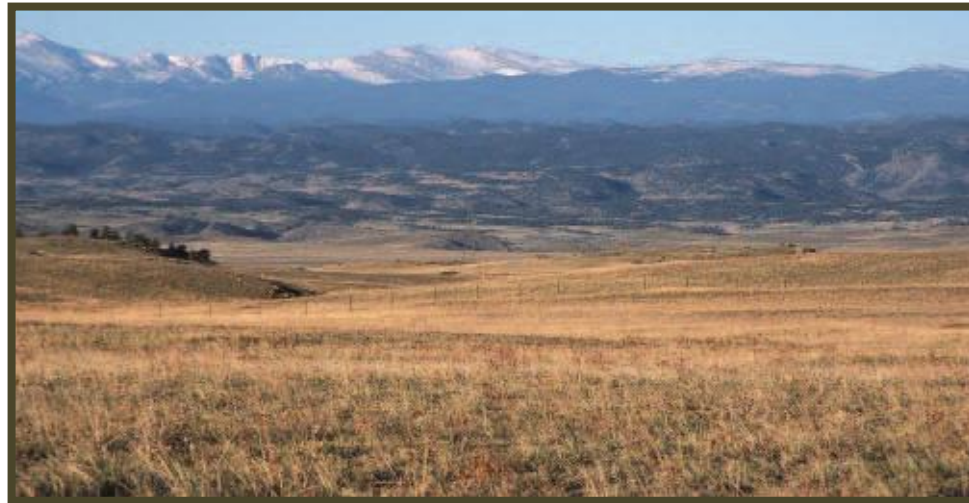
Natalie Little, Katie Newcomb, Meghan Oswalt



Forest Service and Climate Change

Responding to climate change is essential if the Forest Service is to fulfill its mission:

- “to sustain the health, diversity, and productivity of America’s forests and grasslands for the benefit of present and future generations.”



So What?

Fast Facts

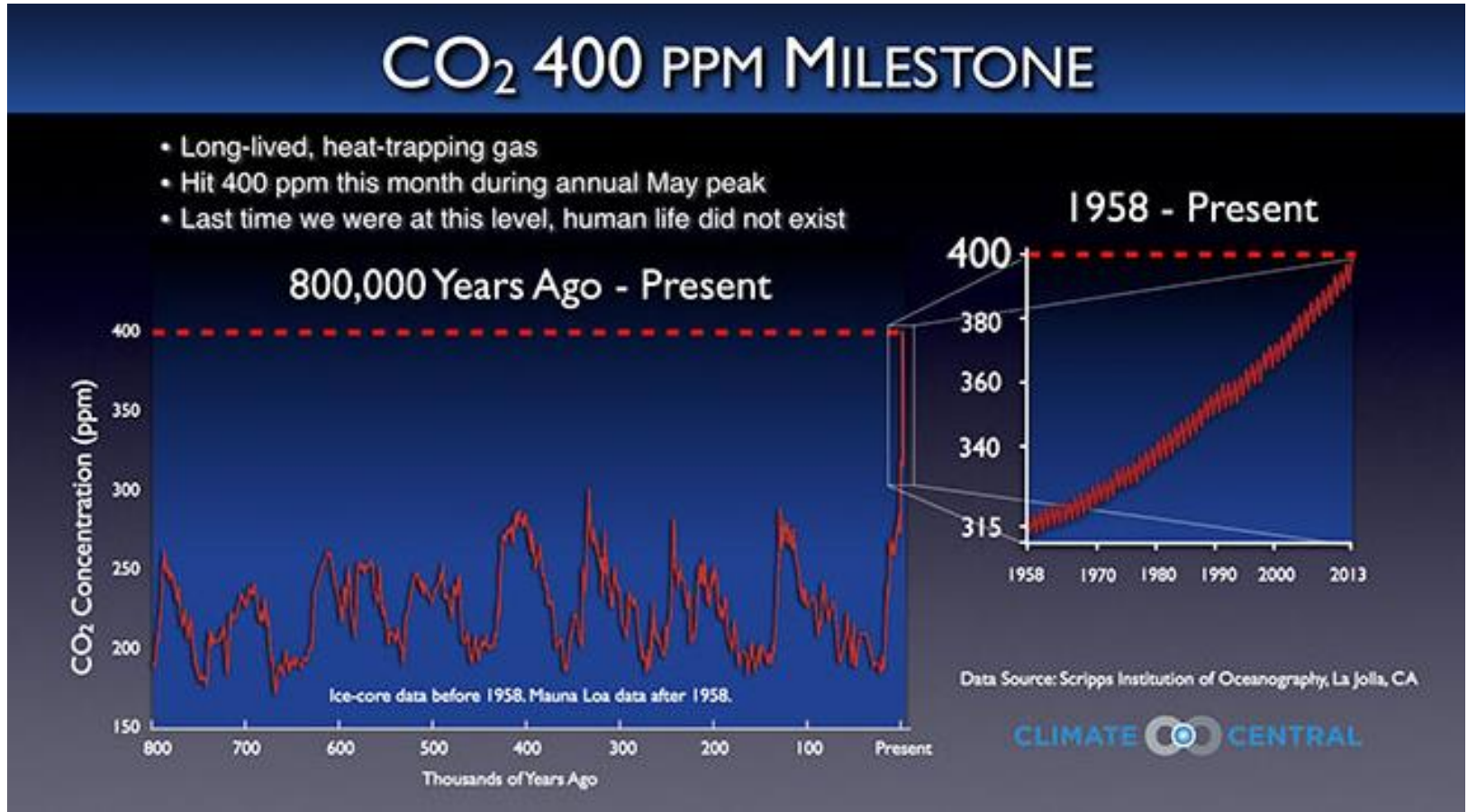
- Global average temp. increased by more than 1.4 degrees F over the last century
- Scientists project that Earth's temp. will rise between 2-12 degrees F by 2100.
- Carbon dioxide has risen to 400 ppm as a trace gas in the Earth's atmosphere – first time in human history
- Climate change effects include:
 - Changing weather patterns
 - Decreasing snowpack
 - Loss of agriculture



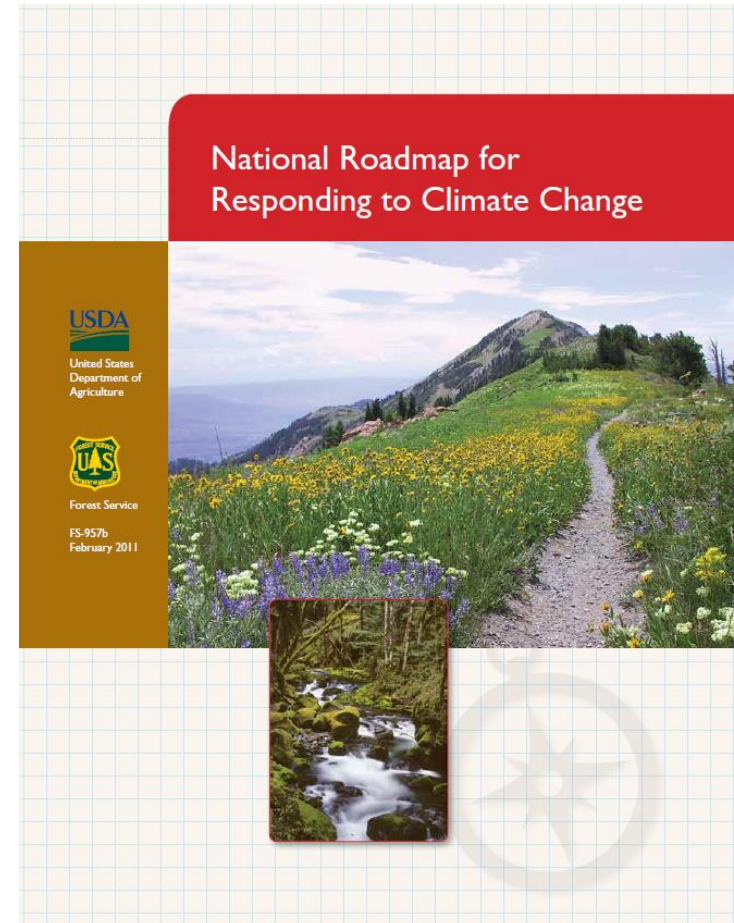
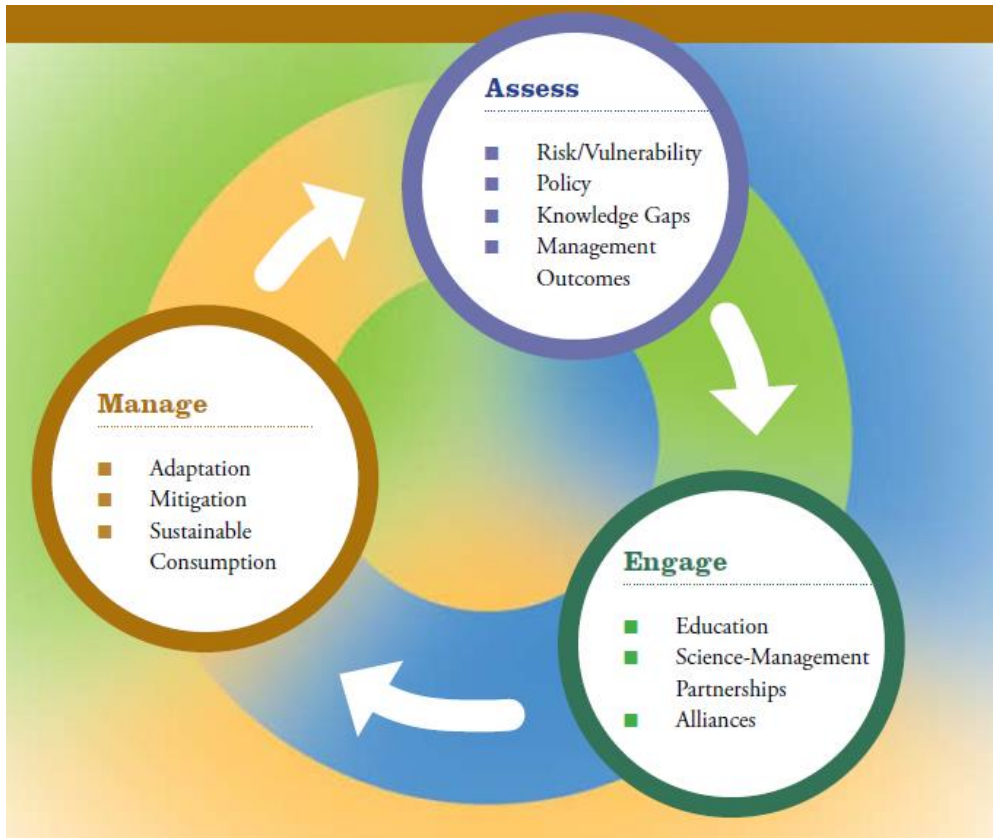
**Squaw Valley, Tahoe, CA –
Jan 2012**



Carbon Dioxide (CO₂) – 400 ppm – May 2014



FS National Roadmap to set priorities



Climate Change Scorecard Overview

Organizational Capacity

- 1 Employee Education
- 2 Designated Climate Change Coordinators
- 3 Program Guidance

Engagement

- 4 Science and Management Partnerships
- 5 Other Partnerships

Adaptation

- 6 Assessing Vulnerability
- 7 Adaptation Actions
- 8 Monitoring

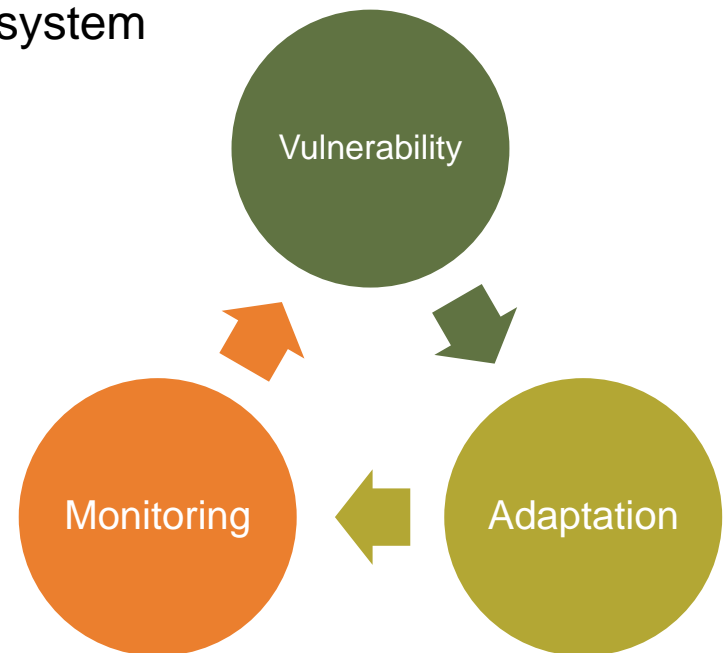
Mitigation and Sustainable Consumption

- 9 Carbon Assessment & Stewardship
- 10 Sustainable Operations



Climate Change – Assessing Vulnerability

- Vulnerability – Degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes
- Vulnerability Assessments – inform the development of management activities, such as where to focus
 - Can study resources and social vulnerabilities
 - Geographic scale – relevant to management actions
- With increased temperature, how might a system in your area change?
 - Alpine habitat
 - Dry grasslands
 - Deer population
 - Campground recreation use
 - Public water supply
 - Lake elevation levels
 - Infrastructure



Climate Change – Adaptation Actions

- Adaptation Actions – facilitate long-term resilience and/or resistance to potentially adverse effects of climate change
 - Add into
 - Management plans to aid in decision-making
 - Project plans
 - Annual program of work
 - A conservation strategy



Road decommissioning – before and after photos



Climate Change – Monitoring

- Monitoring – allows the updating and validation of vulnerability assessments and tracks the effectiveness of adaptation actions
 - Incorporate into
 - Existing regular monitoring programs
 - Develop new monitoring programs



Climate Change – Carbon Information

- National Forest System forest carbon resource is growing
- National Forest System has 26% of total carbon stored in all U.S. Forests
- What's included in the carbon assessment
 - Above-ground portions of trees
 - Below-ground portions of trees
 - Understory
 - Standing dead trees
 - Down dead wood
(coarse woody debris)
 - Litter (forest floor)
 - Soil organic carbon



Forest Service Climate Change Resource Center

“What can I do about climate change?”

<http://www.fs.usda.gov/ccrc/>

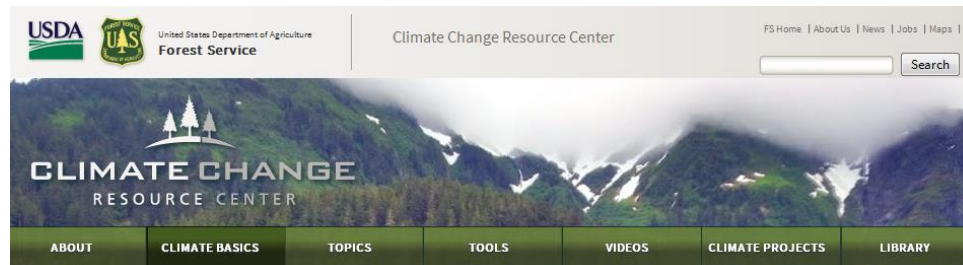
The screenshot shows the Forest Service Climate Change Resource Center website. At the top left, there are logos for USDA and the United States Department of Agriculture Forest Service. The main header features a large image of a forest with the text "CLIMATE CHANGE RESOURCE CENTER". Below this is a navigation menu with tabs for ABOUT, CLIMATE BASICS, TOPICS, TOOLS, VIDEOS, CLIMATE PROJECTS, and LIBRARY. A search bar is located in the top right corner. The main content area is divided into several sections: a "Featured" section with a large image of a path through a forest and the text "Healthy trees and forests provide neighborhoods with a host of climate-related benefits."; a "RECENT ADDITIONS" section listing various reports and articles; and a "Why Forests and Climate Change?" section with a "Start here >" link. There are also several smaller thumbnail images at the bottom of the featured section.

Why Forests and Climate Change?
Start here >

How can forests adapt to climate change?
See some examples >

Forest Service Climate Change Resource Center

Tools for land management.
<http://www.fs.usda.gov/ccrc/>



[Managing for Change](#)
[Climate Change Education](#)
[Climate Science Primer](#)
[Climate FAQs](#)

Climate Basics

Start here to learn about climate change, how it may influence land management, and what options are open to natural resource managers for responding to these changes.



Managing for Change

Why care about natural resource management and climate change? Read this for an introduction to many of the resources offered on the CCRC.



Climate Education

Education is the first step to incorporating climate change into natural resource management. This section features an interactive exercise on climate change science, and other resources for learning or teaching climate change.



Climate Science Primer

The Primer provides a brief background on climate change science and current climate trends. It points to in-depth resources from organizations that specialize in explaining climate basics.



FAQs

For answers to specific questions on climate science, how climate changes affect ecosystems, or how to think about resource management under climate change, the FAQ's are a good place to start.



Forest Service Climate Change Resource Center

A resource to help understand climate change.
<http://www.fs.usda.gov/ccrc/>



[Managing for Change](#)
[Climate Change Education](#)
[Climate Science Primer](#)
[Climate FAQs](#)

Climate Basics - Frequently Asked Questions

[Climate Science](#) | [Ecosystem Effects](#) | [Management Options](#) | [References](#)

(Click any question for details.)

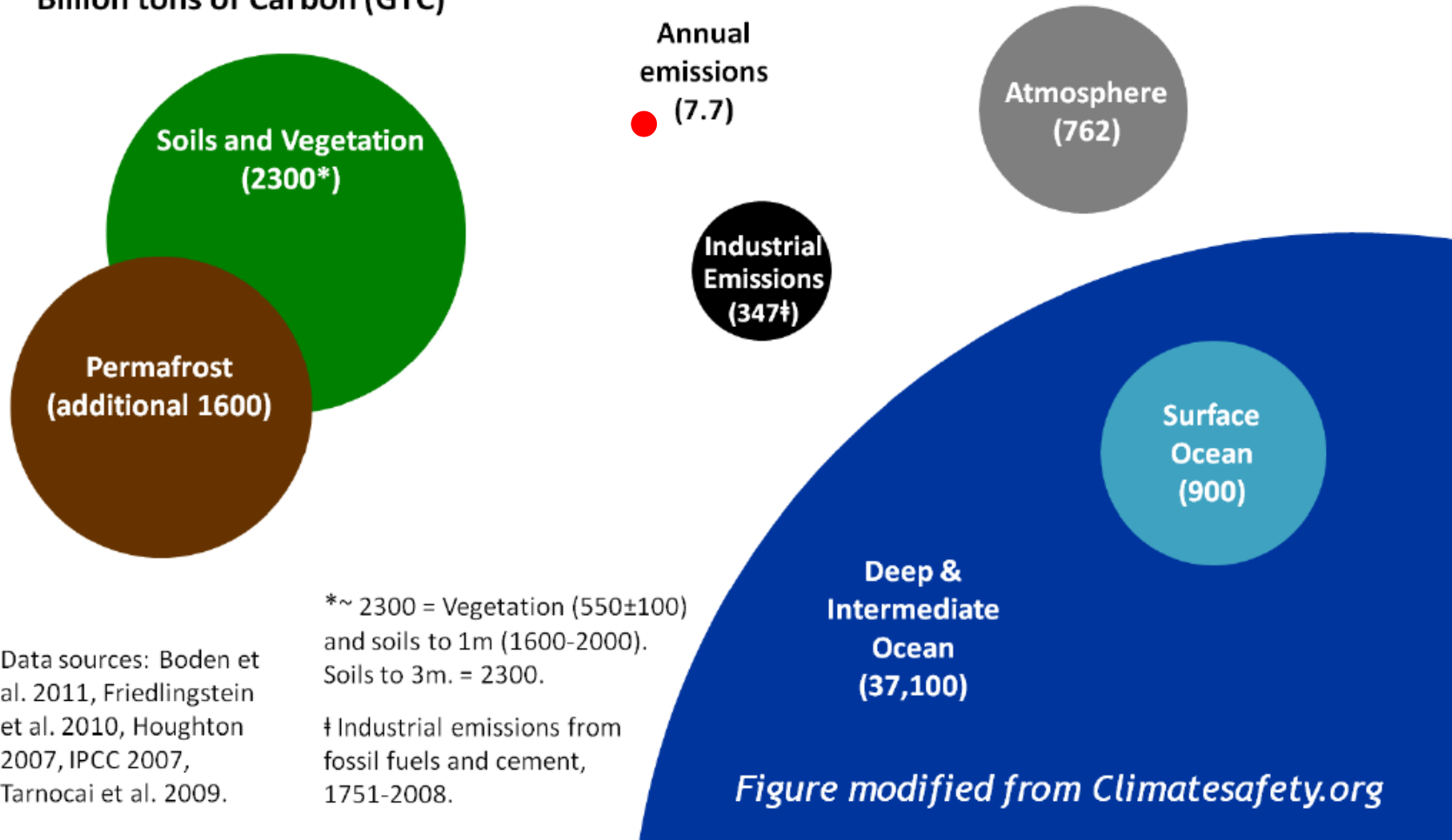
- ▶ [What is climate?](#)
- ▶ [What has caused the climate to change in the past?](#)
- ▶ [How do we know what climate was like in the past?](#)
- ▶ [How do human activities affect climate?](#)
- ▶ [What is the greenhouse effect and what are the major greenhouse gases?](#)
- ▶ [If climate varied naturally in the past, how do we know that humans are disrupting climate now?](#)
- ▶ [Is the rate of climate change greater now than the rate of natural climate change in the past?](#)
- ▶ [What are *albedo* and *feedback*, and how does the Earth's surface affect climate?](#)
- ▶ [What are examples of climate changes that have occurred over the past century?](#)
- ▶ [What do projections suggest for climate changes in the 21st century?](#)

[Printer-friendly version](#)



Climate Change and Sustainability

Billion tons of Carbon (GTC)



Data sources: Boden et al. 2011, Friedlingstein et al. 2010, Houghton 2007, IPCC 2007, Tarnocai et al. 2009.

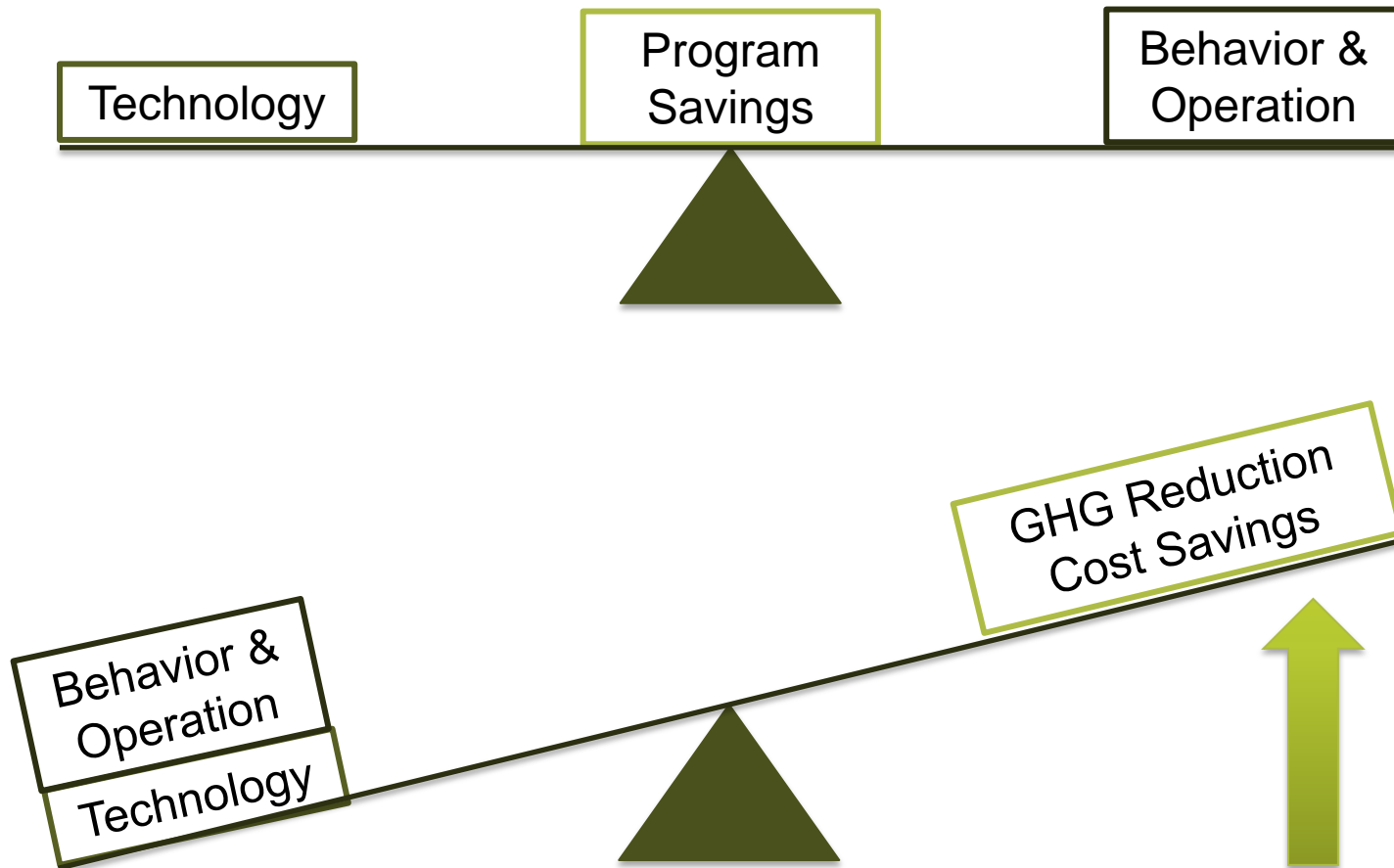
*~ 2300 = Vegetation (550±100) and soils to 1m (1600-2000). Soils to 3m. = 2300.

† Industrial emissions from fossil fuels and cement, 1751-2008.

Figure modified from Climatesafety.org



Engineering and Sustainability



Sustainable Operations Requirements: Decrease Our Footprint

Footprint Area	Federal Requirements <i>Executive Orders 13514 & 13423, Energy Independence and Security Act</i>
Energy	3% annual reduction (30% total) Increase renewables 7.5% annually
Fleet and Transportation	2% annual reduction of fuel consumption (20% total) 10% increase in non-petroleum fuel use
Green Purchasing	Purchase paper with the highest amount of post-consumer fiber practicable
Sustainability Leadership	Designate energy manager at every Unit.
Waste Prevention & Recycling	Divert 50% of construction and demolition materials and debris from disposal
Water	2% annual reduction (26% total)

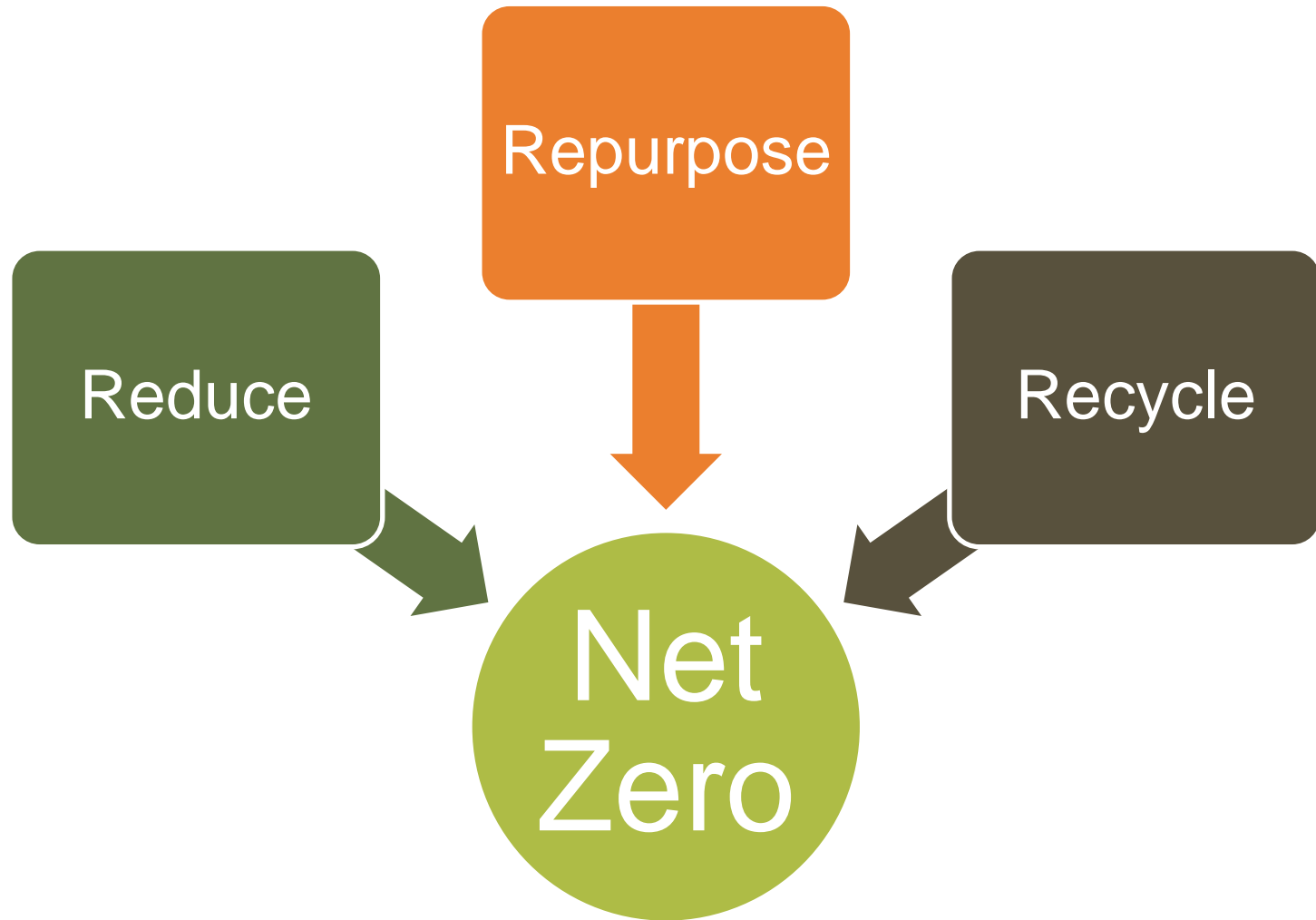


Sustainable Operations Goals: Increase Our Handprint

Footprint Area	SusOps Vision
Energy	<i>Strive Towards Net Zero Energy Consumption</i>
Fleet and Transportation	<i>Strive for Zero Emissions</i>
Green Purchasing	<i>Strive Toward Zero Environmental Footprint Impact Purchasing</i>
Sustainability Leadership	<i>Leave No Habit Unturned</i>
Waste Prevention & Recycling	<i>Strive Towards Zero Wasted</i>
Water	<i>Strive Towards Zero Watershed Impact</i>



Path to Net Zero



No-Idling Policy *(Behavior Change)*

White River National Forest

- Incorporate no-idling and vehicle check-in/checkout system.
- Increased average MPG from 14.6 to 16.8.
- Inspired regional level pilot.

\$26,910
savings



Power-IT-Down

➔ Initiative encourages employees to power down.

PID Phase 1 and 2 Results

Dec. 6, 2013 – Aug 18, 2014

kWh Savings:

Equivalent to CO₂ emissions from 38.3 homes' electricity use for one year.

403,844

Cost Savings

\$36,953



Units Participating

15% of Phase 1 and 2 Facilities



Energy Savings Performance Contract (Technology)

Region 1

- Addressed 500 facilities at 62 sites served by 19 different utility providers.

- 13-year contract.

\$250,000
savings

115 Programmable Thermostats

14 High Efficiency Pumps

13,255 Energy Efficient Light Bulbs & Fixtures

319 Vacancy Sensors

Blown-in Attic Insulation: **110** Facilities

Infiltration Reduction: **118** Facilities

Foundation Insulation: **24** Facilities



Smokey's Garden *(Technology)*

Smokey Bear Ranger District

- Implemented water-wise garden with community partners.
- Included rainwater harvesting system.

17.5%
reduction



Engineering as a Sustainability Leader



If not you, then who?

**Creating Habits Today,
Conserving Resources for Tomorrow**

