Collaborative Restoration Workshop
National Forest Foundation | April 2016

Science & Action | Restoration Under a Future Climate

Key Topics: Adaptive Management, Cross-Boundary Partnership

Speakers

- **Cynthia West,** Director of the Office of Sustainability and Climate Change, U.S. Forest Service
- **John Stanturf,** Senior Scientist, Southern Research Station, U.S. Forest Service
- **Matt Williamson**, Conservation Scientist, University of California-Davis

Overview

The panel discussed how information about the impact of climate change, and potential responses, can be shared with managers to support restoration decision-making.

Cynthia West – Understanding and Managing Climate Change Effects on Federal Land

The Office of Sustainability and Climate Change is working to increase the U.S. Forest Service's tools and capacity to respond to climate change through the Climate Change Scorecard, which scores

1. Organizational capacity (employee education, designated climate change coordinators, program guidance)
2. Engagement (science and management partnerships, other partnerships)
3. Adaptation (assessing vulnerability, identifying adaptation actions, monitoring)
4. Mitigation & sustainable consumption (carbon assessment and stewardship, sustainable operations)

At the forest level, important elements of this are **vulnerability assessments** (evaluation of the degree to which systems are susceptible to the effects of climate change, being conducted by national forests), followed by **adaptation** (adjustment to planning documents and management approaches to mitigate harm or exploit benefits of climate change). In other words, this is where the managers can take steps to build in resilience to change. Forest Service Research Stations and others have developed many resources and partnerships to support managers (see resources).

John Stanturf – Restoration under Climate Change

The key questions for managers are "When should I change from adapting to current conditions (which project the future from the past) to managing for adaptation to future conditions?" and "What if future conditions are radically different from the past, and from projections of the future?" Three strategies are helpful in answering these two questions: *incremental, anticipatory, and transformational adaptation*.

- *Incremental* adaptations are often characterized as "no regrets" approaches where the benefits are realized under current climatic conditions, as well as maybe adapting to future conditions. They involve extensions of current practices to respond to variations in climate and extreme events which could also reduce vulnerability or avoid loss under current conditions.
- *Anticipatory* approaches may use many of the same techniques as incremental approaches but with a greater emphasis on adaptation to future climate, thereby tolerating more ecological novelty. Management focused on resilient forests under future climate conditions aims to maintain ecological function and capacity for change, rather than specific species composition or habitat conditions for particular animals.

- *Transformational* approaches anticipate larger shifts in climate requiring significant changes to management and management in the longer term. Transformational adaptation arises spontaneously as novel ecosystems emerge or it may be intentionally planned.

	Strategies for Adapting to Climate Change		
Features	**Incremental**	**Anticipatory**	**Transformational**
Vulnerability Target	Reduce vulnerability to current stressors	Reduce vulnerability to current and future stressors	Reduce vulnerability to current and future stressors
Restoration Paradigm	Ecological restoration: historic fidelity	Functional restoration	Intervention ecology
Species	Native	Native, or exotic with functional equivalencies	Native, exotic, or designer species
Genetics	Local sources, natural evolution	Conventional breeding or biotechnology for clones or provenances with adaptive traits	Transgenic for keystone species, cloning extinct species
Invasive Species	Prevent or remove	Accept those that are functional analogs to extirpated natives	Accept as novel
Novel Ecosystems	Prevent or avoid	Accept and manage neo-native (emergent) assemblages	Manage novel and emergent ecosystems (exotics dominate)

Matt Williamson – Opportunities and Obstacles for Incorporating Climate Information into Forest Restoration

The John Muir Institute of the Environment, in a partnership with others, have studied where managers access information about climate change through a large-scale survey of people in the National Park Service, Forest Service, and U.S. Fish & Wildlife Service. The research found it is challenging for people to integrate climate change data into their decision-making due to "information overload." The many online portals and other sources of data often aren't used to their potential because people prefer to get information through "consultation with experts." Who those experts are, however, isn't known, although indications are that most people look within their own organizations for expert advice. Climate change information is usually relevant to forest restoration projects, but only about half of projects use it. People list a variety of reasons why they don't use it, and there is no clear answer. Matt discussed the importance of collaborative groups in providing access to a broader suite of expertise and capacity; providing context to ensure credibility and utility; and altering the sociopolitical context for decision-making.

Lessons

- When gathering data, be sure to identify questions first before gathering data or spending money on technology.

Resources

- Intermountain Adaptation Partners
- Northern Institute of Applied Climate Science
- USDA Climate Hubs