Introducing the Adaptation Workbook

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www.forestadaptation.org

Northern Institute of Applied Climate Science

Climate

Carbon

Provides **practical** information, resources, and technical assistance related to forests and climate change.

Regional multi-institutional partnership among:

FOREST SERVICE U.S. DEPARTMENT OF AGRICULTURE

1885 Michigan Technological University

THE TRUST FOR PUBLIC LAND

Great Lakes Indian Fish & Wildlife Commission

AMERICAN FORESTS

The UNIVERSITY of VERMONT

College of Food, Agricultural and Natural Resource Sciences
UNIVERSITY OF MINNESOTA

ncasi

Responding to Climate Change

There isn't a single answer

Each decision is unique and will vary based upon:

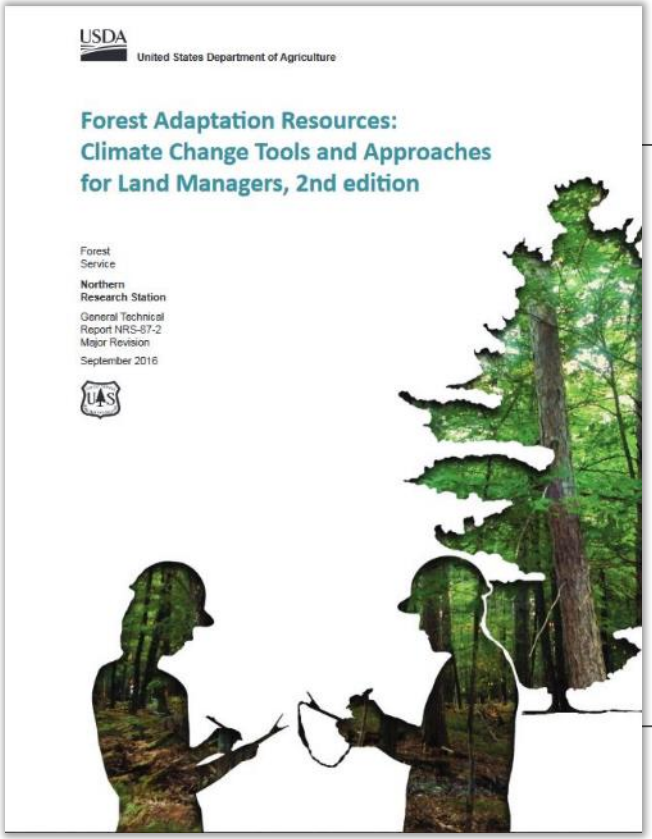
Place: Location & Site Conditions

Purpose: Goals & Objectives

People: Values, Culture, & Resources

Practices: Equipment, Procedures, & Methods

Forest Adaptation Resources

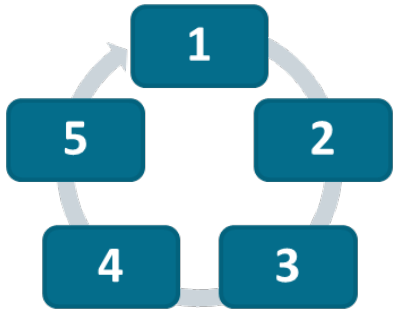


Strategies & Approaches

Menu of adaptation actions

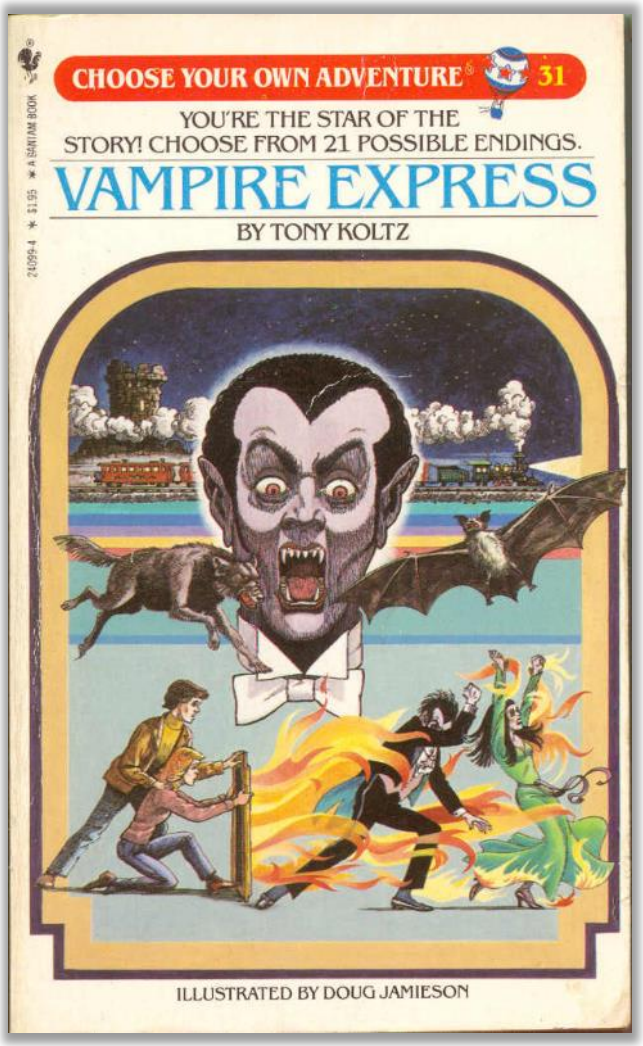
Adaptation Workbook

- Structured process to integrate climate change considerations into management
- Workbook approach



Swanston et al. 2016;
www.nrs.fs.fed.us/pubs/52760

Translating ideas to actions



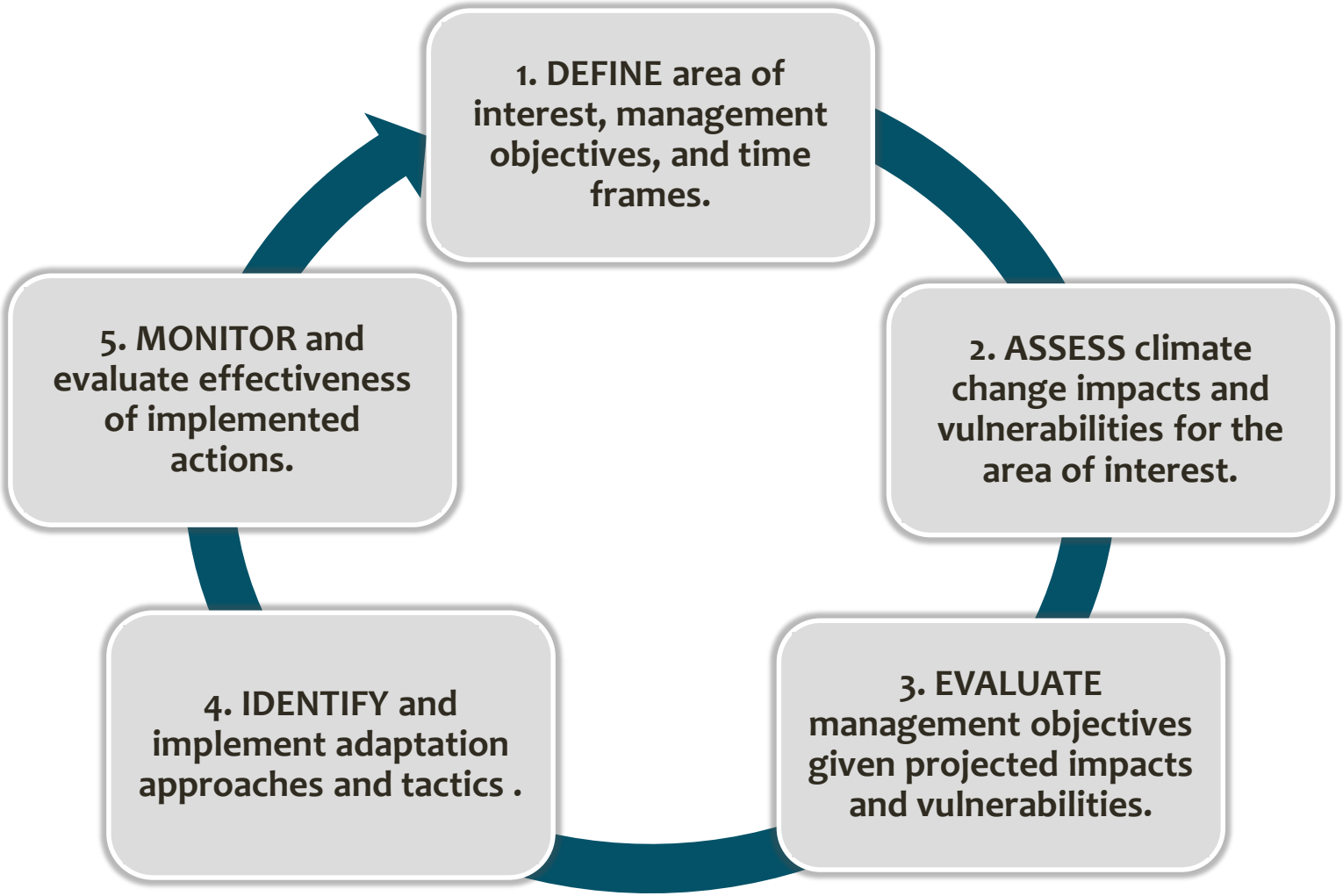
What actions can be taken to

help a system to cope with change

and

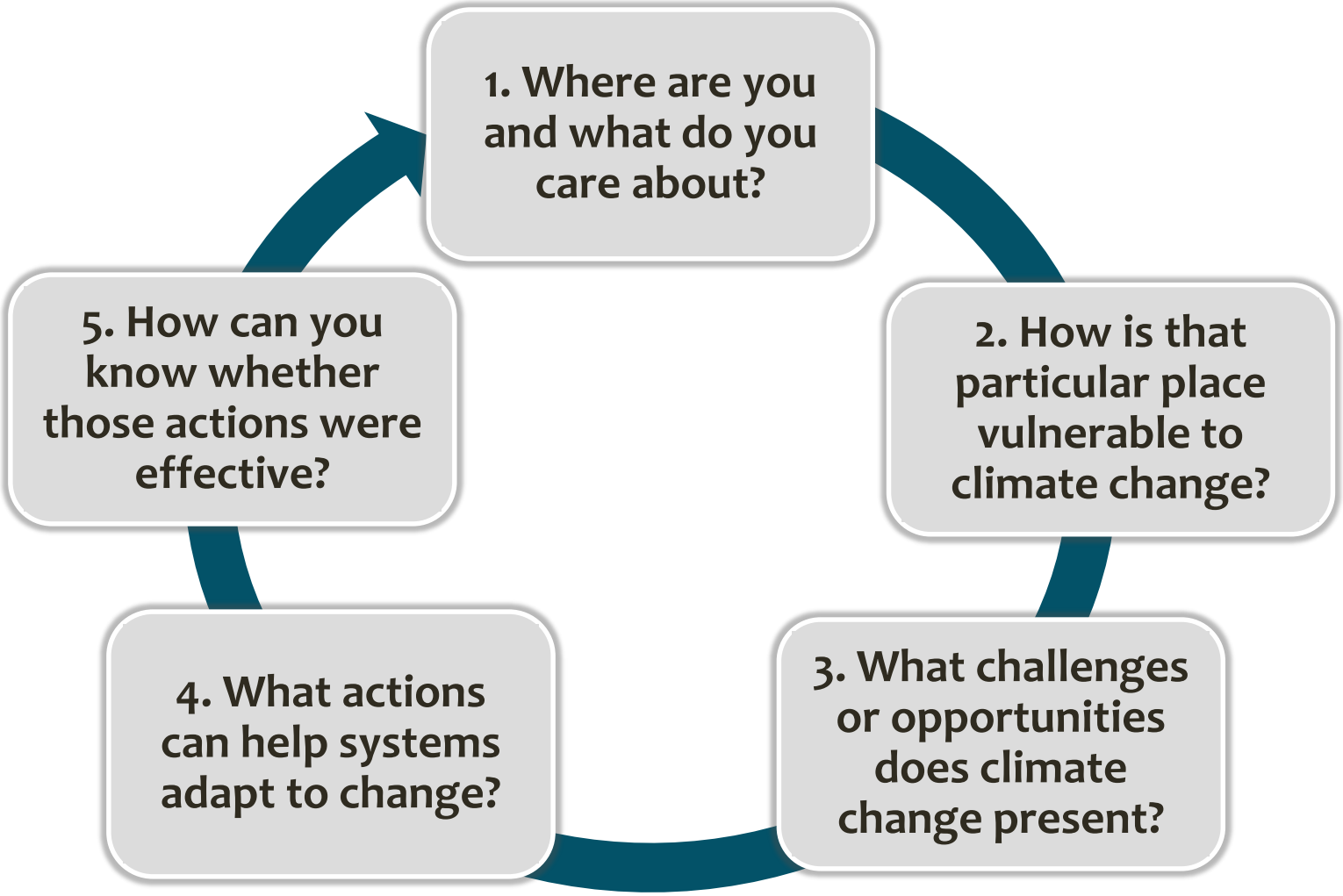
meet management goals and objectives?

Adaptation Process



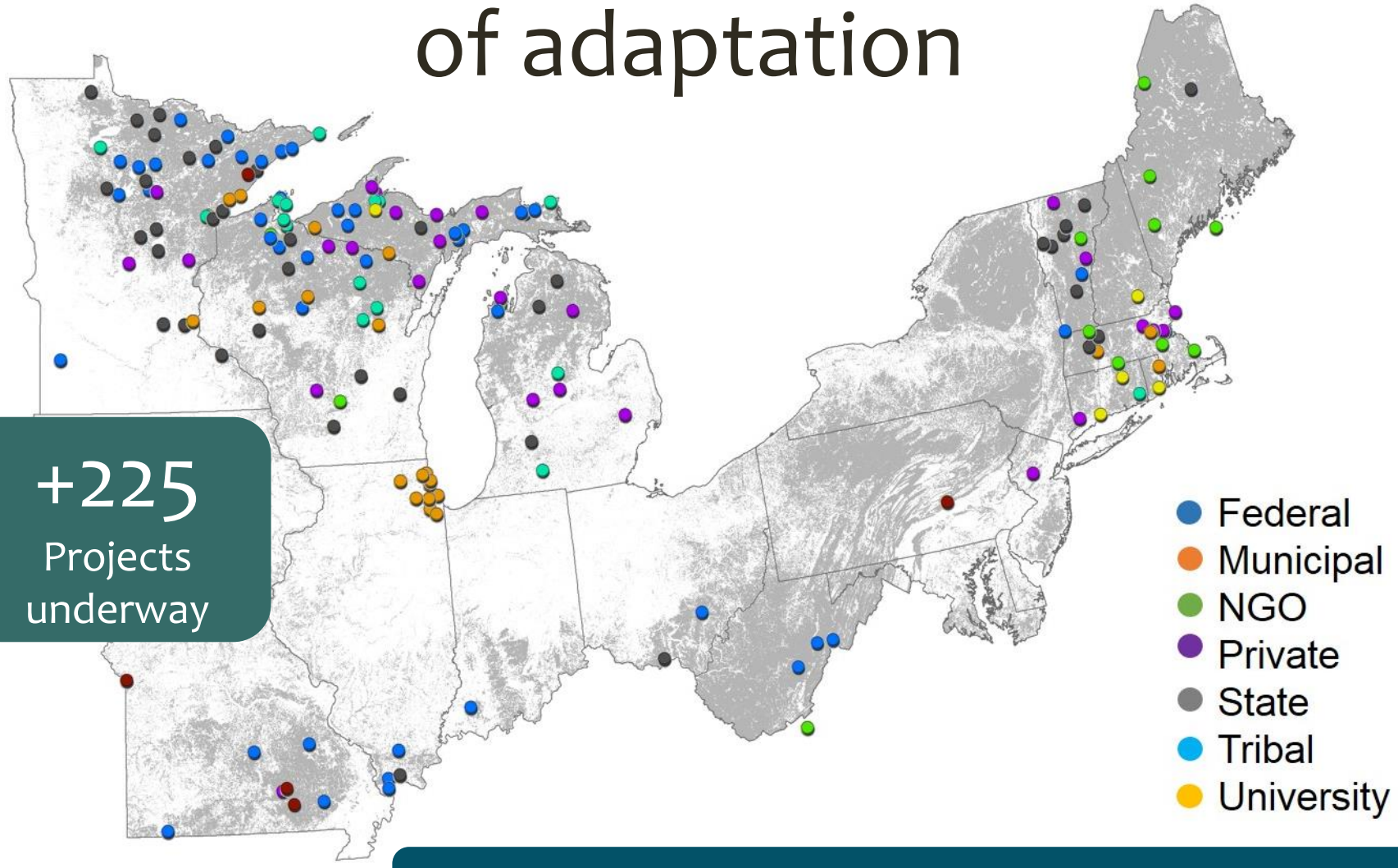
Swanston et al. 2016; www.nrs.fs.fed.us/pubs/52760

Adaptation Process: Deciphered



Swanston et al. 2016; www.nrs.fs.fed.us/pubs/52760

Develop local examples of adaptation



Forestadaptation.org/demos

Format

Adaptation Workbook: "Turbo" version

- For each step:
  - Example (Forests, WI)
  - Thinking/discussion (choose your own adventure)
- Use handout to follow along

1. Where are you and what do you care about?

Forest Example: Spruce Grouse Habitat

1. Where are you and what do you care about?

The Chequamegon Nicolet National Forest

- Lowland conifer complexes or adjacent
- Stands that are of sufficient size

Goals & Objectives:

Maintain and improve habitat for spruce grouse

1. Maintain current habitat where it exists
2. Create new habitat for spruce grouse as opportunities arise

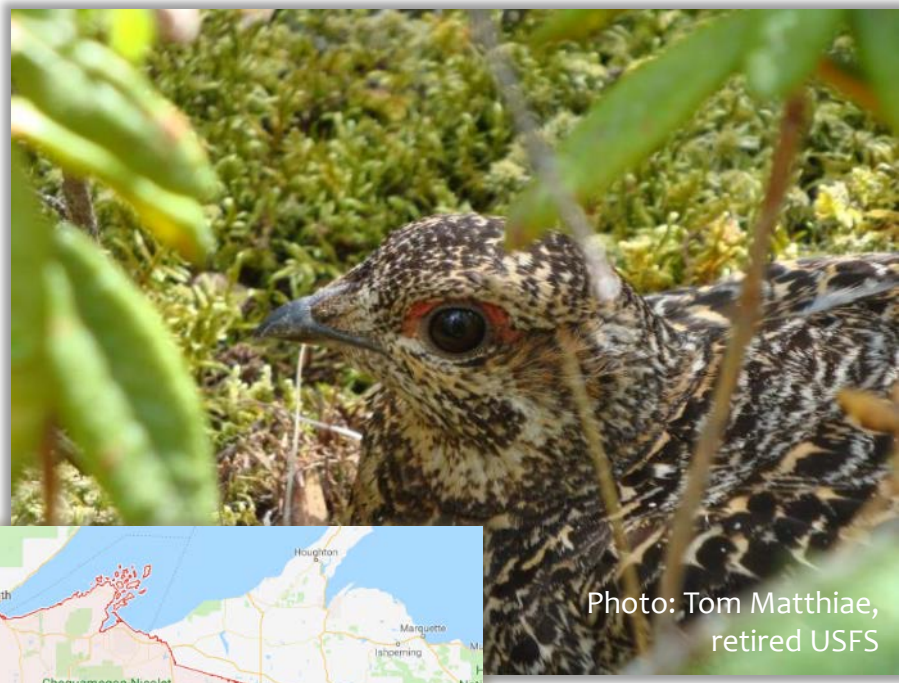
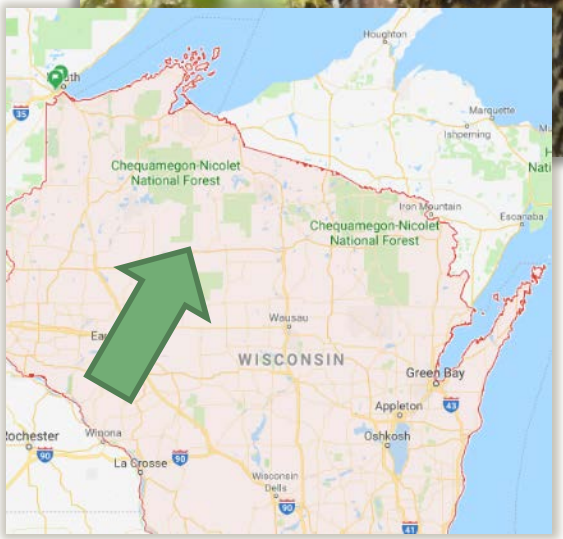


Photo: Tom Matthiae, retired USFS



Location is important:

"400 acres of county owned forest dominated by scrub oak, salvaged after drought; Florence County, WI."

"Headwaters of Ranch Creek. Dixie National Forest; Garfield County, UT."

1. Where are you and what do you care about?

- Grab 1-2 neighbors
- Select a location and 1 main management goal & objective

Your Example:

Sample Goals & Objectives:

GOAL: Sustainably produce high-quality wood fiber from a variety of native trees.

- Encourage valued tree species (x,y,z) at all management stages.

Sample Goals & Objectives:

GOAL: Maintain and improve existing habitat for populations of cutthroat trout.

- Improve in-stream connectivity
- Maintain and create cool-water refugia

2. How is this particular place vulnerable to climate change?

Forest Example: Spruce Grouse Habitat

2. How is this particular place vulnerable to climate change?

Altered precipitation & drier conditions

- Lowland conifers may receive less runoff during the growing season.
- Increased likelihood of peatland fire – extensive due to low road density.

Projected declines in many common northern species

- Many species on the CNNF are projected to have reduced habitat suitability, including black spruce, balsam fir, and tamarack.

2. How is this particular place vulnerable to climate change?

Take a few minutes to reflect with your group

3. What challenges or opportunities does climate change present?

Forest Example: Spruce Grouse Habitat

3. What challenges or opportunities does climate change present?

Challenges

- Decreased regeneration of species important for spruce grouse habitat is likely – e.g. black spruce, balsam fir.
- Reduced and fluctuating water levels could result in trees that a have morphology less suitable for spruce grouse.
- Encroachment of non-preferred tree species could make stands less suitable for spruce grouse.

Forest Example: Spruce Grouse Habitat

3. What challenges or opportunities does climate change present?

Challenges

- Decreased regeneration of black spruce and balsam fir is likely.
- Reduced and fluctuating water levels could result in trees that a have morphology less suitable for spruce grouse.
- Encroachment of non-preferred tree species could make stands less suitable for spruce grouse.

Opportunities

- Drier conditions could affect open bog/peatland systems, making them more suitable to spruce grouse.
- Lowland conifer systems could gradually become suitable for other short-needled conifers, like jack pine.

Forest Example: Spruce Grouse Habitat

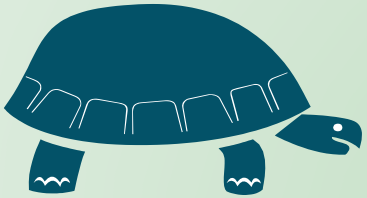
3. What challenges or opportunities does climate change present?

Objectives	Feasibility
1. Maintain current habitat where it exists	• *High (Short-term)* • *Low/Extremely low (Long-term)*
2. Create new habitat for spruce grouse as opportunities arise	• *High*

3. What challenges or opportunities does climate change present?

Share one big challenge and one big opportunity.

3. What challenges or opportunities does climate change present?

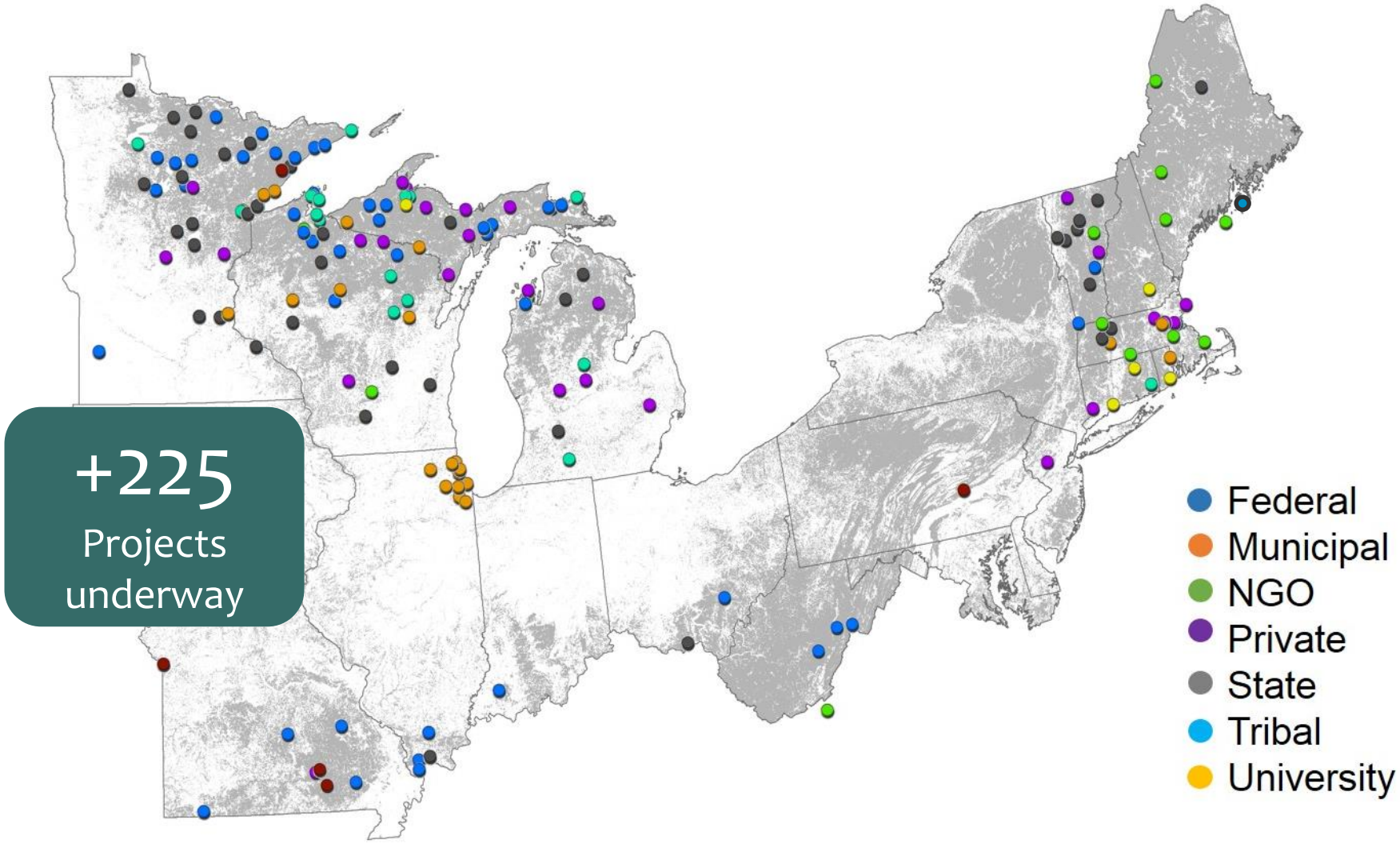


Slow down!

Are you going to continue with these management objectives?

4. What actions can help systems adapt to change?

What adaptation looks like:



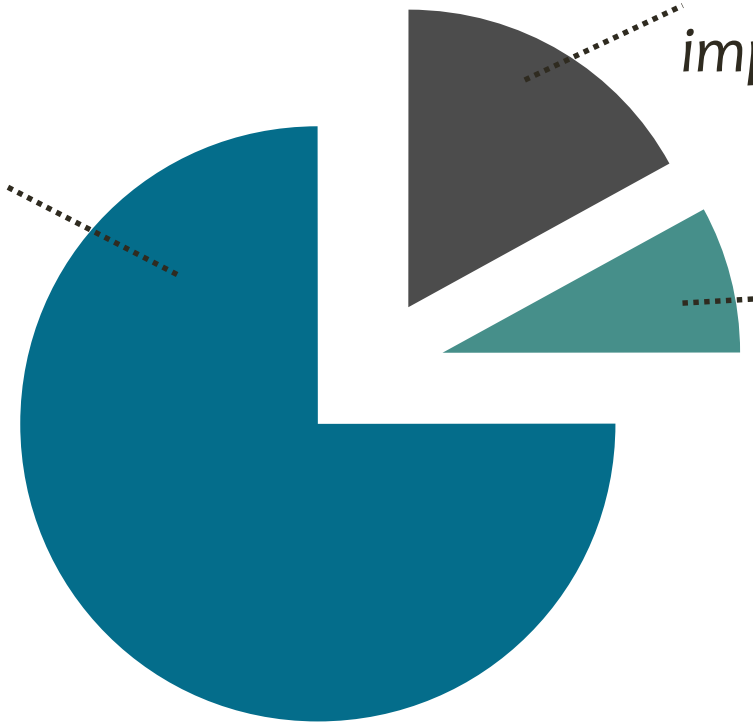
www.forestadaptation.org/demos

What adaptation looks like:

Small "tweaks" *that improve effectiveness*

Same actions– *climate change just makes them that much more important*

New & different *actions to consider, even some that may seem* ***wild & crazy***



**individual results will vary*

Forest Example: Spruce Grouse Habitat

4. What actions can help systems adapt to change?

Adaptation Approach	Tactics
1.2 - Maintain or restore hydrology.	• Manage flow at roads or other control points that affect hydrology for spruce grouse peatland complexes.
4.2 - Prioritize and maintain sensitive or at-risk species.	• Conduct assessment to identify and rank Spruce Grouse Habitat Complexes (high, medium, low).

Already doing/ small tweaks

Forest Example: Spruce Grouse Habitat

4. What actions can help systems adapt to change?

Adaptation Approach	Tactics
1.2 - Maintain or restore hydrology.	• Manage flow at roads or other control points that affect hydrology for spruce grouse peatland complexes.
4.2 - Prioritize and maintain sensitive or at-risk species.	• Conduct assessment to identify and rank Spruce Grouse Habitat Complexes (high, medium, low).
1.2 - Maintain or restore hydrology.	• Artificially supply or drain water in high priority sites.
7.2 - Create habitat corridors through reforestation or restoration.	• Connect large lowland conifer peatland complexes with suitable upland habitat; e.g. convert key stands to short-needled conifer types.

Already doing/ small tweaks

New & Different

4. What actions can help systems adapt to change?

Discuss current actions, small tweaks, and WILD & CRAZY ideas.

5. How can you know whether those actions were effective?

Forest Example: Spruce Grouse Habitat

5. How can you know whether those actions were effective?

Actions	Monitoring items
1.2 - Maintain or restore hydrology.	▪ Pre/Post hydrological surveys (after road decommissioning, culvert replacement, etc.)
7.2 - Create habitat corridors through reforestation or restoration.	▪ Establishment of short-needled conifers in key stands. ▪ Occurrence of spruce grouse in key stands.

5. How can you know whether those actions were effective?

Share 1 idea.

Nice Work!

Photo: Tom Matthiae, retired USFS

A few final thoughts…

Accept uncertainty.

Use new information & ideas.

Take action, focusing on win-wins.

Be creative & flexible.

Work and learn with others.

Thank You

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Climate and Forest Plan Revision

Intermountain Region – Climate Assessment Workshop

May 22, 2018

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Assistant Forest Plan Revision Team Lead

Manti-La Sal National Forest – USDA Forest Service

Purpose

- Provide an overview of the Forest Plan Revision process and how it relates to the IAP / R4 Climate Assessment effort.

- Provide some examples and lessons learned from current Plan Revision Efforts.

Overview

- Plan Revision – What is it and Why?
- Understanding the Plan Revision Process
- Plan Revision and IAP / R4 Climate Assessment
- Climate and Drafting A Revised Plan
- Developing a Monitoring Plan
- Climate Variables, Models, and Maps
- Plan Revision and Climate Lessons Learned
- Weblinks & Additional Resources

Plan Revision – What is it and Why?

Plan Revision – What is it and Why?

- National Forest Management Act
  - Require a Land and Resource Management Plans
  - Updated every 15-years
- R4 Forest Plans
  - Many over 30-years
- Intermountain Region Plan Revisions In Process
  - ✓ Ashley National Forest
  - ✓ Manti-La Sal National Forest
  - ✓ Salmon-Challis National Forest
  - ✓ *More to Come*….

Plan Revision – What is it and Why?

- 4-year Timeline for Plan Revision Efforts
- Provides opportunity to developing tiering opportunities for project-level NEPA
- Current Planning Rule (36 CFR 219)
  - Published April 9, 2012
  - Amended Dec. 12, 2016
  - Provides policy for Forest Plan Revision Process

*"…**climate** change is already altering our Nation's forests in significant ways and those alterations are very likely to accelerate in the future, in some cases dramatically. These alterations present significant challenges to sustainable management of these forests. **Decisions being made today by policymakers and resource managers will have implications through the next century**."*[1]

–Forest Service Chief
(Nov. 2009)

[1] *Statement of Tom Tidwell Chief of the Forest Service US Department of Agriculture before the Subcommittee on Public Lands and Forests Committee on Energy and Natural Resources, United States Senate on Nov. 18, 2009*

Understanding the Plan Revision Process

Understanding the Plan Revision Process

Current Planning Rule Includes Climate-specific Requirements:

- ✓ §219.5 Planning Framework
- ✓ § 219.6 Assessment
- ✓ §219.8 Sustainability
- ✓ §219.10 Multiple Use
- ✓ §219.12 Monitoring

Plan Revision Process Framework

Three Phase Iterative Process

1) Assessment **(pre-NEPA)**
2) Plan Development / **Plan Revision** / Plan Amendment **(NEPA)**
3) Monitoring **(Adaptive Management)**

§ 219.5 Planning framework

"(a) …These three phases of the framework are complementary and may overlap. **The intent of this framework is to create** a **responsive planning process that informs integrated resource management and allows the Forest Service to adapt to changing conditions, including climate change, and improve management based on new information and monitoring. "** *

(**all emphasis added*)

The Forest Plan Revision Process: Manti-La Sal National Forest

YEAR 1
PHASE 1: Where the Forest has been (Spring 2016 - Spring 2017)

START

Internal Pre-Planning Tasks - Setting the Foundation

- Orient the planning team with the Forest and previous Forest Plan revision efforts
- Set up framework for the Planning Team *(file structure, webpage, roles/responsibilities, etc.)*
- Read lessons learned and examples from other forests
- Designate core and extended Interdisciplinary Team (IDT) members
- Identify roles/responsibilities of the RO staff

Develop Working Agreements with Other Agencies

- Identify specific agencies that can contribute to the planning process
- Set up agreements to share information and resources
- Provide clear roles and responsibilities of other agencies

Agency Outreach*

Internal / External Engagement and Outreach

- Review timeline and steps with the Forest
- Establish Plan Revision as a priority on the Forest
- Initial overview of full Planning Process with steps and timeline to public and agencies

Public and Agency Outreach*

Initiation of Assessment

- Publish announcement in the Federal Register (NOI)

Public and Agency Outreach*

Assessment

- Explain how the Forest is used and how it has changed
- Report on current state of the Forest (based on internal and external input)
- Review land-use plans from tribes, federal, state, local governments
- Send Draft Assessment report to public for review

Public and Agency Outreach*

15 Assessment Components *(36 CFR 219.6)*

Wilderness Inventory and Wild/Scenic River Evaluation

- This step occurs independently but informs the Assessment
- Identify any suitability changes in Wilderness areas
- Validate existing eligibility analysis for Wild and Scenic Rivers

Public and Agency Outreach*

Preliminary Need For Change

- Identify specific components from the old Forest Plan that need to change based on the Assessment report

Public and Agency Outreach*

Phase 2

Initiation of NEPA

- NOI – availability of final assessment report and scoping on preliminary need for change (60 days)
- Finalize need for change and identification of issues

Public and Agency Outreach*

Draft Forest Plan

- Develop new plan components
- Develop draft monitoring plan

Public and Agency Outreach*

Draft Alternatives

- Develop alternatives based on issues from scoping not yet addressed

Analyze Effects of Alternatives

- Specialists document the environmental impact of Forest Plan components by alternative

Draft EIS (DEIS)

- Summarize impacts of the draft plan and alternatives in DEIS
- 90-day comment period
- Publish in the Federal Register (NOA)

Public and Agency Outreach*

Final EIS (FEIS) and Forest Plan

- Apply any updates from the 90-day comment period on the DEIS and Draft Forest Plan
- Make available for objection prior to a decision
- Publish announcement of FEIS, Final Forest Plan and Draft Record of Decision (ROD) in the Federal Register

NEPA PROCESS

Objection Period

- 60-day pre-decisional objection period for those who submitted substantive comments during official comment periods
- Publish in the Federal Register (NOI)

Public and Agency Outreach*

Resolve Objections

- 90-day period for the Regional Forester to review objections
- Forest participates in developing resolutions

Record of Decision (ROD)

- Official decision on the FEIS and Final Forest Plan
- Publish in the Federal Register of the Final Forest Plan and Final ROD (NOA)

Public and Agency Outreach*

Phase 3

END

YEARS 2-4
PHASE 2: Plan Revision (Spring 2017 - 2020)

YEARS 4+
PHASE 3: Monitoring (2020+)

Implement Forest Plan

- Newly revised Forest Plan replaces the old Forest Plan
- Monitoring initiated in support of the new Forest Plan
- Implementation will focus on adaptive management as identified in the Forest Plan

Version 4 (September 2016)

*Points in the Revision process where we will be outreaching to the public and agencies. These outreach efforts may include public meetings, workshops, newsletters, etc.

Plan Revision and the IAP / R4 Climate Assessment

Plan Revision and the IAP / R4 Climate Assessment

Phase 1 - § 219.6 Assessment

- ”… An assessment must be completed for the development of a new plan or for a plan revision…”
- The purpose of the Assessment is to provide snapshot of existing conditions, trends, identify available data resources as well as data gaps.
- 15 Required Topics / Resource Areas

Assessment Topics / Resource Areas

IAP Chapters / Resource Areas

	Assessment Topic (36 CFR § 219.6)	Associated Resource Areas
Ecological Sustainability and Diversity	1. Terrestrial ecosystems, aquatic ecosystems, and watersheds	Wildlife/aquatics, range, vegetation, hydrology, soils, fuels, timber/silviculture
	2. Air, soil, and water resources and quality	Air, soils, hydrology, wildlife/aquatics, range, vegetation, fuels, timber/silviculture
	3. System drivers, including dominant ecological processes, disturbance regimes, and stressors, such as natural succession, wildland fire, invasive species, and climate change, and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change	Air, soils, hydrology, wildlife/aquatics, range, vegetation, fuels,
	4. Baseline assessment of carbon stocks	
	5. Threatened, endangered, proposed and candidate species, and potential species of conservation concern present in the plan area	
	6. Social, cultural, and economic conditions	

	Assessment Topic (36 CFR § 219.6)	Associated Resource Areas
Social/Economic Sustainability and Multiple Uses	7. Benefits people obtain from the NFS planning area (ecosystem services)	Social/economics, recreation/scenery, cultural/heritage, engineering, minerals, range, timber/silviculture, wildlife/aquatics, fuels
	8. Multiple uses and their contributions to local, regional, and national economies	Social/economics, recreation/scenery (refer to #9), range, timber/silviculture, hydrology, wildlife/aquatics, vegetation, engineering,
	9. Recreation settings, opportunities and access, and scenic character	Recreation/scenery, social/economic, cultural/heritage, engineering
	10. Renewable and nonrenewable energy and mineral resources	Minerals/geology, social/economics
	11. Infrastructure (recreational facilities and transportation and utility corridors)	Engineering, social/economics
	12. Areas of tribal importance	Cultural/heritage, social/economics
	13. Cultural and historic resources and uses	Cultural/heritage, social/economics
	14. Land status and ownership, use, and access patterns	Lands, engineering
	15. Existing designated areas located in the plan area including wilderness and wild and scenic rivers and potential need and opportunity for additional designated areas	Recreation/scenery, lands

Drivers and Stressors

Phase 1: Assessment and **Phase 2:** Plan Revision

Drivers: dominant ecological processes that shape the ecosystem – natural disturbance regimes; predominant climatic regimes; broadscale system drivers; natural vegetation succession.

Stressors: factors that may directly or indirectly degrade or impair ecosystem composition, structure, or ecological processes in a manner that may impair ecological integrity.

Climate Related Content Requirements

Phase 1: Assessment
§ 219.6(b)(3): Content of the Assessment

Phase 2: Plan Revision
§219.8(a)(1)(iv): Sustainability
§219.10(a)(8): Multiple Use

"System drivers, including dominant ecological processes, disturbance regimes, and stressors, such as natural succession, wildland fire, invasive species, and ***climate change; and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change***"*

(**all emphasis added*)

Drivers – Climate

Stressors – Changes in Climatic Variables

IMPACTS

Influence

TRENDS

Resource Areas (Assessment / IAP)

- Terrestrial and Aquatic Ecosystems, & Watersheds
- Air, soil, and water resources and quality
- Carbon Stocks
- At-Risk Species (SCC & TES)*
- Social, Cultural & Economic
- Ecosystem services
- Multiple Uses & Contributions to Local, Regional, &National Economies
- Recreation and Scenic Character
- Renewable and Nonrenewable Energy & Minerals
- Infrastructure (Rec Facilities, Roads, Utilities)
- Areas of Tribal Importance (Cultural and Historical)
- Land status/Ownership, Use, and Access Patterns
- Designated Areas (Wilder

Spatial

- IAP Subregion
- National Forest
- Project Area

Concurrent Processes

Drivers and Stressors

There are two basic considerations for evaluating climate change:

1) How climate change is likely to modify conditions on the planning unit?

2) How management of the planning unit may influence levels of global greenhouse gases, carbon stocks and thus climate change?

Climate and Drafting a Revised Plan

Drafting a Revised Plan

- NEPA
- Public Participation
- Ecosystem Approach
- Best Available Scientific Information (BASI)

Ecosystem Approach

Climate Impacts

(1) At-Risk Species →

(2) Ecosystems/Communities →

(3) Plan Components→

(4) Indicators/Monitoring

Revised Plan Content/Elements

- Purpose and Need
- Distinctive Roles and Contributions
- Geographic and Management Areas
- Plan Components
  - Desired Conditions
  - Objectives
  - Standards
  - Guides
  - Goals (optional)

Revised Plan Content/Elements

- Management Strategy
- Timber Suitability
- Multiple Uses
- Alternatives
- Affected Environment

Climate and Revised Plan Development

- Climate change information should be integrated in appropriate sections of the plan, the Environmental impact statement (EIS) and the planning record.

- The **affected environment** section of the EIS is a good place for a basic description of the influence of climate change on the planning unit.

Climate and Revised Plan Development

- Most of the focus of the evaluation for plan revision will be to understand how climate change is affecting the planning unit to determine what parts of the plan need to be changed to maintain the commitment to sustainability.

- The evaluation should also include some discussion of how management of the planning unit may influence climate change.

Content Should Address

- Identify assumptions, limitations, and uncertainty for any data/models used.
- Identify risks and vulnerabilities within the planning unit.
- Discussions of ecological adaptations likely on the planning unit.
- Discussions of how management of the unit can also adapt.
- Focus on expected climate change factors that are most likely to influence the decisions of the plan such as goals and desired conditions, and convey how (or why) they could be affected.

Content Should Address

- Identify current conditions may be difficult to maintain in the future.
- Recognized in the evaluation of the habitat requirements for some species.
- Identify potential risks that may lead to ‘undesirable conditions’ from climate change.
- Identify ecosystems that are most at risk due to climate change.
- Provide analysis at the appropriate **scale** using the best climate change information available.

Developing a Monitoring Plan

Drivers and Stressors

Phase 1: Assessment and **Phase 2:** Plan Revision

Drivers: dominant ecological processes that shape the ecosystem – natural disturbance regimes; predominant climatic regimes; broadscale system drivers; natural vegetation succession.

Stressors: factors that may directly or indirectly degrade or impair ecosystem composition, structure, or ecological processes in a manner that may impair ecological integrity.

Phase 3: Monitoring

Indicators: quantitative or qualitative variables that can be monitored or described, and when observed periodically, show trends.

Climate Related Content Requirements

Phase 3: Monitoring

§ 219.12(a)(1)(vi): Plan Monitoring Program

"***Measurable changes*** on the plan area ***related to climate change*** and other stressors that may be affecting the plan area."*

(**all emphasis added*)

Developing Monitoring Content

- Develop a monitoring program for the revised plan with an awareness of climate.

- Rely on regional scale and other cooperative monitoring to develop basic information specifically about climate change.

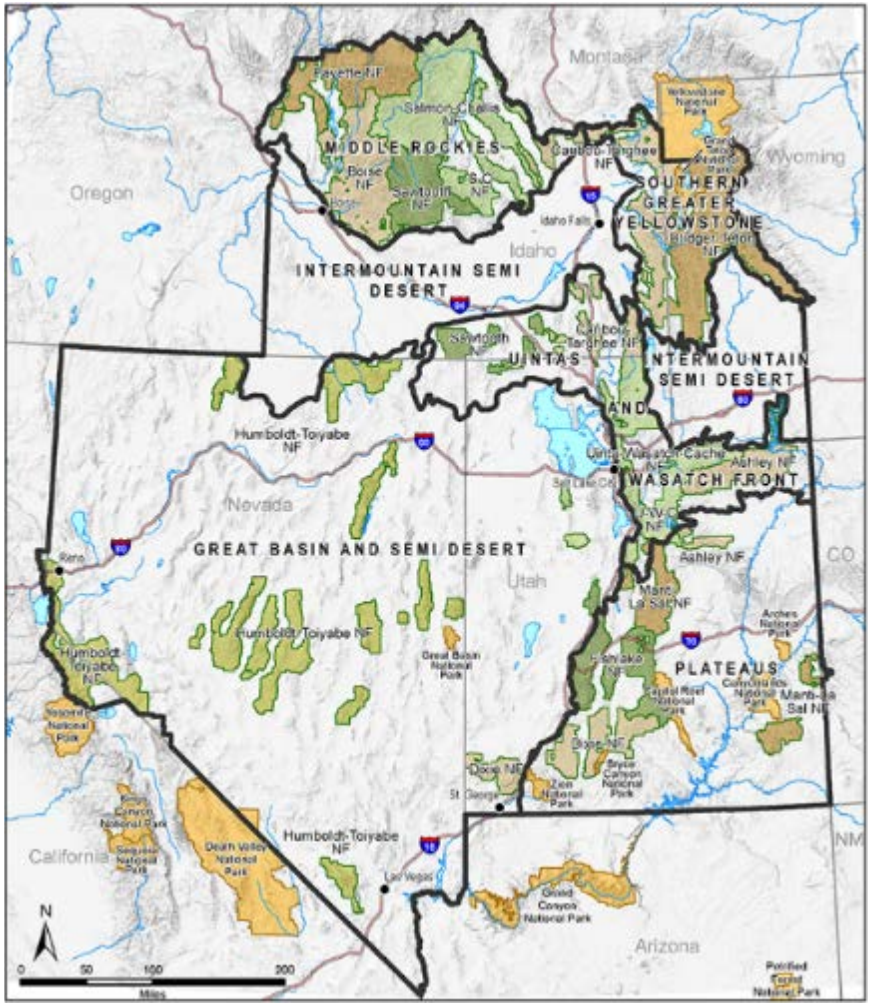
Climate Variables, Models and Maps

Scale:

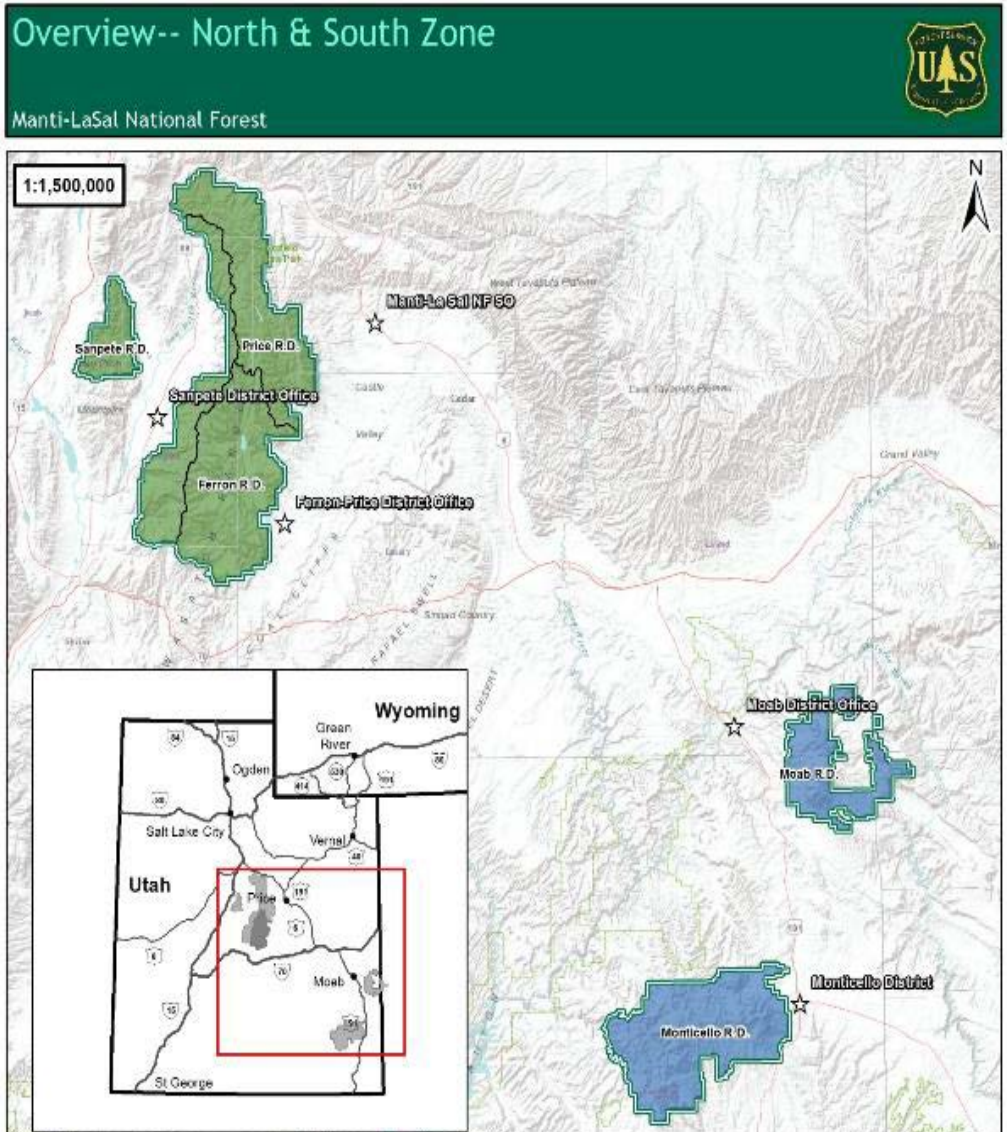
1. IAP / R4 Climate Assessment Subregions

2. Planning Area

IAP / R4 Climate Assessment Subregions



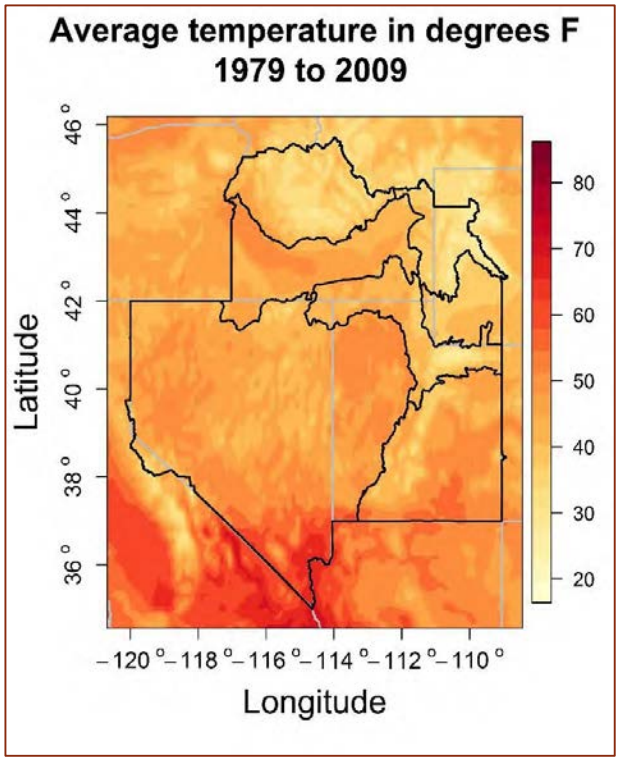
Planning Area

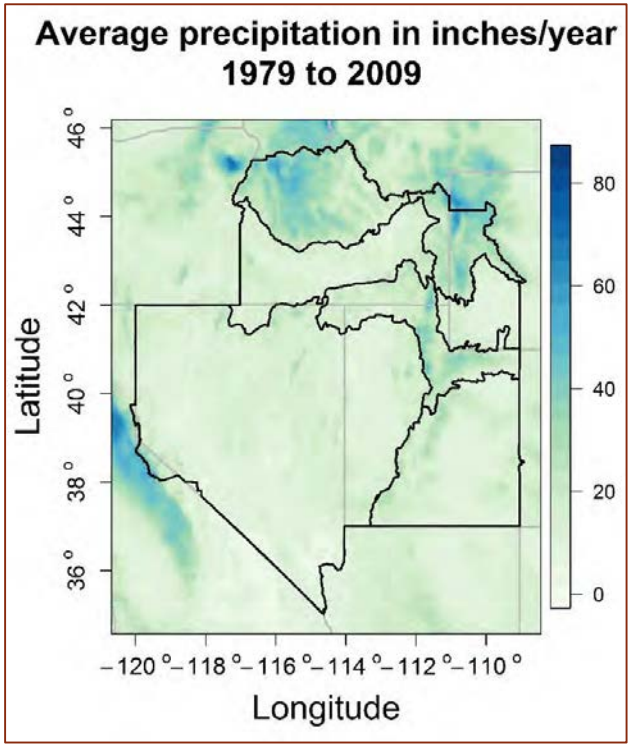


IAP / R4 Climate Assessment
Climate Map Variables – Charlie Luce

Precipitation ✓ Historical ✓ Absolute Change ✓ Percent Change	**Snow Residence Time** ✓ Historical ✓ Absolute Change ✓ Percent Change ✓ Future
Snow Weight Equivalent ✓ Historical ✓ Absolute Change ✓ Percent Change ✓ Future	**Temperature** ✓ Historical ✓ Absolute Change ✓ Percent Change

IAP Area – Temperature / Precipitation

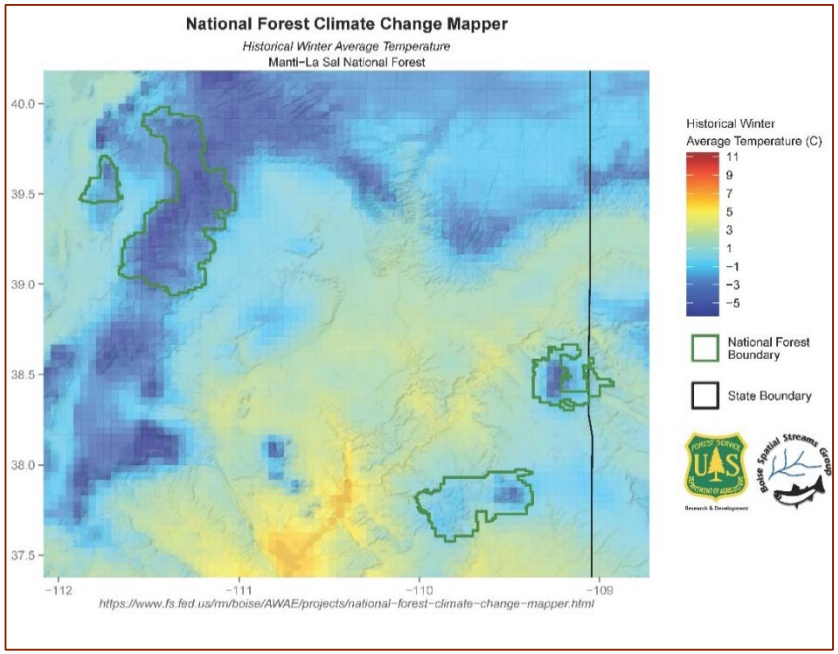


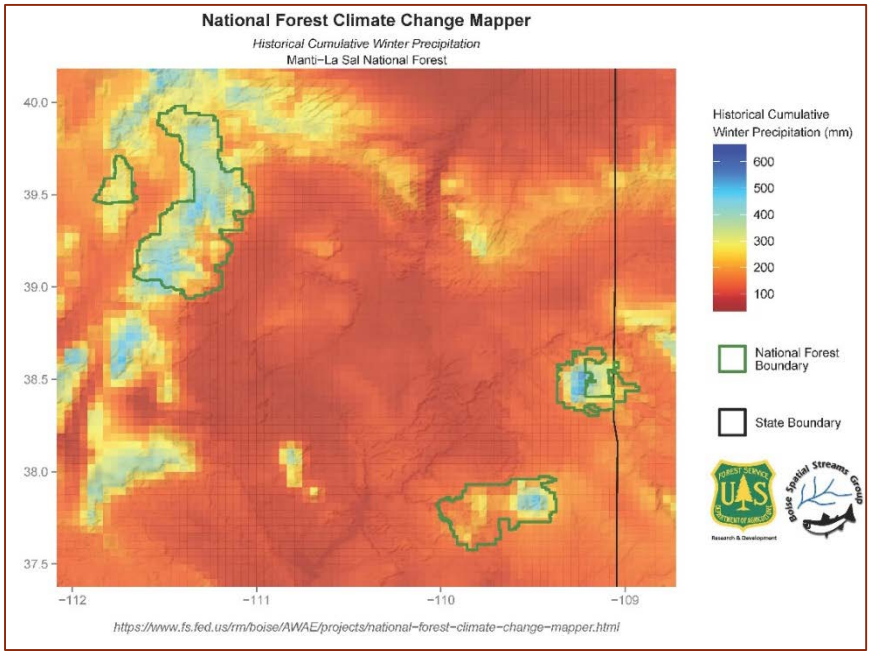


Historical (1979-2009) mean annual monthly temperature (°F) across the Intermountain Region (USDA 2016).

Historical (1979-2009) total annual precipitation (inches) across the Intermountain Region (USDA 2016)

Forest – Temperature / Precipitation





Historical winter average temperatures across the Manti-La Sal National Forest. Map generated using methodology from Abatzoglou and Brown (2012).

Historical average precipitation across the Manti-La Sal National Forest. Map generated using methodology from Abatzoglou and Brown (2012).

Plan Revision and Climate Lessons Learned

Lessons Learned

- Identify climate resources and variables early.
- Plan time to incorporate into concurrent processes.
- Make sure that all resource specialists understand:
  - ✓ How climate impacts their resource.
  - ✓ What resources area available.
  - ✓ Historical and predicted trends for the plan area.
- Make sure all resource specialists are referencing the same climate base line data and resources.

Weblinks & Additional Resources

- **IAP Website:** *http://www.adaptationpartners.org/iap/webinars.php*
- **Intermountain Region Forest Plan Revision**: *https://www.fs.usda.gov/detail/r4/landmanagement/planning/?cid=fseprd522028*
- **RMRS Intermountain Region (R4) Climate Change Maps:** *https://www.fs.fed.us/rm/boise/AWAE/projects/NFS-regional-climate-change-maps/regions/intermountain-region-r4.html*
- **EMC Plan Revision SharePoint Site:** *https://ems-team.usda.gov/sites/fs-emc-_plngrule2012/SitePages/Home.aspx*
- **Manti-La Sal NF Plan Revision SharePoint Site:** *https://ems-team.usda.gov/sites/fs-r04-mlsfpr/_layouts/15/start.aspx#/*

Closing Thoughts

Thoughtful planning, content and planning structure in addressing climate in the revised plan can provide a platform which future project-level NEPA projects can be tiered.

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DIALOGUE AND Q&A