Navigating the Climate Change Performance Scorecard

A Guide for National Forests and Grasslands (Version 2, August 2011)

**Mitigation &**

**Sustainable Consumption**

9. Carbon assessment and stewardship

10. Sustainable operations

**Adaptation**

6. Assessing vulnerability

7. Adaptation actions

8. Monitoring

**Organizational Capacity**

1. Employee education

2. Designated climate change coordinators

3. Program guidance

**Engagement**

4. Science and management partnerships

5. Other partnerships

USDA

Forest Service Response to Climate Change

# Foreword

Climate change is one of the major challenges we face as we fulfill our mission to sustain the health, diversity, and productivity of the Nation’s forests and grasslands for present and future generations. The future vitality of the lands we manage is at risk from climate change, which drives fire, insects, diseases, invasive species, drought, and other forces. It is not in our mission or our nature to just let things happen. We must manage forests and grasslands to adapt – that is, to accommodate the changes and new conditions imposed by climate shifts. But adaptation cannot be the single focus of our response to climate change and we cannot do it alone. That’s why the Climate Change Roadmap and Performance Scorecard are so important – they direct us in creating a balanced approach that also includes mitigating climate change, building partnerships across boundaries, and preparing our employees to respond to climate-related issues by understanding and applying emerging science.

The Roadmap and Scorecard are about developing our organizational ability and readiness to adapt to a rapidly changing future and building climate change response into how we pursue our mission. They do not impose a one-size-fits-all approach because there is no one solution to the array of challenges that climate change creates. Given the diversity of our landscapes, our stakeholders, and our partners, we must maintain the flexibility to develop different approaches for different places. Furthermore, the Roadmap and Scorecard are designed to encourage innovation, experimentation, and adaptive management and improve our capabilities based on realistic assessments of our strengths and weaknesses. We already have many of the tools we need to respond to climate change, but we may need to develop new approaches to deal with new challenges by experimenting with our tried and true techniques. The Scorecard provides a way to share lessons learned so that we don’t repeat mistakes or reinvent what’s already out there.

I am confident that the Roadmap and Scorecard process will make us national leaders in assuring sustainability in a changing future.

Thank you for all that you do.

THOMAS L. TIDWELL

Chief

January 2011

# Preface

This Guide was designed for you by you and your fellow Forest Service employees. This first official version of the Scorecard Guide is based on a lot of hard work and lessons learned in developing and using a prototype guide for the preliminary assessment this spring. During this process, we listened to you. Most of the feedback in the assessment validated that the Guide was on the right track; the general structure, approach, and tone remain. What you see in this version are refinements that help it work in the operational world of a large, dispersed organization. There are many people to thank for this, but my most fervent appreciation goes to Leslie Brandt who staffed the original framing team; Rob Harper who led that team; its team members: Mike Balboni, Tracy Beck, Bob Davis, Trey Schillie, and Paul Strong; and Cathy Dowd in our office who headed up the post-preliminary assessment revision. Thanks too to all the field and WO staff who dived in to make it a better product.

We hope this guide will develop your ability to deal with the ever more evident implications of a changing climate. We also hope that it will make us a more effective learning organization that will set new standards for applying adaptive management in turbulent times. This Guide is meant to help you start from where you honestly think you are now and develop a path on which to move forward. Work through the Guide to understand your options. Consider all the other things your unit is doing and plans to do and how climate change response can be woven together with those efforts. Don’t try to do everything at once. This is a four-year push, not a 6-month panic. The FY 2011 Scorecard report is only our baseline. Our goal for achieving the target of 7/10 is FY 2015. In the meantime, Scorecard reporting will stimulate the development of materials and tools that will help us help you progress in your plan, maintain those changes, and take on progressively harder challenges with greater confidence.

A key partner in making this work is the Climate Change Coordinator (or coordination team) for your unit and their counterpart in the Regional and Station offices. They comprise a national network for communication among units, regions, stations, and the WO and can bring issues quickly to the attention of the entire network for resolution. Informed by this network, the national, regional, and station staffs are working to make sure program directions are harmonious and to identify ways to complete Scorecard tasks across multiple units or even larger scales. Work with your regional climate change coordinator to help you prioritize the Scorecard elements so you can take advantage of these developments as they occur.

We emphasized during the preliminary assessment, and we re-emphasize now, that this guide is meant to be molded, modified, and shared. We encourage you to give us – directly or through the climate change coordinators - suggestions for improving it. What is working? What is not? What are we missing? What new things should we be trying? We are looking forward to learning from you in the next and future rounds of Scorecard reporting.

DAVE CLEAVES

Climate Change Advisor

August 2011

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# Introduction

## About this guide

*Navigating the Climate Change Performance Scorecard* provides direction on completing the Scorecard to Forest and Grassland (hereafter referred to as Unit) Supervisors and their staff. Much of this guide will also be helpful for Research Stations, Regional Offices, and the Washington Office in identifying areas where they can or should lend support. The guide was designed to be flexible while still providing some basic requirements and helpful hints on how to develop and account for associated activities.

## How this guide is organized

This introductory section provides an overview of the Scorecard, the annual reporting cycle, roles and responsibilities, and the relationship of the Scorecard to USDA and Forest Service strategic plans, policies, and initiatives.

The guide is organized around the four Scorecard dimensions and ten Scorecard elements (questions). Each element in the guide contains the following:

1. **Definitions** of terms that may be new to you, have more than one meaning, or require further clarification. The definitions in this document capture the intent of the Scorecard and the associated guide, and may differ from definitions found in a textbook or dictionary.
2. **Geographic Scale** specifies whether the activities listed on the Scorecard should be carried out by individual Units or at a larger scale.
3. **Getting to “yes”** sets minimum requirements for a “yes” answer on the Scorecard and describes what information will be collected in the narrative to support your answer.

*If you’re short on time, you can just read these three parts for each element for the main points.*

Look for the “tool boxes” throughout the document. These boxes provide helpful hints about how you might accomplish some Scorecard activities on your Unit.

**Technical guidance** for some Scorecard elements is provided in the appendices. The technical guidance is more detailed and geared toward technical staff and researchers whose work will support the Agency’s performance and learning under the Scorecard.

## Scorecard Overview

### What is the Scorecard?

The Scorecard is a way for the Forest Service to improve its organizational capacity and readiness to respond to climate change. Each National Forest and Grassland will measure its progress from 2011-15 by describing accomplishments and/or plans for improvement toward a “yes” answer to ten questions in four dimensions – organizational capacity, engagement, adaptation, and mitigation (see next page). After a preliminary assessment in early 2011, the scorecard will be completed annually in the fiscal years 2011-2015. **By 2015, each Unit is expected to answer yes to at least seven of the scorecard questions, with at least one yes in each dimension**. The replies to the scorecard questions are supported by narratives describing accomplishments and/or plans for improvement toward a “yes” answer.

### What is the purpose of the Scorecard?

The Scorecard will better prepare us for the journey in accomplishing the Agency’s mission in the face of a changing climate. It will help facilitate implementation of the [Forest Service National Roadmap for Responding to Climate Change](http://www.fs.fed.us/climatechange/pdf/Roadmap_pub.pdf) and comply with the [USDA Strategic Plan](http://www.ocfo.usda.gov/usdasp/sp2010/sp2010.pdf) (see policy section). Annual Scorecard reporting will prompt each Unit to take stock of its accomplishments and set goals for the following year. The Scorecard’s multiple dimensions ensure that each Unit works toward a balanced response to climate change.

### Who is responsible for scorecard reporting and activities?

The Unit Supervisor will report on Scorecard accomplishments each year, but all Forest Service employees have a role to play. Accountability ultimately rests on the Agency as a whole (see table on roles and responsibilities). The annual Scorecard reporting cycle will require evaluation of support and staff leadership at the Unit, Region, and national levels. Many of the activities listed on the Scorecard will be carried out by Regions or the Washington Office, or with the support of Research Stations and external partners. The Geographic Scale section provides direction about whether each element is best carried out at the unit, sub-regional, regional, or national scale. Region, Station, and Washington Office support will be assessed through annual SES performance evaluations.

### How will annual Scorecard reports be used?

Results will be used to measure Agency progress in our ability to build climate change response into how we pursue our mission. The Scorecard will assess strengths and identify areas for greater investment in accomplishing particular elements at the Unit level. When the appropriate geographic scale is larger than the Unit, the narrative will be an opportunity for the Unit to let Regions, Research Stations, and the Washington Office know whether they are getting the support they need. The Regional Forester will use this information in annual performance reviews and to identify areas that require a greater investment for Units to succeed. The Climate Change Advisor’s Office will use information from Units and Regions to refine guidance and Scorecard expectations, coordinate efforts to support areas of need identified in the evaluations, and communicate our Agency’s progress and successes to the Administration, Congress, media, and key stakeholders.

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| --- |
| **The Forest Service Climate Change Performance Scorecard, 2011 (version 1.3)**To be completed annually by each National Forest or Grassland (Unit). |
| **Scorecard Element** |  **Unit Name** | **Yes/No** |
| **Organizational Capacity** |
| 1. Employee Education | Are all employees provided with training on the basics of climate change, impacts on forests and grasslands, and the Forest Service response? Are resource specialists made aware of the potential contribution of their own work to climate change response? |   |
| 2. Designated Climate Change Coordinators | Is at least one employee assigned to coordinate climate change activities and be a resource for climate change questions and issues? Is this employee provided with the training, time, and resources to make his/her assignment successful? |   |
| 3. Program Guidance | Does the Unit have written guidance for progressively integrating climate change considerations and activities into Unit-level operations? |   |
| **Engagement** |
| 4. Science and Management Partnerships | Does the Unit actively engage with scientists and scientific organizations to improve its ability to respond to climate change?  |   |
| 5. Other Partnerships | Have climate change related considerations and activities been incorporated into existing or new partnerships (other than science partnerships)? |   |
| **Adaptation** |
| 6. Assessing Vulnerability | Has the Unit engaged in developing relevant information about the vulnerability of key resources, such as human communities and ecosystem elements, to the impacts of climate change? |   |
| 7. Adaptation Actions | Does the Unit conduct management actions that reduce the vulnerability of resources and places to climate change? |   |
| 8. Monitoring  |  Is monitoring being conducted to track climate change impacts and the effectiveness of adaptation activities? |   |
| **Mitigation and Sustainable Consumption** |
| 9. Carbon Assessment and Stewardship | Does the Unit have a baseline assessment of carbon stocks and an assessment of the influence of disturbance and management activities on these stocks? Is the Unit integrating carbon stewardship with the management of other benefits being provided by the Unit? |   |
| 10. Sustainable Operations  | Is progress being made toward achieving sustainable operations requirements to reduce the environmental footprint of the Agency?  |   |

The Scorecard. This form, along with supporting narratives for each element, will be completed annually by each Forest or Grassland.

### Online reporting

Scorecard reports should be submitted using the online form that is available through the Climate Change Intranet site (<http://fsweb.wo.fs.fed.us/chief/climatechange/>), which asks the following questions. Bold questions are Scorecard questions that require a YES or NO response; sub questions are prompts that require a narrative response. Your answers to the prompts should help you determine whether you can answer the Scorecard questions yes or no. They will also allow you to show the efforts you have made in each element even if your answer to the Scorecard question is no.

1. **Employee education - Are all employees provided with training on the basics of climate change, impacts on forests and grasslands, and the Forest Service response? Are resource specialists made aware of the potential contribution of their own work to climate change response?**
	1. What climate change training is required of all employees on your Unit?
	2. What training have resource specialists had to increase awareness of the potential contribution of their own work to climate change response?
2. **CC coordinators - Is at least one employee assigned to coordinate climate change activities and be a resource for climate change questions and issues? Is this employee provided with the training, time, and resources to make his or her assignment successful?**
	1. What is the name and contact information for the climate change coordinator on your Unit?
	2. What training, time, and resources is he or she provided to fulfill his or her responsibilities?
3. **Program guidance – Does the Unit have written guidance for progressively integrating climate change considerations and activities into Unit-level operations?**
	1. In what ways have you integrated climate change considerations and activities into your overall annual operations?
4. **Science and Management Partnerships - Does the Unit actively engage with scientists and scientific organizations to improve its ability to respond to climate change?**
	1. How have your Unit and the science community collaborated and shared information to improve your ability to respond to climate change?
	2. Who are your main science partners?
5. **Other partnerships - Have climate change considerations and activities been incorporated into existing or new partnerships (other than science partnerships)?**
	1. In what ways have climate change activities been incorporated into your existing or new partnerships?
6. **Assessing vulnerability – Has the Unit engaged in developing relevant information about the vulnerability of key resources, such as human communities and ecosystem elements, to the impacts of climate change?**
	1. What key resources have you identified on your Unit?
	2. What scientific, social, and economic information about the exposure and sensitivity of those resources to climate change have you reviewed and considered?
	3. What current stressors are you observing on your Unit? How do (or will) these stressors interact with a changing climate?
	4. What historical climate data and climate projections have you examined? How might your key resources and their stressors be impacted by these climate changes?
	5. Who have you consulted to help interpret the information you’ve collected?
	6. How have you used this vulnerability information to prioritize possible management actions?
7. **Adaptation actions – Does the Unit conduct management actions that reduce the vulnerability of resources and places to climate change?**
	1. What adaptation activities are you doing on your Unit to reduce the vulnerability of your key resources to climate change?
	2. Are these activities aimed at increasing resilience to stressor impacts, promoting resistance to climate change, or facilitating transitions to respond adaptively to environmental change?
8. **Monitoring - Is monitoring being conducted to track climate change impacts and the effectiveness of adaptation activities?**
	1. What current monitoring activities can be or are being used to track climate change impacts and the effectiveness of adaptation activities on your Unit?
	2. What climate change related trends are you observing on your Unit?
	3. How are you using this information to adjust your management activities?
	4. What additional monitoring might need to be conducted?
9. **Carbon assessment and stewardship - Does the Unit have a baseline assessment of carbon stocks and an assessment of the influence of disturbance and management activities on these stocks? Is the Unit integrating carbon stewardship with the management of other benefits being provided by the Unit?**
	1. Does your Unit have a baseline assessment of carbon stocks?
	2. Does your Unit have an assessment of how disturbance and management activities are influencing carbon stocks or carbon sequestration and emissions? What is the basis for this assessment?
	3. How is your Unit integrating carbon stewardship with the management of other benefits being provided by the Unit?
10. **Sustainable operations - Is progress being made toward achieving sustainable operations requirements to reduce the environmental footprint of the Agency?**
	1. What actions has your Unit taken to make progress towards the sustainable operations targets listed in the definitions for this element?
	2. What reductions in resource use were achieved as a result of these actions?
	3. What support does your Unit provide for Green Teams, sustainable operations training, recognition programs, and other activities that foster a culture of sustainable consumption?

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| Forest Service Role  | **Scorecard Responsibility** |
| Climate Change Advisor & Staff | Develop and refine guidance. |
|  | Submit annual reminders to the field.  |
|  | Evaluate annual Scorecard reports. |
|  | Report on Agency-wide Scorecard performance to the Chief, budget office, Department, and Congress. |
|  | Track and evaluate overall national progress. |
|  | Provide guidance and support to national programs, Regions, and Stations. |
| Regional Forester  | Designate a regional climate change coordinator.  |
|  | Evaluate and report on Scorecard accomplishments for the Region. |
|  | Organize and implement regional programs to support performance improvement.  |
| Regional Climate Change Coordinator  | Provide guidance and support for Forests and Grasslands in completing the Scorecard.  |
|  | Coordinate with other Regions, Stations, Washington Office, and Unit-level climate change coordinators. |
|  | Assist the Regional Forester in annual evaluation of regional scorecard accomplishments. |
|  | Serve as liaison with the Climate Change Advisor’s Office. |
|  | Advocate for performance improvement and climate change integration.  |
| Washington Office, Regional Office Staff, and Research Stations | Develop national or regional support for the Scorecard such as educational programs (Element 1), assessments (Elements 6, 9), adaptation actions (Element 7), monitoring (Element 8), and partnerships (Elements 4 & 5). |
|  | Assist in the development and refinement of regional and national Scorecard guidance. |
| Unit Supervisor | Report annually on Scorecard accomplishments.  |
|  | Designate a climate change coordinator. |
|  | Build climate change considerations into appropriate operational activities. |
| Unit Climate Change Coordinator | Assist the Unit Supervisor in annual Scorecard reporting. |
|  | Coordinate Scorecard activities. |
|  | Serve as liaison with regional climate change coordinator.  |
| Unit Staff | Participate in and support Unit-level scorecard activities. |

Scorecard roles and responsibilities. Although the Unit Supervisor is responsible for reporting, all Agency employees have a role to play.

## The Scorecard reporting cycle

Annual reporting on the Scorecard is designed to align with the fiscal year calendar (see figure on next page).

1. A request describing Scorecard reporting procedures will be sent from the Chief’s Office (Climate Change Advisor) to Regional Foresters and Unit Supervisors in August 2011 and in July of each fiscal year 2012-2015.
2. Each Unit will complete the Scorecard online. Both the Climate Change Advisor’s Office and the regional climate change coordinators will be able to access the online responses.
3. Regional climate change coordinators will evaluate responses to ensure consistency with this guide. The Climate Change Advisor’s Office will forward Scorecard responses to the office of Strategic Planning, Budget, and Accountability for inclusion into the Performance Accountability System.
4. The Regional Forester, with the support of the regional climate change coordinator, will evaluate Scorecard performance Region-wide, and the level of support being provided by the Regional Office. The assessment, which is submitted to the Chief’s Office, should include a summary of all Scorecard reports in the Region, how Regions, Research Stations, and the Washington Office lent support to activities listed on the Scorecard, and goals for improving regional support in the coming years. Any specific barriers to reaching compliance or recommended changes to the guidance document should also be communicated in the summary.
5. The Climate Change Advisor’s Office will summarize and evaluate nation-wide responses to the Scorecard and the trends by Region and element toward 100% compliance by 2015. The Climate Change Advisor’s Office will also make any recommended changes to the Scorecard guide for the following year.
6. The Climate Change Advisor’s Office will send this summary to the Regions, Stations, and the Washington Office within the first quarter of each fiscal year. The Climate Change Advisor’s Office will keep the Chief and the Department updated on annual progress of National Forests and Grasslands and Region, Station, and national support.

## Getting help and sharing successes

Unit-level climate change coordinators should contact their regional climate change coordinators with any questions or concerns they have pertaining to the Scorecard, the guide, or Scorecard-related activities. The [Climate Change Advisor’s Office](http://fsweb.wo.fs.fed.us/chief/climatechange/) maintains an up-to-date list of regional climate change coordinators. Regional coordinators should contact the Climate Change Advisor’s office with questions or concerns they are unable to answer. Questions specific to Element 10 can be posed directly to National\_Sustainable\_Operations@fs.fed.us. Units, Regions, Stations, and national programs are encouraged to share their successes with the Climate Change Advisor’s Office throughout the year. The Climate Change Advisor’s Office may wish to contact Units to follow up on particular programs or actions described in the narratives. Please contact the Climate Change Advisor’s Office with Scorecard-related questions or stories.

Overview of the 2011 Scorecard reporting cycle. Specific dates may differ by Region or from year to year.

## Policy: relationship to strategic initiatives and policies

### USDA Strategic Plan (2010-2015)

The Scorecard was designed to link to the [USDA Strategic Plan](http://www.ocfo.usda.gov/usdasp/sp2010/sp2010.pdf) Goal 2 to “ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while enhancing our water resources” and performance measure 2.2.3, “percent of National Forests in compliance with a climate change adaptation and mitigation strategy.” The Forest Service is being tasked by the Department to lead the way to success in this measure. The Scorecard will help Units develop these strategies using a balanced and flexible approach.

### Forest Service Strategic Plan (2007-2012)

The Scorecard aligns with several goals, objectives, and strategies in the [Forest Service Strategic Plan](http://www.fs.fed.us/publications/strategic/fs-sp-fy07-12.pdf). The Scorecard is particularly aligned with Goal 1: to Restore, Sustain, and Enhance the Nation’s Forests and Grasslands. Working to reduce the impacts of invasive species, pests, and diseases and to restore and maintain healthy watersheds and diverse habitats will certainly be part of adaptation actions (Element 7). By assessing vulnerability in Scorecard Element 6, we will help achieve this goal by assessing the probable ecological and socioeconomic impacts of climate change on our forests and grasslands.

Accomplishing the activities on the Scorecard will help us achieve other goals and objectives as well. For example, we can help meet energy resource needs (Objective 2.3) through the production of energy from woody biomass. This objective is aligned with dimension 4: Mitigation and Sustainable Consumption (Elements 9 & 10). Strategies for Goal 5 of the FS Strategic Plan focus on partnerships and training to meet new challenges (Elements 1-5), and objectives focus on improving our facilities (Element 10) and information systems (Element 8). Finally, Goal 7 focuses on providing science-based applications and tools and increasing the transfer of scientific information, which aligns with almost every Scorecard element (in particular Elements 4 & 6-9).

### National Roadmap for Responding to Climate Change

The [National Roadmap for Responding to Climate Change](http://www.fs.fed.us/climatechange/pdf/Roadmapfinal.pdf) (hereafter referred to as the Roadmap) is the companion document to the Scorecard. The Roadmap lays out the vision and rationale for the Agency-wide climate change response and identifies short-term and long-term actions that the Agency should take. The Scorecard provides a means of tracking implementation of the Roadmap on the level of individual Forests and Grasslands and for holding the Agency accountable for its climate change response. The table at the end of this section lays out the alignment between the Roadmap actions and each element of the Scorecard.

### 2011 Planning Rule

The Agency is in the process of [planning rule revision](http://www.fs.usda.gov/wps/portal/fsinternet/%21ut/p/c5/04_SB8K8xLLM9MSSzPy8xBz9CP0os3gjAwhwtDDw9_AI8zPwhQoY6IeDdGCqCPOBqwDLG-AAjgb6fh75uan6BdnZaY6OiooA1tkqlQ%21%21/dl3/d3/L2dJQSEvUUt3QS9ZQnZ3LzZfMjAwMDAwMDBBODBPSEhWTjBNMDAwMDAwMDA%21/?ss=119987&navtype=BROWSEBYSU) for 2011. Although it has not been finalized, the planning rule is being designed to complement the Agency’s climate change response. The new planning rule is being designed to address topics such as ecosystem resilience, collaboration, science-management integration, local and broad-scale monitoring, and an “all-lands approach” to land management. These concepts are supported by the same principles highlighted in the Roadmap and Scorecard.

### Executive Order 13514

[Executive Order 13514](http://www.fedcenter.gov/programs/eo13514/) – Federal Leadership in Environmental, Energy, and Economic Performance – directs each agency to not only develop a sustainability strategy and reduce greenhouse gas emissions but to develop policies and practices to support the Federal Adaptation Strategy. The Scorecard will simplify accomplishment reporting for this order.

### Sustainable Operations Targets and Strategies

Government-wide and Forest Service-specific [sustainable operation requirements](http://www.fs.fed.us/sustainableoperations/documents/crosswalk-sus-goals-eo.pdf) (Element 10) have been set under Executive Order (EO) 13423, EO 13514, the Energy Independence and Security Act of 2007, and other sustainable operations related laws, regulations, and guidance. These requirements are further detailed in the USDA Strategic Sustainability Performance Plan. The Agency must also lead public response by example, as directed by the President in Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance. This requires an Agency-level commitment to: (1) Incorporate and maintain long term programs, practices, tools, and policies that integrate environmental footprint principles throughout the organization by removing barriers and promoting the use of efficient technologies; (2) Institute a culture that emphasizes education, rewards positive actions, and recognizes achievements that reduce our environmental footprint in long lasting ways; (3) Integrate environmental footprint activities into daily decisions, habits, planning and operations; and (4) Increase capacity and capabilities to implement sustainable operations throughout all levels of the organization.

### Restoration Initiatives and Multi-Party Monitoring (CFLRP, PWJSI, WCF)

Restoration initiatives, such as the [Collaborative Forest Landscape Restoration Program](http://www.fs.fed.us/restoration/CFLR/index.shtml) (CLFRP) and the Priority Watersheds and Jobs Stabilization Initiative (PWJSI), complement several elements on the Scorecard. These initiatives are designed to engage partners, make ecosystems more resilient, and incorporate multi-party monitoring. The [Watershed Condition Framework](http://fsweb.wo.fs.fed.us/wfw/watershed/watershed-classification.html) (WCF) is currently being implemented by the field. Many of the indicators used in the WCF can help assess vulnerability (Element 6) and track climate change impacts if monitored (Element 8).

### Resources Planning Act Assessments

The [Resources Planning Act (RPA) Assessment](http://www.fs.fed.us/research/rpa/what.shtml#2010RPA) reports on the status and trends of the Nation’s renewable resources on all forests and rangelands, as required by the Forest and Rangeland Renewable Resources Planning Act of 1974. Since 1990, the effects of climate change on forest resources have been an additional focus of assessment research. The 2010 RPA Assessment will incorporate climate change effects into analyses of forest conditions, wildlife habitat, and water supply. These assessments can provide a potential launching point for Unit-level vulnerability assessments (Element 6) by helping to set the context for national and regional factors affecting Units (population growth, economic drivers, land use), providing scenario information (climate, population, economic), and by identifying resource areas of focus. RPA Assessments are also pertinent to Element 8 (Monitoring) and Element 9 (Carbon Assessments).

| Roadmap Actions and Initiatives |
| --- |
| Scorecard Element | Ongoing Activities | Immediate Initiatives | Longer Term Initiatives |
| 1EmployeeEducation | Providing basic and applied science  |  |  |
| Conducting workshops for scientists and managers |  |  |
| 2Climate Change Coordinators | Building management capacity for addressing climate change |  |  |
| 3Program Guidance  | Building management capacity for addressing climate change | Align Forest Service policy and direction |  |
| 4Science andManagementPartnerships | Providing basic and applied science  | Develop vulnerability assessments through partnerships | Fortify internal climate change partnerships |
| Conducting workshops for scientists and managers |  | Expand capacity for assessing the social impacts of climate change. |
| 5Other Partnerships | Building public awareness of climate change | Build public support for a strong, well-coordinated climate change response | Engage youth in climate change response |
|  | Use collaborative approaches to support multiparty climate change responses | Build interagency coordination |
|  | Develop vulnerability assessments through partnerships | Expand capacity for assessing the social impacts of climate change. |
|  |  | Support community and regional collaboration. |
| 6 Assessing Vulnerability | Providing basic and applied science  | Furnish more predictive information on climate change and variability | Expand capacity for assessing the social impacts of climate change. |
|  | Develop vulnerability assessments through partnerships |  |

|  |  |  |  |
| --- | --- | --- | --- |
| 7Adaptation Actions | Restoring healthy, resilient forest and grassland ecosystems | Refine management practices using risk management and adaptive management | Develop a longer term restoration capacity |
| Protecting infrastructure | Set priorities for management actions | Develop transition strategies |
| Addressing climate change in planning and analysis | Connect habitats to improve adaptive capacity | Implement a genetic resources conservation strategy |
| Protecting rare and sensitive species | Develop decision support tools for adaptation and mitigation | Develop comprehensive strategies for maintaining and restoring habitat connectivity |
| Providing basic and applied science  |  |  |
| 8Monitoring | Playing a leadership role in carbon assessments and climate change monitoring | Tailor monitoring to facilitate adaptive responses | Implement monitoring systems to evaluate the effectiveness of management actions designed to facilitate adaptation and mitigation |
| Utilizing national monitoring networks |  |  |
| Providing basic and applied science  |  |  |
| 9Carbon Assessment and Stewardship | Actively managing carbon stocks | Develop decision support tools for adaptation and mitigation |  |
| Facilitating demonstration projects leading to the development of markets for ecosystem services |  |  |
| Promoting woody biomass utilization |  |  |
| Playing a leadership role in carbon assessments and climate change monitoring |  |  |
| Providing basic and applied science  |  |  |
| 10Sustainable Operations | Reducing the Forest Service’s environmental footprint | Develop a web-based sustainable operations information system | Take sustainable consumption to the next level |

**Dimension 1: Organizational Capacity** — engage employees through training and integrate climate change into program of work.

The Forest Service’s climate change response will be more successful if employees are informed and climate change is integrated into existing programs. As highlighted in the Roadmap, the Agency is already building management capacity for addressing climate change by working with partners to develop education and information resources for land managers and natural resource practitioners. Scorecard Element 1 makes sure these resources are available to employees and are used in employee professional development. The Roadmap highlights that the Agency is establishing climate change technology transfer contacts at the Region, Station, and Area levels. The Scorecard challenges Units to develop a similar role on each national forest or grassland, which will be designated as “climate change coordinators” (Element 2) to be part of a national learning network for climate change response. An immediate initiative identified in the Roadmap is to align the Agency’s policy and direction with climate change strategies. Element 3 addresses whether Units are integrating climate change considerations and activities into operations.

## 1. Employee Education

To be prepared to respond to climate change, we need an informed workforce. Misconceptions about climate change lead to misunderstandings of climate change causes and impacts and, therefore, the risks that we face. Since all Forest Service employees contribute to our mission, all employees need to understand the basics climate change and how it impacts forests and grasslands. This will help them explain our climate change response to the public. Resource specialists need additional discipline-specific training to understand how their work can contribute to climate change response.

Here are just a few situations where climate change knowledge fits into the things we do every day:

* Natural resource managers need to understand how to incorporate adaptation and mitigation into their management activities.
* Planners need to understand how climate change considerations may alter decision-making processes and monitoring plans.
* Public affairs and education specialists need to know how to communicate our climate change response to the public.
* Engineering staff need to consider climate change impacts when designing new infrastructure or potential energy savings when designing new office space.
* Any employee may be asked what the Forest Service is doing to respond to climate change.

### Scorecard Question

* **Are all employees provided with training on the basics of climate change, impacts on forests and grasslands, and the Forest Service response?**
* **Are resource specialists made aware of the potential contribution of their own work to climate change response?**

### Definitions

* **All employees** are all permanent employees and term employees of the USDA Forest Service that have at least a 6-month appointment.
* **Training** includes formal and informal learning opportunities such as distance learning, workshops, seminars, formal classes, and educational webinars and videos.
* **Resource specialists** include line officers, staff officers, and employees that have technical expertise in natural resource management.

### Geographic Scale

Educational programs can be developed locally, regionally, or nationally. Units are encouraged to take advantage of educational programs that have been developed within and outside of the Agency. Units should consult their regional climate change coordinators for information on suitable training opportunities and resources.

### Getting to YES

To answer “yes,” your Unit should require all employees to participate in introductory-level climate change training and resource specialists should have additional training that is specific to their discipline. At this time, there is not a national curriculum so Units should choose the type of training (see box) that best fits their needs and resources. The narrative for this element asks you to answer the following questions:

What climate change training is required of all employees on your Unit?

What training have resource specialists had to increase awareness of the potential contribution of their own work to climate change response?

**What types of training could you offer your employees?**

Depending on employee’s level of specialization and link to climate change response, consider:

For all employees

* **Distance learning:** All employees can access online reputable climate change information developed by the Forest Service and other federal agencies. Your climate change coordinator could identify information that is specific to your geographic area and appropriate for different disciplines.

*Tip: Check out the* ***Climate Change Resource Center****, an FS website designed for land managers (*[*http://www.fs.fed.us/ccrc/*](http://www.fs.fed.us/ccrc/)*);* ***Climate.gov****, a multi-agency website for a range of audiences (http://www.climate.gov/#education); the* ***Climate Literacy Guide****, which covers the essential principles of climate science (http://www.globalchange.gov/resources/educators/climate-literacy); and* ***Climate Change Wildlife and Wildlands****, a toolkit for formal and informal educators (*[*http://www.globalchange.gov/resources/educators/toolkit*](http://www.globalchange.gov/resources/educators/toolkit)*).*

* **Basic educational seminars:** Live seminars about climate change, either in-person or through video, consist of presentations and discussion.

*Tip: Take advantage of times you are already gathered together, such as family and safety meetings, or utilize VTC and webinar technology for dispersed employees.*

For resource specialists

* **Intensive training:** Weeklong, in-person courses that provide in-depth information about climate change, ecosystem response, and adaptation may be appropriate for climate change coordinators, line officers, staff officers, and employees that have technical expertise in natural resource management.

*Tip: Some Regions and Stations are starting to offer these courses: talk to your regional climate change coordinator for more information.*

* **Discipline-specific training:** In-person workshops provide in-depth information and discussion about the interaction of climate change with specific discipline areas (e.g., silviculture, fish biology, and hydrology).

*Tip: Some regional and national training programs, such as the National Advanced Silviculture Program and NEPA, are beginning to offer climate change training as part of existing courses. Contact your regional climate change coordinators for more information.*

* **Targeted workshops:** Encourage your resource managers to work closely with researchers through combined in-person and video-linked workshops to address specific issues, resources, and locations.

*Tip: Utilize your science-manager partnerships you developed in Scorecard Element 4.*

*More detailed information about these training approaches can be found in Appendix A.*

## 2. Designated Climate Change Coordinators

Developing a climate change response requires a coordinated effort: within and among Units, and between the Unit, Regional Office, Research Stations, and Washington Office. Having someone assigned as a climate change coordinator can help ensure that the work is getting done, and that you’re sharing your challenges and successes with others. Although the work may be divided up among several staff members, the coordinator serves as a single point of contact.

**What can a climate change coordinator do for you?**

Below are just a few things a climate change coordinator can do for your Unit:

* **Coordinate** activities listed on the Scorecard, such as:
* Organizing educational seminars for employees.
* Assisting with the planning of adaptation actions.
* Starting up a Unit-level “green team.”
* Working with Unit leadership to set annual goals for climate change-related activities.
* Assisting the Unit in working with external climate change partnerships in your area.
* Discussing opportunities for joint studies with a Forest Service Research Station or local university.
* **Assist the Unit Supervisor** in annual Scorecard reporting and integrating climate change into work planning.
* **Serve as a resource** for the Unit’s leadership team on climate change issues.
* **Communicate** with the regional climate change coordinator about accomplishments and challenges.
* **Share lessons learned and successes** related to climate change activities with other Units, the Regional Office, and the Washington Office.

### Scorecard Question

* **Is at least one employee assigned to coordinate climate change activities and be a resource for climate change questions and issues?**
* **Is this employee provided with the training, time, and resources to make his or her assignment successful?**

### Definitions

* A **climate change coordinator** is a permanent staff member with a program of work that includes assisting with climate change-related activities at the Unit level, and coordinating with the Regional Office and other Units on climate change activities. The climate change coordinator should have leadership and communication skills, enough of a technical or scientific background to learn and adopt new concepts related to climate change response, and time for climate change activities and training. The coordinator should also have a role in activities related to one or more Scorecard elements.

**Who should be your climate change coordinator?**

There’s no one right answer to this question. Some forests and grasslands have assigned forest ecologists, ecosystem management staff officers, NEPA coordinators, soil scientists, air and water specialists, and silviculturists.

### Geographic Scale

Each Unit should have one assigned coordinator. If more than one National Forest or Grassland is managed by the same Supervisor (e.g. Green Mountain and Finger Lakes), one coordinator can serve all Units managed by that Supervisor.

### Getting to YES

To answer “yes,” your Unit should have a climate change coordinator with the ability to serve as a resource for climate change questions and issues and training and time to fulfill his or her responsibilities. Let the Regional Office and other Units in your Region know who your coordinator is. Discuss with the coordinator your expectations of fulfilling his or her roles and responsibilities. The narrative for this element asks you to answer the following questions:

1. What is the name and contact information for the climate change coordinator on your Unit?
2. What training, time, and resources is he or she provided to fulfill his or her responsibilities?

## 3. Program Guidance

Climate change response is not about adding on an entirely new climate change program, but rather about building climate change considerations and activities into our existing programs. This will require guidance in setting priorities and to give direction for integrating climate change into existing programs.

### Scorecard Question

* **Does the Unit have written guidance for progressively integrating climate change considerations and activities into Unit-level operations?**

Definitions

* **Guidance** is a written document that provides the Unit with specific direction on how it may integrate climate change considerations and activities into its current programs and activities.
* **Climate change activities** are actions we take to respond to climate changes such as assessing current risks, vulnerabilities, policies, and gaps in knowledge; engaging employees and stakeholders to seek solutions; and managing for resilience in ecosystems and human communities through adaptation, mitigation, and sustainable consumption.
* **Operations** are any activities carried out by the Unit, including training, partnerships, land management activities, planning, or business operations.

Geographic Scale

Guidance should be applicable to operations at the Unit level. Regional Offices, National programs, or Research Stations can provide guidance or assist in developing guidance.

### Getting to YES

To answer “yes,” your Unit should have an up-to-date written document that identifies how you plan to integrate climate change considerations and activities into your overall annual operations. Each year, show how your Unit has made progress in integrating climate change considerations and activities into your operations. The narrative for this element asks you: In what ways have you integrated climate change considerations and activities into your overall annual operations?

**What counts as guidance?**

You and your leadership team will be the best judges of what the right approach is for your particular Unit. There are many activities you might consider, including:

* Develop a 1-5 year climate change action plan for your Unit.
* Develop a joint action plan with other Units or partners in your geographic area.
* Develop amendments and appendices to ongoing program guidance.
* Develop a statement of climate change priorities for program goals, program delivery, and performance expectations.
* Develop a climate change team program of work.
* Incorporate consideration of climate change into the Unit’s Strategic Goals document.

# Dimension 2: Engagement — develop partnerships and transfer knowledge

The global nature of climate change means successful responses will require working across boundaries to accomplish common goals. Research-management partnerships are key to the rapid and successful adoption of new information needed to address emerging management problems and define relevant research and development objectives. While much expertise lies within the Agency, many experts, advisors, and initiatives are outside the Agency, and oftentimes the most effective action can be to participate in ongoing local or regional efforts.

The Roadmap highlights the need for engagement with our internal and external partners. While the Forest Service is already integrating science and management through workshops and building public awareness, there are opportunities to strengthen existing relationships and build new ones. In the near term, our Units will need to engage with their scientific partners to assess the vulnerability of human and ecological systems and look for potential ways our lands can be used to reduce atmospheric greenhouse gas concentrations. Through partnerships we can build environmental awareness, knowledge, and skills for employees, private landowners, Tribes, youth groups, and visitors so that we can all be better prepared to participate in decisions about the Nation’s forests and grasslands. We will also need to work with the general public, local stakeholders, youth, tribes, and other agencies for an all lands approach to dealing with climate change and other large-scale threats to the broad array of benefits we receive from our forest and grassland landscapes.

## 4. Science and Management Partnerships

Many of our climate change activities will require assistance from technical experts in areas such as climate change education, vulnerability assessments, adaptation planning, carbon assessments, or sustainable business operations. Having established relationships with experts in the social and natural sciences can help you make better decisions and ensure that science and technology is being developed to fill management needs.

### Scorecard Question

* **Does the Unit actively engage with scientists and scientific organizations to improve its ability to respond to climate change?**

**What can a science-management partnership do for you?**

Science-management partnership can help to expand expertise and capabilities at the Unit level. Below are just a few activities that you may consider:

* Work together to develop a science seminar series on the relevance of climate change to particular program areas (Element 1).
* Work with scientists, land and community managers, educators, and communicators to translate climate change science into accurate, audience-appropriate, and easily accessible tools and information (Elements 1, 3, 5, 6, 7, and 9).
* Work with social scientists to develop place-based educational materials that more effectively communicate climate change issues (Element 1).
* Discuss with scientists your need for research that will inform forest plan revisions, programmatic or project level planning, effects analyses, or monitoring related to climate change (Elements 3, 7, and 8).
* Develop adaptation actions and assess vulnerability or carbon (Elements 6, 7, and 9).
* Work with local experts on renewable energy and sustainability science to develop a joint “green team” (Element 10).
* Discuss with scientists your needs for research and technical support to improve your ability to manage climate-related issues (Elements 6, 7, 8, and 9).
* Exchange ideas and provide input into the development of tools that integrate climate change science and management, such as TACCIMO, the Template for Assessing Climate Change Impacts and Management Options: <http://www.sgcp.ncsu.edu:8090/>

### Definitions

* **Scientists and scientific organizations** include Forest Service Research Stations, universities, other research agencies and programs, and other entities with a role in applied science development or delivery including science specialists and programs within the National Forest System and State and Private Forestry.
* **Partnerships** are any formal or informal relationship where two or more entities work together to achieve mutually beneficial goals.

### Geographic Scale

Science-manager partnerships may exist on the Unit, with a coalition of Units across a particular geography or ecosystem, or at a larger state or regional scale. Units are encouraged to scale up and aggregate based on shared social and political interests as well as partner and scientific geography. However, larger-scale partnerships must have a direct benefit to the Unit level.

### Getting to YES

To answer “yes,” your Unit should have an ongoing partnership with scientists or scientific organizations that is helping you to improve your ability to respond to climate change. The narrative for this element asks you to answer the following questions:

1. How have your Unit and the science community collaborated and shared information to improve your ability to respond to climate change?
2. Who are your main science partners?

**Where can you get engaged with the science community?**

You may already have established relationships with scientists that you could expand upon to include climate change activities. Here are some ideas you may consider:

* Utilize your regional program managers such as ecologists, geneticists, wildlife biologists, hydrologists, and botanists and Forest Health Protection entomologists and pathologists as dedicated science application and delivery specialists.
* Work with scientists on your local experimental forest.
* Develop partnerships with science delivery and technology transfer specialists at the Research Station closest to your Unit.
* Work with local organizations that specialize in climate change science delivery.
* Work with scientists outside of the agency that do research in your geographic area.
* Engage with the science committees of regional science-management integration efforts convened by other agencies, such as the Department of Interior’s Landscape Conservation Cooperatives, Climate Science Centers, or Joint Ventures.
* Take advantage of national level service centers such as the Threat Assessment Centers, the Ecosystem Management Service Center, the Forest Management Service Centers, the Forest Health Technology Enterprise Team, the Stream Systems Technology Center (“Stream Team”).

*For a list of existing programs that focus on science-management integration, see Appendix B.*

## 5. Other Partnerships

Responding to climate change, and other large-scale challenges, lends itself to an all lands approach. We can increase our capability to respond to climate change by working with partners at a landscape scale, framing problems and solutions at the level of watersheds, ecoregions, or broad geographic areas. A functional landscape in this context is defined not by its acreage or jurisdictions, but by interdependencies of ecological, social, and economic processes and functions.

### Scorecard Question

* **Have climate change considerations and activities been incorporated into existing or new partnerships (other than science partnerships)?**

### Definitions

* **Climate change activities** are actions we take to respond to climate changes such as assessing current risks, vulnerabilities, policies, and gaps in knowledge; engaging employees and stakeholders to seek solutions; and managing for resilience in ecosystems and human communities through adaptation, mitigation, and sustainable consumption.
* **Partnerships** are any formal or informal relationship where two or more entities work together to achieve mutually beneficial goals.

**How do you incorporate climate change into partnerships?**

* Design and deliver place-based climate change education events for employees, youth, volunteers, or the general public (Element 1).
* Incorporate climate change adaptation and mitigation concepts into community-level or grass-roots collaborative planning processes, such as watershed assessments (Elements 7 and 9).
* Develop state-level or regional climate impact assessments for the forest sector (Element 6).
* Engage in joint ecosystem restoration projects as part of your adaptation strategy (Element 7).
* Set up a local division of a citizen science climate change monitoring program (Element 8).
* Increase understanding of climate change impacts using the traditional ecological knowledge of American Indian and Alaska Native Tribal communities (Elements 5 and 6).

### Geographic Scale

Partnerships may exist at the Unit level, with a coalition of Units, or at sub-regional/regional scales. Units are encouraged to scale up and aggregate based on shared social and political interests as well as partner geography. However, larger-scale alliances must be beneficial to the Unit level.

### Getting to YES

To answer “yes,” your Unit should include climate change-related considerations and activities in one or more existing or new partnerships to expand your capacity to respond to climate change. The narrative for this element asks you: In what ways have climate change considerations and activities been incorporated into your existing or new partnerships?

**Which partnerships might involve climate change considerations and activities?**

The partner landscape is diverse, and mutually beneficial goals may vary from place to place. Think about partners and organizations you are already involved with or new organizations that are being developed specifically to respond to climate change. Below are just a few you may consider:

* State-level climate change impact groups, such as the Wisconsin Initiative on Climate Change Impacts (http://www.wicci.wisc.edu/).
* Climate change groups convened by other federal agencies, such as the Department of Interior’s Landscape Conservation Cooperatives (http://www.fws.gov/science/shc/lcc.html).
* State-level forest resource groups, forest advisory councils, or forest health councils.
* American Indian and Alaska Native Tribal governments and communities.
* Landscape-scale groups convened by non-governmental organizations, such as The Nature Conservancy’s Central Appalachians Integrated Landscape project or Southwest Climate Change Initiative, and the U.S. Fire Learning Network (<http://tncfire.org/training_usfln.htm>).
* State Foresters.
* Community-based forestry coalitions.
* Watershed councils.
* Resource conservation districts.
* Grazing associations.
* Utilities and utility commissions.

*More resources on partnerships and engagement can be found at the Partnership Resource Center:* [*http://www.partnershipresourcecenter.org*](http://www.partnershipresourcecenter.org)

# Dimension 3: Adaptation — assess impacts of climate change and manage change

In order to manage forests in a changing climate, we will need to assess the current and expected impacts of climate change, assess which resources are most vulnerable to these impacts, adjust our management strategies when necessary, and monitor impacts and effectiveness of our strategies over time. The Roadmap identifies a need to develop climate change vulnerability assessments for our National Forests and Grasslands and for those assessments to include social impacts. Element 6 provides an approach to developing these assessments at the Unit-level to inform decision-making. The Roadmap also identifies an immediate need to improve adaptive capacity on the lands we manage. Element 7 asks whether this process is underway at the Unit level, and is based on information from the vulnerability assessments. Finally, both vulnerability assessments and adaptation actions will require some form of monitoring. Monitoring changes in impacts and stressors helps us understand what resources are or will be most vulnerable. Part of a robust adaptation strategy is the appropriate use of monitoring to inform whether the strategy is effective. Element 8 asks whether monitoring is being used to track both climate change impacts and the effectiveness of adaptation actions.

## 6. Assessing Vulnerability

Developing a climate response requires us to understand how climate change may affect the resources we manage and the benefits they provide. Resource and social vulnerability intertwine. A vulnerable community around a forest puts more demands on the resource and the Agency and offers less potential and fewer resources for partnering. A more vulnerable forest threatens adjacent resources and puts more ecosystem services at risk. As with any threat we face, understanding which resources are most vulnerable and how the threat interacts with other stressors can help us develop and prioritize management activities in response. This understanding can also help us identify our monitoring needs.

### Scorecard Question

* **Has the Unit engaged in developing relevant information about the vulnerability of key resources, such as human communities and ecosystem elements, to the impacts of climate change?**

### Definitions

* **Vulnerability** is the degree to which a system is susceptible to, and unable to cope with, adverse effects of stressors, including climate variability and extremes. Vulnerability to climate change is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.
* **Key resources** are economic, ecological, and social resources of particular importance to Unit-level decisions and actions. They can also include resources of regional or national importance, interest, or concern, if the Unit contributes to or affects these.
* **Stressors** are any physical, chemical, or biological entity that can induce an adverse response. Stressors can arise from physical and biological alterations of natural disturbances, increased demand for ecosystem services (such as recreation), alterations of the surrounding landscape, chemical alterations in regional air quality, or from past management actions.

### Geographic Scale

Vulnerability can be assessed at a Unit, state, multi-unit, or Regional scale, but must be at a spatial resolution relevant to management actions at the Unit level and include the geographic area of the Unit. Units are encouraged to take advantage of and be actively engaged in state and regional assessments that are being conducted by Forest Service Research Stations and Regional Offices, state or other federal agencies, non-governmental organizations, or other research groups. Units should seek assistance from Regions and partners when evaluating whether published assessments are appropriate for their needs and geographic location. If no vulnerability assessments are available or in development in the Unit’s geographic area, Units should consult their regional climate change coordinator or partners for assistance in assessing vulnerability of their key resources to climate change.

Getting to YES

To answer “yes,” vulnerability of key resources to climate change should be assessed for a geographic area that includes your Unit and be used in Unit-level management decisions. Consult your regional climate change coordinator for assistance as many Regions have already begun work on this element.

Vulnerability assessments can vary in approach, scope, level of detail, and geographic scale. We recommend that they include the following components (described in more detail in Appendix C):

1. **Key resources:** Identify the key resources on the Unit. You may have already completed this step in your forest planning process.
2. **Review of existing information:** Review relevant scientific, social, and economic information to identify the sensitivity of key resources to climate change. Check with your Regional Office to see if they have already created such a document or have gathered this information.
3. **Current stressors:** Determine the influences and stressors on the existing landscape, and identify current stressors which may interact with climate change and social and economic factors.
4. **Local climate change and impacts:** Look at historical climate data and available climate model projections for your area to determine the potential exposure of key resources to climate change.
5. **Professional judgment:** Consult with scientists, regional program managers, tribes, or other partners who have place-based experience to help interpret the information you’ve collected.

The narrative for this element asks you to answer the following questions:

1. What key resources have you identified on your Unit?
2. What scientific, social, and economic information about the exposure and sensitivity of those resources to climate change have you reviewed and considered?
3. What current stressors are you observing on your Unit? How do (or will) these stressors interact with a changing climate?
4. What historical climate data and climate projections have you examined? How might your key resources and their stressors be impacted by these climate changes?
5. Who have you consulted to help interpret the information you’ve collected?
6. How have you used this vulnerability information to prioritize possible management actions?

**How do you identify your key resources?**

The most valued benefits that a Unit provides to its surrounding community vary from place to place. To identify your key resources, consult your land management plan, scientific experts, tribes with traditional ecological knowledge, and other stakeholders. Consider:

* Trees and their associated products such as paper, building materials, and biofuels
* Availability of grazing resources for domestic and wild herbivores
* Clean and abundant drinking water
* Winter recreation opportunities such as ice fishing, skiing, and snowmobiling
* Ecological communities and ecosystems
* Wilderness character
* Habitat for fish, wildlife, and rare and endangered species
* Infrastructure for socioeconomic benefits, including energy and transportation

**Where can you find a vulnerability assessment?**

Many federal agencies, state governments, non-governmental organizations, and scientific research groups have developed or are in the process of developing climate change vulnerability assessments or similar products. Your Unit vulnerability assessment need not be as formal as these products, but here are some assessments you may want to consider\* or review:

* Unit-level vulnerability assessments
	+ Examples: Watershed vulnerability assessments in development for several national forests; The Ecosystem Vulnerability Assessment and Synthesis for the Chequamegon-Nicolet National Forest (<http://treesearch.fs.fed.us/pubs/38255>)
* State-level climate impact assessments for the forest sector
	+ Example: The Washington Climate Change Impacts Assessment
* State-level action plans and assessments that include climate change
	+ Examples: State Wildlife Action Plans and State Forest Resource Assessments and Strategies
* Regional assessments developed by the Forest Service
	+ Example: A Vulnerability Assessment and Action Plan for National Forests in Western Washington (<http://ecoshare.info/wp-content/uploads/2011/05/CCFB.pdf>)
* Regional assessments developed by other federal agencies or groups of agencies
	+ Examples: BLM Rapid Ecoregional Assessments; Regional assessments for the US Global Change Research Program’s National Climate Assessment; National Park Service Resource Condition Assessments.
* Regional assessments developed by non-governmental organizations
	+ Examples: vulnerability assessments developed by the Nature Conservancy and the National Wildlife Federation.

\*Note: Some of these assessments may not have sufficient detail at the local level to be used in unit-level decisions or may only address impacts but not sensitivity of resources or adaptive capacity. You will need to evaluate them on a case-by-case basis. More information is available in Appendix C.

## 7. Adaptation Actions

New information about the potential vulnerabilities of key resources to climate change may cause us to reconsider whether our current goals and objectives can be met using our current management activities. Treatments may need to be adjusted in time and place, or different treatments may be needed to achieve the same goals. In some cases, goals and objectives themselves may need to be re-evaluated. Adjusting our activities and decision-making processes to reduce the vulnerability of key resources to climate change is called adaptation, an essential step in ensuring that our lands continue to provide benefits under a changing climate. Adaptation actions aim to promote resilience or resistance to climate change or facilitate transitions when an altered climate regime can no longer sustain our current systems.

### Scorecard Question

* **Does the Unit conduct management actions that reduce the vulnerability of resources and places to climate change?**

### Definitions

* A**daptation actions** facilitate long-term (decades to centuries) Unit-level resilience and/or resistance to potentially adverse effects of climate change orfacilitates transitions to future states by minimizing disruptive outcomes. Adaptation actions are supported by scientific principles and documented in the scientific literature.
	+ Examples: maintaining and enhancing biological diversity, reducing terrestrial or aquatic exotic species, modifying genetic guidelines for planting nursery stock, or investing in infrastructure that can withstand a disaster.
* **Resilience** is the degree to which systems (e.g., a forest ecosystem, aquatic system, or human community) can recover from one or more disturbances without a major (and perhaps irreversible) shift in composition or function.
	+ Example of managing for resilience: periodic reduction in stem densities and surface fuels to reduce fire severity in dry forest or use of distributed energy systems that are locally self-sufficient.
* **Resistance** is the ability of an organism, population, community, or ecosystem (terrestrial, aquatic, human) to withstand perturbations without significant loss of structure or function. From a management perspective, resistance includes 1) the concept of taking advantage of and boosting the inherent (biological) degree to which species are able to resist change, and 2) manipulation of the physical environment to counteract and resist physical and biological change.
	+ Example of managing for resistance: placement of fire breaks on the perimeter of climatically sensitive wildlife habitat to reduce fire spread or constructing levees to avoid flooding.
* Approaches that **facilitate transitions (also called response and realignment)** are strategic actions that work directly with the changes that climate is provoking and ease transitions to future states by mitigating and minimizing undesired and disruptive outcomes while maintaining essential functions.
	+ Example of managing to facilitate transitions: planting species or genotype mixes that may be more suited to altered climate conditions in restoration projects.

**How do you incorporate adaptation actions in to your decisions and management activities?**

Below is one approach that has been used on other Units that may work for you:

1. **Connect adaptation actions to vulnerability assessments:** Development of adaptation actions will generally be focused on those resources and locations that have been judged to be most sensitive to climate change in interaction with multiple stressors.
2. **Review synthesized information on adaptation strategies:** Documentation of adaptation strategies includes the scientific basis for how various general approaches to management and planning can maintain or enhance resilience and resistance of key resources or facilitate transitions.
3. **Review planned projects:** Review planned projects (see list on next page for ideas) to determine if management actions are consistent with adapting to a changing climate, then revise as needed in the context of objectives for sustainable resource management.
4. **Develop adaptation actions:** Management plans and projects may require the development of specific on-the-ground actions that can maintain or enhance resilience and resistance of key resources to a changing climate or facilitate transitions.
5. **Evaluate feasibility and probability of success:** Consider if the potential benefit of a proposed adaptation action is worth the investment of cost and human resources. Generally, only those actions that have a high probability of achieving a positive outcome should be pursued.
6. **Identify monitoring options:** Monitoring is critical for determining the success of adaptation actions over a period of decades. Periodic evaluation of monitoring data will allow for adjustments of management if necessary.

*For more information about this approach, see Appendix D.*

### Geographic Scale

Adaptation actions will usually take place at the Unit level, but some might encompass larger scales that include the Unit. Support should be provided by Regional Offices, Research Stations, and the Washington Office. Units are encouraged to consult their regional climate change coordinator or partners for assistance.

Getting to YES:

To answer “yes,” your Unit should identify and incorporate relevant adaptation actions based on the vulnerability of key resources (identified in Element 6) into priority setting and management actions. The narrative for this element asks you to answer the following questions:

1. What adaptation activities are you doing on your Unit to reduce the vulnerability of your key resources to climate change?
2. Are these activities aimed at increasing resilience to stressor impacts, promoting resistance to climate change, or facilitating transitions to respond adaptively to environmental change?

**Where should you add adaptation actions?**

Adaptation actions should be added into existing plans to aid in decision-making. As you move forward in developing new projects and plans, you should consider including actions for climate change adaptation. Below are some types of plans and strategies where adaptation considerations are appropriate:

* A conservation strategy.
* Your Unit’s Land Management (Forest) Plan.
* Landscape plans such as Collaborative Forest Landscape Restoration Projects.
* Community Wildfire Protection Plans.
* Suite of essential actions under the Watershed Condition Framework.
* Project plans.
* Travel Management plans.
* Your Unit’s annual program of work.

8. Monitoring

Monitoring paves the way for vulnerability (Element 6) and carbon assessments (Element 9) to be updated and validated, revealing critical new issues. Just as monitoring visitor use can help make better decisions about managing your recreation program, so too can monitoring help you develop and adjust adaptation actions to respond to climate change. There is a wide variety of national monitoring programs already in place that are organized by the Forest Service, other agencies, and non-governmental organizations. Many of these programs, as well as your local monitoring programs, may have data that will help you assess trends in climate change, associated stressors, and the viability of your most vulnerable resources.

### Scorecard Question

* **Is monitoring being conducted to track climate change impacts and the effectiveness of adaptation actions?**

### Definitions

* **Monitoring** is both (1) the collection and analysis of resource data to measure the direction, pace, and magnitude of changes over time in the amounts, spatial distribution, or condition of resources; and (2) the systematic collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives. SeeAppendix E for descriptions of three types of monitoring that are important to consider in the context of climate change.
* **Effectiveness monitoring** is focused on evaluating resilience and adaptation outcomes that result from on-the-ground activities. The aim is to determine the effectiveness of management actions taken to reduce stressors, enhance resilience, or conserve species.

### Geographic Scale

Monitoring may take place at the Unit level or larger scale. Discuss with your Regional climate change coordinator how data from your Unit level monitoring programs may relate to climate change issues. Many types of monitoring relevant to climate change are coordinated at regional or national scales. Work with Regional Offices and science partners to interpret data from monitoring programs and examine local, regional, and larger-scale long-term (multi-decade in most cases) trends and how these trends may differ across spatial and temporal scales. These trends should then be interpreted for the Unit level.

### Getting to YES

To answer “yes,” your Unit should evaluate current monitoring programs to determine how they can be used to track changes in the most highly vulnerable resources and most critical stressors and provide a summary of important trends. There are two ways to approach this:

1. If a vulnerability assessment has been completed, focus monitoring on the conditions of highly vulnerable resources and critical stressors identified in the assessment. Try to avoid a single emphasis approach (single species for example), but rather focus on systems and major system components. In addition, stressors whose effects are expected to be exacerbated by climate change should also be monitored (e.g. burn severity, insect or disease outbreaks).
2. If a vulnerability assessment is not yet available, work with scientific and technical experts to identify potentially important, highly vulnerable resources and critical stressors based on current scientific data and publications.

You should work with your Regional Office to ensure that any new monitoring is consistent with regional and national programs.

The narrative for this element asks you to answer the following questions:

1. What current monitoring programs can be or are being used to track climate change impacts and the effectiveness of adaptation activities on your Unit?
2. What climate change related trends are you observing on your Unit?
3. How are you using this information to adjust your management activities?
4. What additional monitoring might need to be conducted?

**What monitoring programs address climate change?**

Monitoring programs that were designed for other purposes can provide helpful information on trends in climate-related stressors and changes in vulnerable resources. Below are some monitoring programs that you may want to consider:

* Unit-level land management plan monitoring.
* Unit-level monitoring of wildlife, phenology, visitor use, growth response, etc.
* The Forest Service’s Forest Inventory and Analysis (FIA) program.
* The Forest Service’s Watershed Condition Framework monitoring.
* The U.S. Geological Survey (USGS) National Stream Gauging Network.
* The USGS National Atmospheric Deposition Program’s National Trends Network.
* The Natural Resources Conservation Service’s Natural Resource Inventory.
* The Environmental Protection Agency’s Ambient Air Quality Monitoring Program.
* The Forest Health Monitoring program.
* Department of Interior Landscape Conservation Cooperative monitoring programs.
* Other appropriate federal, state, university, and non-governmental organization monitoring programs, such as the Breeding Bird Survey.
* Experimental forests.
* The Forest Service “Climate Tower Network.”
* The Ten-Year Wilderness Stewardship Challenge ([www.wilderness.net](http://www.wilderness.net)).

*See Appendix E for examples of how to use national monitoring programs to address questions at the Unit level.*

# Dimension 4: Mitigation and Sustainable Consumption — assess carbon stocks and reduce our Agency footprint

In addition to adapting to climate change, the Forest Service is contributing to worldwide efforts to mitigate climate change and reducing greenhouse gas emissions from its land management activities and business operations where possible. As mentioned in the Roadmap, the Agency as a whole is already actively managing carbon stocks, playing a leadership role in carbon assessments, and working to reduce its environmental footprint. Elements 9 and 10 ask how these activities are being translated down to the Unit level. Element 9 addresses Unit-level understanding of the land management aspect of greenhouse gas mitigation, while Element 10 addresses the business operations aspect.

## 9. CarbonAssessment and Stewardship

Our nation’s forests and grasslands play a critical role in storing carbon and helping to reduce the amount of greenhouse gases that are released into the atmosphere. We as an Agency continue to play a strong role in helping to mitigate greenhouse gas emissions by conserving and restoring forest and grassland ecosystems, and may also play a role in other greenhouse gas mitigation activities such as energy infrastructure development. Being a “carbon literate” Agency means understanding how carbon storage varies across the landscape and how disturbances and management actions have affected carbon stocks in the past and may affect them in the future. This understanding is even more critical when climate change may exacerbate stressors, creating even more carbon losses in some ecosystems. Understanding and communicating the temporal dynamics of carbon is particularly challenging. Carbon assessments can help you understand how much carbon is currently stored in your forest and grasslands and how the potential to reduce atmospheric greenhouse gases may be influenced by management activities and disturbance regimes.

### Scorecard Question

* **Does the Unit have a baseline assessment of carbon stocks and an assessment of the influence of disturbance and management activities on these stocks? Is the Unit integrating carbon stewardship with the management of other benefits being provided by the Unit?**

### Definitions

* A **baseline assessment** is a compilation of data about current carbon stocks and recent changes in carbon stocks on the land and in harvested wood products. The data may be presented by land use and cover categories within National Forest or Grassland boundaries that support analysis and assessment: forest, shrubland, grassland, wetland, other non-forest land, and meaningful subdivisions of these (Note: These cover types may not be significant everywhere, or may be too small in area to justify separate analysis).
* **Carbon stocks** arethe quantity of carbon stored in terrestrial components (“pools”) of the forest or grassland at a given point in time. Pools include aboveground living trees or other vegetation, dead wood, leaf litter, roots and soil. For the purposes of reporting on this element, we are not including carbon in fossil fuel resources, wood products, lakes or rivers, emissions from agency operations (included in Element 10), or the impacts of socioeconomic infrastructure on emissions. However, decisions about such resources may still have implications for Unit level decisions related to greenhouse gas mitigation more broadly.
* An **assessment of the influence of disturbance and management activities on carbon stocks** is an analysis of the main factors affecting changes in carbon stocks, the opportunities to increase sequestration or reduce emissions of greenhouse gases through changes in land management where appropriate, and the interactions with other services provided by the land. Consideration of the needs and potential impacts of energy and other socioeconomic infrastructure may be appropriate for such analysis, particularly if conducted at larger geographic scales than the Unit level, but is not required for the purposes of this scorecard.

### Geographic Scale

The baseline assessment may be prepared at the Unit, state, landscape, or regional level as long as it breaks out information for individual Units (see Appendix E). The most appropriate scale for conducting the assessment of disturbance and management activities on carbon stocks may be either the individual Unit or a larger scale (landscape, state, region) depending on the availability of existing analyses and whether Units have been explicitly included as part of a larger-scale assessment, such that the prospective role of federal lands can be determined. The assessment may also draw on information from life cycle analysis of the effect of forest management alternatives done at a multi-region, national, or international scale.

### Getting to YES

To answer “yes,” your Unit should have a baseline assessment of carbon stocks and an assessment of the influence of disturbance and management activities on these stocks and should use these assessments to integrate carbon stewardship with the management of other benefits being provided by the Unit. Assessments can be separate documents, a combined document, or part of a larger regional or state assessment. However, the information should be presented in a way that is easily understood by and relevant to those making Unit-level decisions. The previous sections on definitions and geographic scale provide some guidance about what information may be minimally required, and the technical information in Appendix F provides additional guidance about approaches.

The narrative for this element asks you to answer the following questions:

1. Does your Unit have a baseline assessment of carbon stocks?
2. Does your Unit have an assessment of how disturbance and management activities are influencing carbon stocks or carbon sequestration and emissions? What is the basis for this assessment?
3. How is your Unit integrating carbon stewardship with the management of other benefits being provided by the Unit?

**What tools are available for estimating carbon?**

Links to tools developed by Forest Service researchers and other groups for estimating carbon are at the Climate Change Resource Center (CCRC) Tools at <http://www.fs.fed.us/ccrc/tools/>. You will find:

* **COLEv2.0** enables the user to examine forest carbon characteristics of any area of the continental United States.
* The **Carbon Calculation Tool 2007, CCT2007.exe** reads Forest Inventory and Analysis (FIA) data and generates state-level annualized estimates of carbon stocks on forest land.
* The **Forest Vegetation Simulator (FVS)** is the USDA Forest Service's nationally supported framework for forest growth and yield modeling.

*More details about these tools and other carbon estimation methods are in Appendix F.*

## 10. Sustainable Operations

### The direct relationship between healthy forests and our faucets, our clean air, our heating systems, our modes of transportation, and many other goods and services has never been more apparent or important. Several laws, regulations, and Executive Orders have established requirements for reducing our environmental footprint. To fulfill the Forest Service’s obligation to present and future generations, our land stewardship mission must be strategically integrated with practices that reduce our resource consumption. Instituting a culture of sustainable consumption by integrating environmental footprint reduction principles into all our programs, practices, and policies will help us to reach our goals.

### Scorecard Question

* **Is progress being made toward achieving sustainable operations requirements to reduce the environmental footprint of Agency operations?**

### Definitions

* **Environmental footprint** isa measure of human demand on an ecosystem. For the Forest Service, footprint areas include energy, water, waste, fleet/transportation, and purchasing.
* **Sustainable operations as defined by EO 13514** are operations conducted in such a way as to create and maintain conditions under which humans and nature can exist in productive harmony, and that permit fulfilling the social, economic, and other requirements of present and future generations.
* **Applicable** means cost effective, practicable, and appropriate and feasible within the Unit’s geographic area. For example, a Unit in a remote area may not be able to meet the requirement to use non-petroleum fuels if such fuels are not commercially available in their area.
* **Sustainable operations requirements** are the legal requirements of EO 13423, EO 13514, Energy Policy Act of 2005, and the Energy Independence and Security Act of 2007, summarized as follows (full list at <http://www.fs.fed.us/sustainableoperations/documents/crosswalk-sus-goals-eo.pdf>):
	+ **Energy:** Reduce energy intensity (BTU/GSF) by 3 percent per year or 30 percent total by FY 2015 (2003 baseline). Increase use of renewable energy to not less than 5 percent of total electric energy in FY2011-12 and not less than 7.5 percent of total electric energy in FY2013 and beyond. Renewable energy requirements are doubled if the energy is produced at a federal facility, on federal lands, or on Indian land.
	+ **Water:** Reduce potable water intensity (gal/GSF) by 2 percent per year or 16 percent total by FY2015 (2007 baseline). Reduce industrial, landscaping, and agricultural water consumption by 2 percent per year or 20 percent total by FY2020 (2010 baseline).
	+ **Fleet and Transportation:** Reduce fuel consumption by 2 percent per year or 20 percent total by FY2020 (2005 baseline), increase use of non-petroleum fuels by 10 percent per year by 2015 (2005 baseline), right-size fleet, and increase use of low emission and high fuel economy vehicles.
	+ **Greenhouse Gas Emissions:** Reduce greenhouse gas emissions from direct sources (Scopes 1 and 2) by 21 percent and from indirect sources (Scope 3) by 7 percent by 2020 (baseline 2008).
	+ **Waste Prevention and Recycling:** Divert 55 percent of non-hazardous solid waste in buildings by FY2015 (FY2005 baseline); by FY2015, divert 50 percent of construction and demolition debris each year; increase recycling; and divert compostable and organic materials. Employ environmentally sound disposition of electronics.
	+ **Green Purchasing:** By FY2015, ensure that 95% of all new purchases/contract actions, including task and delivery orders, comply with at least 1 of the 6 categories of green products: energy efficient (Energy Star-qualified, FEMP-designated, and low standby power), water efficient, environmentally preferable, EPEAT, biobased, recycled content, and non-ozone depleting. Purchase uncoated paper containing at least 30 percent post-consumer fiber.

**Do facilities data calls overlap with Element 10?**

Actions taken and reported in national Engineering data calls, such as those from Green Purchasing and Fleet, sometimes overlap with requirements in Element 10. Examples include:

* **Building Sustainability Assessments - Federal Real Property Profile Element #25** – Requires building specific measurement against the *Guiding Principles* in the areas of integrated design, energy performance, water conservation, indoor air quality, and environmental impact of materials. This data call only applies to buildings larger than 5,000 GSF.
	+ Required under EO 13423 and EO 13514
	+ Reported at the end of each FY (September 30)
* **Energy and Water Evaluations of Covered Facilities** – This data call is facility (i.e., building or site) specific. There are currently 102 Covered Facilities in the Forest Service.
	+ Required under EISA
	+ Ongoing reporting, with DOE “snapshot” taken on June 30th
* **FY Greenhouse Gas (GHG) and Annual Energy Report** – These national-level reports contain compiled information on Agency GHG emissions by scope, renewable energy installations, energy and water intensity, metering of buildings, and training expenditures.
	+ Required under EO 13514 and EISA
	+ Reported annually in early January for the last FY

*Tip: Collaborate with unit engineers, energy managers, and subject specialists to ensure coordination of these requirements.*

### Geographic Scale

### To reach Agency-level sustainable operations requirements, significant efforts must be made at the Unit level, with assistance, guidance, and leadership from the Regions, Stations, Area, and national level. Place-based solutions are the most effective for making operations more sustainable and implementing a culture of sustainable consumption over the long run.

### Getting to YES

To answer “yes,” your Unit should either:

* demonstrate in the narrative that it has made progress towards the applicable sustainable operations requirements listed in the definitions OR
* complete the Sustainable Operations Checklist (Appendix G) annually (use the narrative to provide a justification for any items deemed not applicable).

The narrative for this element asks you to answer the following questions:

1. What actions has your Unit taken to make progress towards the sustainable operations targets listed in the definitions for this element?
2. What reductions in resource use were achieved as a result of these actions?
3. What support does your Unit provide for Green Teams, sustainable operations training, recognition programs, and other activities that foster a culture of sustainable consumption?

**How do you start a “green team”?**

A green team is a group of employees, regardless of discipline or organizational level, that facilitates the pragmatic implementation of sustainable operations principles at their work site. Having a green team can help your Unit reduce its environmental footprint while providing leadership development opportunities and promoting collaboration within and among Units.

To get started on your own green team, check out the online “Green Team Toolkit” at <http://www.fs.fed.us/sustainableoperations/greenteam-toolkit/index.shtml>. You will find:

* How to Start a Green Team
* Resources by Footprint Area
* Success Stories by Region/Station/Area
* Green Team Contacts
* Green Factoids
* National Footprint and Sustainability Strategies

…and more!

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