**GOAL**

***By the end of 2012, for 50 percent of the nation, the Department will identify resources that are particularly vulnerable to climate change, and implement coordinated adaptation response actions.***

**Overview**

As a first step in achieving the Climate Change High Priority Performance Goal, the Department will assess the vulnerability of resources that may be impacted by climate change and assess the threats to resources that may be exacerbated by climate change. Those resources include: (i) fresh water supplies; (ii) landscapes, including wildlife habitat; (iii) native and cultural resources; and (iv) ocean health; and the specific threats to those resources, include (i) invasive species; (ii) wildfire risk; (iii) sea-level rise; and (iv) melting ice/permafrost.

These assessments, along with other information available to resource managers, will be used to identify and implement short-term management actions that can be implemented by the Department. Additionally, the Department will use the assessments and other related information to inform longer-term planning processes, in coordination with our partners and other stakeholders who jointly manage these resources with us. Throughout this effort, we will prioritize the collection and integration of key data that provide indicators of how climate change is affecting resources.

**Measures**

The following measures will be used to assess our progress in meeting our climate change high priority performance goal, with the following interim metrics:

1. **Vulnerability Assessment Measures: By the end of 2011, DOI will complete vulnerability assessments for one or more of the resource impacts identified above for five geographic regions. By the end of 2012, DOI will complete vulnerability assessments for an additional seven geographic regions.**
	1. In order to conduct vulnerability assessments, we are establishing a network of Climate Science Centers (CSC) and Landscape Conservation Cooperatives (LCC) to pull in other federal, state, tribal, and private stakeholders. Interim metrics:
		1. Number of LCCs formed in 2010, 2011, 2012
		2. Number of CSCs formed in 2010, 2011, 2012
	2. CSCs and LCCs will identify the priority resources and resource impacts that will be their focus, and they will do so in their organizing documents in partnership with stakeholders. Interim metrics:
		1. Number of LCC operating plans completed in 2010, 2011, 2012
		2. Number of CSC research priority documents completed in 2010, 2011, 2012
	3. Working with CSC support, LCCs will conduct vulnerability assessments, which will pull from existing data and also utilize new work done by CSCs and LCCs. Interim metrics:
		1. Number of vulnerability assessments underway in 2010, 2011, 2012
		2. Number of vulnerability assessments completed in 2011, 2012
2. **Adaptation Strategy Measure: By the end of 2012, for at least seven geographic regions, the Department will implement three adaptation response actions.**
	1. We are committed to implementing appropriate adaptation actions in the near term. The ultimate goal of the CSC/LCC network is to identify science-based approaches for responding to the impacts of climate change. Interim metrics:
		1. Number of climate change adaptation actions undertaken by DOI in 2011 and 2012
	2. Implementing coordinated solutions that will be used by our partners across landscapes will require an on-going engagement over many years. We can and must, however, begin to identify and implement appropriate responses now. Interim metrics:
		1. Number of adaptation planning workshops conducted in each geographic region in 2011 and 2012
		2. Number of climate change adaptation actions undertaken by stakeholders in 2011 and 2012
3. **Data Collection and Integration Measure: By the end of 2011, we will identify at least one data set that provides sound, replicable indicators of climate change impacts for each of the resource areas and climate change-related threats to resources identified above.** By 2012, we will develop an information collection and sharing architecture that will be used to maximize the collection of that data across the Department and with our partners.
	1. Interim metrics:
		1. Number of data sets identified as critical for each priority resource or impact
		2. Number of geographic areas that have established integrated climate change data collection priorities.

**DATA CALL – CLIMATE CHANGE VULNERABILITY ASSESSMENTS**

**Definitions:**

***Vulnerability*** is the degree to which a natural or human system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability 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.

***Vulnerability assessments*** are science-based activities (research, synthesis, modeling, monitoring) undertaken with the intent of identifying, quantifying, or evaluating the degree to which natural resources, cultural resources, infrastructure, or other values are likely to be affected by changing climatic conditions. Each vulnerability assessment minimally needs to address each of the following factors for one or more systems in the area being assessed:

* *Sensitivity* of the resources in question to climate change
* Likely *exposure* of the resources in question to climate change
* *Adaptive capacity* of the resources in question to climate change

Theses assessments should include considerations of current and future potential vulnerabilities.

The focus of a vulnerability assessment can be a specific resource or resource type (e.g., species, cold water fish), sector (e.g., fresh water, energy, forestry), community (e.g., city, ecosystem), site (town, refuge, park), region (e.g., state, southwestern deserts), or other assessment target. The level of detail and comprehensiveness will vary with management needs and consequences, available resources, and the state of knowledge. An assessment consists of a report evaluating resource vulnerability, or any combination of a stand-alone report, data sets, and/or results and analyses.

Individual vulnerability assessments may be undertaken at a range of geographic scales and may address individual species or ecosystem elements, or one or more systems consistent with the mission of the respective bureau and any non-federal partners, with the goal of identifying the vulnerabilities affecting the assessment target, or may be done to evaluate relative vulnerabilities of multiple targets across a geographic area.

**Information Requested:**

Each bureau is requested to provide to ClimateHPPG@usgs.gov, for collection and “mapping” and comparison with LCC coverage, the following:

1. The number of vulnerability assessments underway per each quarter in FY 2011 and then FY 2012
2. The number of vulnerability assessments completed per each quarter in FY 2011 and then FY 2012

For each of the assessments identified, please provide the following information. For planning purposes, please assume funding levels for FY 2011 and FY 2102 that are equivalent to that provided in the FY 2011 President’s Budget Request to Congress.

1. Project location. Please provide adequate information to enable mapping of the geographic extent / area and location (especially relative to the coverage of each Landscape Conservation Cooperative) addressed by the project.
2. Assessment endpoints. Please describe what resources are being assessed against which threats for vulnerability to climate change. Where applicable, identify which of the focal resources are being assessed against which of the focal threats that are identified in the DOI HPPG. (Please note that there are no definitions of the terms for the HPPG focal threats and resources; please use common sense and your best judgment.)
	1. DOI High Priority Performance Goal (HPPG) Focal Resources
* fresh water supplies
* landscapes, including wildlife habitat
* native and cultural resources
* ocean health;
	1. DOI High Priority Performance Goal (HPPG) Focal Threats
* invasive species
* wildfire risk
* sea-level rise;
* melting ice/permafrost.
	1. Other Resources and Threats

While these focal resources and threats were identified in the Priority Goal, please be sure to specify any other resources and threats that are part of the main purpose of the assessment under “other” resources or “threats” in the attached template.

**Reporting Timeframe:**

* Bureaus should complete the attached template and submit to ClimateHPPG@usgs.gov by January 28, 2011.
* USGS will compile preliminary map and assessment of duplicate reporting by February 15, 2011.
* Mapping and reporting of assessment coverage by area and LCC region, and by endpoint and targeted resources to be provided by March 15, 2011.

**Reporting Template:** Please provide the requested information in an Excel spreadsheet (see below). Information on project location may reference additional documents (maps, GIS coverages, etc.).

**Reporting Template : Vulnerability Assessments**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Bureau(s)1 | Project Name2 | Project Location3*(i.e. identify LCC’s and/or CSC’s where possible)* | Assessment Endpoints | QTR/FYInitiated (or est’d to be initiated) | QTR/FYCompleted (or est’d to be complete) | POC – Responsibility for Targeting and Reporting (name, phone, email) |
|  |  |  | Resource(s) being assessed | Threat(s) being assessed  |  |  |  |
| Focal resources4 | Other resources4 | Focal threats5 | Other threats5  |  |  |  |
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1. Identify bureau using standard abbreviation (e.g. FWS, USGS, etc.)
2. Identify the project with a unique title
3. Provide adequate information to enable the geographic scope of the project to be identified AND MAPPED, including the relationship of the project location to relevant Landscape Conservation Cooperative boundaries. Please provide geographic coordinates, standard geographic regions (e.g. states), shapefiles, or similar descriptive materials.
4. Assessment endpoints: Resources being assessed: Identify the primary focus of the assessment.
	1. Indicate which, if any, of the DOI focal resources for climate change: (fresh water supplies, landscapes, including wildlife habitat, native and cultural resources, ocean health) is addressed by the assessment. If the assessment targets one or more of these resources, please describe the specific resources assessed. ALSO identify other resources addressed by the assessment.
5. Assessment endpoints: Threats being assessed: Identify the primary threats addressed by the assessment.
	1. Indicate which, if any, of the DOI focal threats for climate change (invasive species; wildfire risk; sea-level rise; melting ice/permafrost) is addressed by the assessment. ALSO identify other resources addressed by the assessment.

**DATA CALL - ADAPTATION STRATEGIES**

**Definitions**

***Adaptation*** is “the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.” (IPCC Fourth Assessment (AR4), Working Group II (WGII) (Adaptation), pg. 27).

***Adaptation Actions*** are those actions meant to increase adaptive capacity by mobilizing institutions and policies to establish or strengthen conditions favorable to adaptation. (IPCC AR4 WGII definition for “planned adaptation”, pg. 294).

**Types of Adaptation Actions**

Below are seven types of adaptation actions defined by West et al. 2009 and CCSP 2008. Note: these actions are *not mutually exclusive*, nor are they all taken *solely* to adapt to climate change impacts.

1. Reduce existing anthropogenic threats and stressors

Ex: Reduce human water withdrawals to restore natural hydrologic regimes

1. Protect key ecosystem features that promote resilience

Ex: Aggressively prevent the establishment of invasive species that have been documented to impair ecosystem functioning

1. Maintain representation or important species, communities, or physical environments

Ex: Maximize habitat heterogeneity within marine protected areas or expand protected areas to include entire ecological units (e.g. coral reefs)

1. Replicate species, genotypes, and habitats to reduce extinction risk

Ex: Practice ‘bet-hedging’ by replicating populations and gene pools of desired species that will potentially be impacted by climate change

1. Restore degraded ecosystems to maximize adaptive capacity

Ex: Direct estuarine habitat restoration projects to places where the restored ecosystem has room to retreat as sea level rises

1. Identify refugia or important landscape connections or corridors that facilitate migration

Ex: Create or protect refugia for valued aquatic species at risk to the effects of early snowmelt on river flow

1. Relocate species and populations or “assist” animal migration

Ex: Establish or strengthen long-term seed banks to create the option for re-establishing extirpated populations

**Criteria for discriminating Climate Change Adaptation Actions from other management activities**

Below is a list of “filters” or “decision points” that could be used to identify which adaptation actions are primarily associated with the Climate Change HPPG.

1. Does the policy, program or project address an issue or stress that is directly related to climate change or an environmental stress that is exacerbated by climate change?
2. Is that activity over and above what would normally be the course of action in addressing that specific program or project (e.g., is the cumulative level of activity increased?)
3. Will the result of that policy, program or project be an ecosystem, community or population that is better able to maintain integrity in light of climate change impacts?

**Information Requested:**

Provide the following to richard\_t\_beck@ios.doi.gov by January 31, 2011, using the attached template:

1. Number of climate change adaptation actions undertaken by DOI in 2011 and 2012
2. Number of adaptation planning workshops conducted in each geographic region in 2011 and 2012
3. Number of climate change adaptation actions undertaken by stakeholders in 2011 and 2012.

Estimates of potential actions to be implemented based on extrapolations of past experience are recommended. Having a previous frame of reference to judge potential future activity will be useful for explaining differences of achieved vs. originally estimated. The important commodity here is not so much the amount of activity, but the amount of activity that has been coordinated and/or advised by the climate change science and information provided through the CSCs and LCCs. For planning purposes, please assume funding levels for FY 2011 and FY 2102 that are equivalent to that provided in the FY 2011 President’s Budget Request to Congress.

**REFERENCE MATERIAL**

CCSP, 2008: Preliminary review of adaptation options for climate-sensitive ecosystems and resources. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. [Julius, S.H., J.M. West (eds.), J.S. Baron, L.A. Joyce, P. Kareiva, B.D. Keller, M.A. Palmer, C.H. Peterson, and J.M. Scott (Authors)]. U.S. Environmental Protection Agency, Washington, DC, USA, 873 pp.

IPCC, 2007: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 976pp.

West, J. M. S. H. Julius, P. Kareiva, C. Enquist, A. E. Johnson, J. J. Lawler, B. Petersen, and E. R. Shaw. 2009. U.S. Natural resources and climate change: concepts and approaches for management adaptation. Environmental Management 44:1001-1021.

**Reporting Template: Adaptation Actions**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Bureau(s) or “Stakeholder” implementing the project/action | Type of Adaptation Action*(specify if workshops)* | Project Location*(i.e. identify LCCs and/or region where possible)* | When Initiated (or est’d to be initiated)Specify which half of which Fiscal Year | When Completed (or est’d to be complete)Specify which half of which Fiscal Year | POC – Responsibility for Targeting and Reporting (name, phone, email) |
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