

# CLIMATE CHANGE, INVASIVE SPECIES, AND LAND USE CHANGE AS DRIVERS OF ECOLOGICAL CHANGE IN THE GREATER YELLOWSTONE AREA

*A workshop to identify priority science and implementation strategies*

MSU Foundation Building, Montana State University, Bozeman Montana  
November 3–5, 2009

## Organized by:

National Park Service; Big Sky Institute, Montana State University; Greater Yellowstone Coordinating Committee; USGS Northern Rockies Science Center; NPS Rocky Mountains Cooperative Ecosystem Studies Unit; NPS Greater Yellowstone Inventory and Monitoring Network; University of Wyoming

## Purpose

Climate change, land-use change, and invasions of non-native species are external drivers that threaten to dramatically alter the Greater Yellowstone Area (GYA). Understanding how these drivers influence wildlands and their consequences for ecosystem management in the GYA are important challenges for scientists and managers. This workshop brings together topical experts, agency and NGO scientists, and managers to identify high-priority science needed in the GYA over the next 10–20 years. Output from the workshop will support the formulation of science agendas (a follow-up exercise) for land management agencies in the GYA. The science agendas are intended to identify critical information gaps, steer the research community toward the most important science needs of managers, and guide future funding and permitting decisions by the agencies.

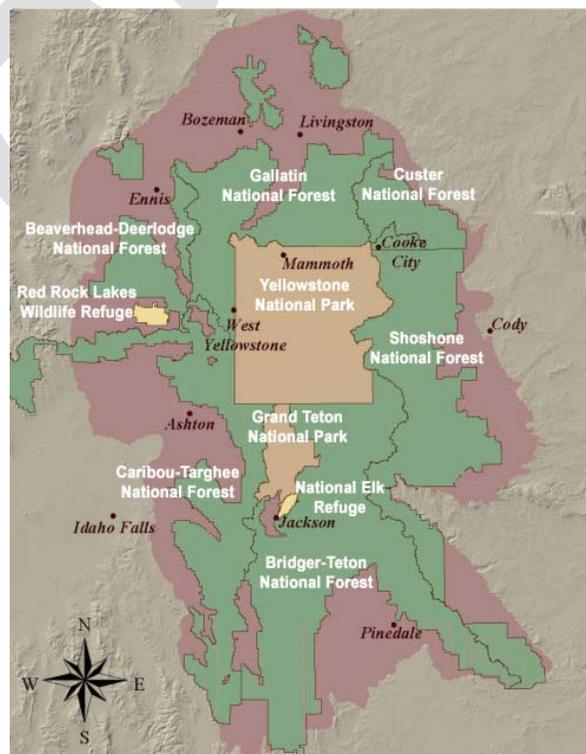
## Background

A review of past and current research (annotated bibliographies) and monitoring that addresses the three drivers, and a written summary of the current funding mechanisms available to facilitate science in the GYA, are available to workshop participants on the workshop website at [www.greateryellowstonescience.org/gyascienceworkshop](http://www.greateryellowstonescience.org/gyascienceworkshop).

## Workshop Objectives

The objectives of the workshop are to:

- 1) Review current understanding of how climate change, land-use change, and invasive species act as drivers of ecological change in the GYA over a 10–50 year time period, using expertise of participants as well as using analyses and summaries of past science;



- 2) Identify the critical knowledge gaps and science needed by managers over the next 10–20 years to adaptively address expected changes and challenges associated with the drivers;
- 3) Prioritize the needed science for each driver, and make recommendations on how science agendas can be strategically implemented based on existing institutional capacities, and identify needs for new capacity as appropriate; and
- 4) Identify the next steps (“who”, “what”, and “when”) in generating written workshop products and developing science agendas.

## Workshop Methods

The workshop will include plenary talks followed by concurrent breakout sessions for each driver. Each breakout will be attended by ~seven individuals with science expertise on the topic and three agency managers and/or scientists. Workshop participants have been selected based on their research experience and familiarity with a particular driver at a regional, national, or international level, and/or their experience as scientists or managers of GYA wildlands. Cross-fertilization, integration, and interchange between groups will occur during several combined sessions.

The geographic scope of inquiry (e.g., review of past, existing, and ongoing science) by workshop participants will be unconstrained by jurisdictional or ecosystem boundaries. However, the list of priority science projects for each driver will emphasize applications to GYA wildlands.

## Workshop Final Products

Five products, as shown in the table below, will result from this workshop, all in support of the November 2010 Greater Yellowstone Ecosystem Biennial Scientific Conference, "Questioning Greater Yellowstone's Future: Climate, Land Use, and Invasive Species."

	<b><i>GYA Science Agenda workshop final product</i></b>	<b><i>Lead and completion date</i></b>
1	Planning input for creation of the final GYA Science Agenda (committee named, including leadership, first meeting set) to be written based on the framework created in this conference (deliverable 1).	<i>YNP, Glenn Plumb lead; completion by end of workshop</i>
2	Creation of a technical report (including annotated bibliography) on the workshop with publication on four websites: Greater Yellowstone Science Learning Center, Greater Yellowstone Coordinating Committee, Rocky Mountain CESU, and the Big Sky Institute. The report will describe a framework for identifying high priority science needs for the GYA over a 10-20 year time horizon. The framework will identify critical information gaps, steer the research community toward the most important science needs of managers, and guide future funding and permitting decisions by the agencies.	<i>Big Sky Institute, Todd Kipfer lead; completion 1 March 2010</i>
3	Publication of the GYA Science Agenda framework in an appropriate ecological science journal (e.g., Bioscience, Frontiers in Ecology).	<i>Yellowstone National Park, Tom Olliff lead; completion by May 2010</i>
4	Publication of the GYA Science Agenda Framework created at this workshop in a summer 2010 article in <i>Yellowstone Science</i> .	<i>YNP, Tami Blackford lead; completion by summer 2010.</i>