

**TESTIMONY OF HERBERT C. FROST, ASSOCIATE DIRECTOR, NATURAL RESOURCE STEWARDSHIP AND SCIENCE, NATIONAL PARK SERVICE, DEPARTMENT OF THE INTERIOR, BEFORE THE HOUSE NATURAL RESOURCES COMMITTEE, SUBCOMMITTEE ON NATIONAL PARKS, FORESTS, AND PUBLIC LANDS REGARDING THE CHALLENGES POSED BY THE SPREAD OF INVASIVE SPECIES ON FEDERAL LANDS IN THE DESERT SOUTHWEST**

**APRIL 10, 2010**

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Chairman Grijalva and members of the subcommittee, thank you for this opportunity to testify on behalf of the Department of the Interior (Department) on the challenges posed by the unprecedented spread of invasive species on federal lands in the desert Southwest. We appreciate the subcommittee's interest and support of efforts to address the impacts invasive plants are having in the Sonoran desert ecosystem.

My testimony will focus on three main areas: the current threat from invasive plants to native ecosystems, the Department's response, and how we are addressing the threat posed by buffelgrass through cooperation and collaboration with our partners.

**Background**

Executive Order 13112 defines an invasive species as "an alien [with respect to the ecosystem under consideration] species whose introduction does or is likely to cause economic or environmental harm or harm to human health." Invasive species proliferation is considered one of the greatest threats to our natural and cultural resources, food-producing systems, agricultural commodities, and human health. The United States is experiencing an increase in the number of invasive species crossing our borders through various pathways, and, given the global nature of our economy and transportation systems, we expect this trend to continue. EO 13112 charged all federal departments and agencies to prevent and control invasive species and created the National Invasive Species Council (NISC). NISC provides high-level interdepartmental coordination of federal invasive species actions. NISC is co-chaired by the Secretaries of the Interior, Agriculture, and Commerce.

The introduction and spread of invasive species is fundamentally changing our natural and cultural landscapes. Isolation and careful management do not insulate our public lands. Collaborative efforts among federal, state, and local entities and willing private landowners can be highly effective in managing a shared problem when we recognize that invasive species cross geographic and jurisdictional boundaries.

Our protected areas are no longer protected; over 39 million acres of land managed by the Department are infested with invasive plant species (US Department of the Interior, 2010). Managing invasive species is one of our most significant challenges, and preventing the introduction of additional invasive species and controlling the spread of those already present is an important focus of the Department.

Buffelgrass (*Pennisetum ciliare*), is a fire adapted, perennial bunch grass introduced from the African savannah. Buffelgrass grows in dense stands, producing large quantities of seed that readily germinate and is able to invade both disturbed and undisturbed desert sites. It is spreading rapidly across Arizona's deserts, threatening the ecological integrity of the Sonoran desert ecosystems and public as well as private lands.

Conversion of the Sonoran Desert into non-native grasslands will significantly affect biodiversity, including not just threatened, endangered and at-risk plant and animal species, but also iconic species including the saguaro cactus. Species dependent on the desert community and threatened by buffelgrass invasion include cactus ferruginous pygmy-owls, desert tortoises, lesser long-nosed bats, and many other species common to desert life. Effects include loss of habitat as the desert converts to grassland, the inability to move through dense stands of buffelgrass, and the direct effects from fire (Rice et al, 2008; Flanders et al, 2006; Esque et al, 2003; Burgess et al, 1991; Morales-Romero and Molina-Freaner, 2008; Wilson et al, 1995; Williams and Baruch, 2000; Clarke et al, 2005; and Búrquez-Montijo et al, 2002).

Unlike some other areas in the U.S., fire is an infrequent occurrence in the Sonoran desert, with fire frequencies estimated to be greater than 250 years (Humphrey, 1974; McLaughlin and Bowers, 1982; Schmid and Rogers, 1988; and Schussman, Enquist, and List, 2006). Buffelgrass and other invasive grasses like red brome increase the combustible materials or fine fuels, which help carry fires through the desert. Buffelgrass stands can burn at over 1,400 degrees – almost three times hotter than fires generated by native vegetation. A low intensity fire in 1994 in Saguaro National Park killed 11 desert tortoises and 25% of saguaros (Esque and Schwalbe, 1994-1996); mortality is expected to be much greater from fires where buffelgrass is present. In addition, buffelgrass reestablishes readily with each burn at the expense of less-fire adapted native species, inducing a grass-fire cycle that progressively increases the frequency, intensity and extent of wildfires (Cardille et al, 2001; D'Antonio et al, 1992; Thomas, 1991; Esque et al, 2007; and Búrquez-Montijo et al, 2002).

Climate induced changes in temperature and precipitation patterns will further stress native communities and will likely increase natural disturbances, such as drought, flooding, fire and temperature extremes. These disturbances can weaken the ability of native ecosystems to compete with invaders. We are already beginning to see some of these changes in the southwest, where buffelgrass has been able to respond more quickly to recent variations in climate (Ward, Smith, and McClaran, 2006).

## **Buffelgrass Impacts and Management Response on Lands Managed by the Department of the Interior**

### **National Park Service (NPS)**

Buffelgrass is impacting most parks in the southwest, but effects are the most pronounced at Organ Pipe Cactus National Monument (Organ Pipe) and Saguaro National Park (Saguaro) in Arizona. It was first detected at Organ Pipe in the mid 1980s, but was initially dismissed by southern Arizona land managers as primarily a roadside weed, not well adapted to expanding to the native desert environment. In the early 1990s, an active management program based on

manual removal was launched in response to the rapidly expanding buffelgrass population. Despite early success, the populations continued to expand along with other invasive grasses. It is now viewed as one of the most serious threats to natural and cultural resources in the park.

Buffelgrass was first observed at Saguaro National Park in 1989, and NPS land managers estimate that buffelgrass populations are doubling in size every two years. Inventories between 2002 and 2004 indicated that buffelgrass covered 175 acres of the park and was expanding. Buffelgrass is now found on 2,000 acres of park land (or 2%), and current estimates have buffelgrass increasing in area by 35 % per year and potentially covering 60 % of the park's desert habitat by 2020.

In response, the park developed an aggressive management control program, by using a combination of manual and chemical methods. In 2009, these treatments included 3000 hours contributed by local community volunteers. The park has also joined with the local communities, the University of Arizona, the Forest Service and BLM in investigating aerial and other state-of-the-art application methods.

### **US Fish and Wildlife Service (FWS)**

Buffelgrass is an existing and potentially widespread threat to FWS refuges in Southern Arizona and beyond. The introduction of a cold-adapted variety in Texas and Mexico is expected to begin to impact desert grasslands and woodlands upslope and in higher latitudes, and climate change may exacerbate this spread. Specific threats include the saguaro cacti, the iconic symbol of the Sonoran Desert landscape and the Arizona tourist industry. Imminently threatened are the Sonoran Desert and desert grassland refuges in Arizona and New Mexico including the Cabeza Prieta, Kofa, Leslie Canyon, San Bernardino, San Andres National Wildlife Refuges and refuges and protected areas throughout the borderlands region into south Texas. The Service has responded to this threat on many levels through increased interagency and partner coordination, monitoring for early detection, integrated buffelgrass control measures (e.g., herbicide, mechanical and manual removal), and through buffelgrass Burned Area Rehabilitation projects to restore sustainable native habitats. Effective control continues to be a challenge due to the abundance of buffelgrass seed sources that invade from adjacent lands and Mexico.

### **Bureau of Land Management (BLM)**

The BLM is working to control infestations of buffelgrass which occur on an estimated 14,750 acres within the Tucson Field Office. Most of this is on the Ironwood Forest National Monument. The need to control and manage these existing infestations is part of the BLM's early detection and rapid response program, which is coupled with control and management of the species. To do so, the BLM applies an integrated pest management approach using various treatment methods such as manual, mechanical, and chemical control methods. Even more importantly, prevention is of the highest priority to ensure that infestations of buffelgrass and other weed species are not introduced or spread into other fragile parts of the Sonoran Desert and north and west into the Mohave Deserts. Control of buffelgrass is important to prevent its movement to the north and west where the BLM is trying to control and manage other invasive annual grasses that have become detrimental to the Mohave Desert and the Great Basin.

On Ironwood Forest National Monument, the BLM, along with local volunteers, Friends of the Ironwood Forest, Sonoran Desert Weed Whackers and other groups conduct regular buffelgrass removal projects. For example, The Waterman Mountains, which contain rare and unique vegetative communities, have been the target of the “Save the Watermans” project. This project has nearly eradicated buffelgrass from the Waterman Mountains following a concerted three-year effort which is aimed at completely controlling the species in this area by the end of 2010. In recognition of the remarkable success of the project, and their unrelenting efforts, John Scheuring and the Friends of the Ironwood Forest have been selected to receive the BLM’s 2010 “Making a Difference” National volunteer award.

Building on the “Save the Watermans” success, the BLM and its partners have now begun planning for a new “Save the Silverbells” campaign, which will target buffelgrass in the nearby Silverbell Mountains, also located on the Ironwood Forest National Monument. The BLM will treat 285 acres of buffelgrass on the Monument in 2010. This is a combination of first-year, second-year and third-year treatments. Forty of the 285 acres of buffelgrass eradication treatment planned for 2010 will be a third year treatment, and we expect to have buffelgrass completely eradicated from this 40 acres by the end of 2010.

#### **Bureau of Indian Affairs (BIA)**

The Bureau of Indian Affairs, along with Arizona tribes, has the responsibility for managing invasive species on over 3 million acres within the Sonoran Desert region. In addition to the Tohono O’Odham Nation, consisting of 2,789,047 acres, there are five urban tribes with a land base of about 350,000 acres susceptible to buffelgrass invasions within the vicinity of Phoenix. The Sonoran Desert Museum 2006 Buffelgrass Survey Report stated that distribution of buffelgrass is along all major highway routes including Interstate 10 west of Phoenix to the California border. It is present north and east of Phoenix near several Indian reservations (Van Devender, Thomas, and Dimmitt, 2006). Since 2006, the spread of buffelgrass has increased and weed specialists are concerned. Recent rains in Phoenix have turned vacant lots and disturbed areas into carpets of buffelgrass (Morrison, 2010).

Foresters and range specialists align the buffelgrass invasion with the cheatgrass problem on tribal and public lands. Both are extreme fire hazards, disturb the natural ecosystem and are serious problems within the wildland/urban interface.

#### **United States Geological Survey (USGS)**

USGS scientists have been studying the impacts of invasive plants to native species and lands in the Southwest desert. In collaboration with the National Park Service and Bureau of Land Management, USGS researchers have determined that there are increased risks to the survival of saguaros and tortoises by exposure to the more frequent fires caused by nonnative grasses. Fires are a rare occurrence in the saguaro-palo verde plant communities that characterize this desert and losses are considered to be catastrophic among long-lived species (Esque and Schwalbe, 1994-1996; Esque and others, 2007). Researchers are only beginning to understand the changes in Southwestern deserts that result from these plant invasions and fires. The problems of nonnative plant invasions, increased fire frequency, and restoration are interrelated and require an integrated research program to gain valuable information for managers. In addition to fire related impacts, researchers are also studying the seedbank characteristics of buffelgrass and

native plant species to assist in restoration efforts following successful buffelgrass control efforts.

### **Interagency Cooperation**

The growing concern for buffelgrass invasions has galvanized area land managers, scientists and local communities into action, forming the Southern Arizona Buffelgrass Coordination Center and Buffelgrass Working group. On February 9, 2007, more than 120 representatives from state and federal agencies (including NPS, FWS, BLM, USGS and USDA-Forest Service), county and municipal governments, academia and private conservation organization from across southern Arizona joined concerned citizens at the first Buffelgrass Summit. Together we developed and are implementing a 5-year Southern Arizona Buffelgrass Strategic Plan for regional buffelgrass control that includes identification of buffelgrass sites using GPS mapping for purposes of monitoring, control, management, and eradication. In addition, the Invasive Species Advisory Committee (ISAC) which is the Federal Advisory Committee Act chartered group of nonfederal stakeholders that advise NISC, met in Tucson, AZ in May of 2009. This group toured buffelgrass areas and had extensive discussion of this issue within the larger context of invasive plants contributing to the frequency and severity of wildfires.

In 2005, Arizona declared buffelgrass a noxious weed. Local governments followed with ordinances to encourage utilities, developers, and private landowners to control buffelgrass on their properties and right-of-ways. Both the public and private sectors are quickly ramping up to meet the buffelgrass challenge, and, over the past decade, control efforts have accelerated, culminating in treatment of thousands of acres on public lands and right-of-ways in 2008. In spring 2009, over 100 volunteers pulled buffelgrass in the Tucson Basin each month, and a similar volunteer effort is well under way in Phoenix.

The non-profit Southern Arizona Buffelgrass Coordination Center was established in November 2008 to educate the public about buffelgrass infestation and eradication. Other collaborative efforts include local Cooperative Weed Management areas, local weed management organizations, Bureau of Indian Affairs and tribal partnerships, and partnerships between DOI and the US Forest Service on management, aerial mapping and research projects.

### **Ongoing Challenges**

The ecological transformations we are experiencing in the southwest are also occurring across the border in Mexico. Buffelgrass has been widely planted as pasture grass in Mexico and populations are expanding north across the border. In addition, a new variety of buffelgrass (Frio) that can withstand colder temperatures was jointly released and planted in South Texas and Mexico. This cold tolerant variety is adapted to a much wider geographic area and could expand invasive buffelgrass populations northward into northern Arizona and beyond (Hussey and Burson, 2005).

Illegal border activity and associated national security measures have resulted in conditions that make control of buffelgrass more difficult. Movement of goods and people and increased border

activity creates ground disturbances and pathways for dispersal of buffelgrass and other invasive species along the border, and increasing security concerns make it difficult for land managers to detect and control border buffelgrass populations. Finally, even if we can eradicate the invasive plant species from an area, the damage they cause together with the extremely arid environment makes restoring native species very difficult.

### **Conclusion**

While this hearing is focused on buffelgrass we must consider the many invasive species that threaten desert ecosystems in the southwest. Species such as red brome, schismus, fountain grass, and Sahara mustard threaten upland sites, while other species are impacting riparian areas along rivers and streams. More than 100 non-native species have been recorded in parks in the southwest and more than 10% of the flora is not native to the parks. The explosion of buffelgrass and these other invasive species is a major concern to land managers in the Sonoran desert ecosystem.

There are current and developing tools that will allow us to address this growing problem, but only with a sustained and increased commitment to the problem. All solutions must be based on a coordinated landscape approach that includes all the land owners and jurisdictions in the area. The approach must include all invasive species and look past control to restoration of sustainable native plant communities. Southern Arizona has already organized around the issue through cooperative efforts involving local businesses, citizens, academia, conservation organizations, fire departments, and local, state and federal governments. The Department will continue to actively participate in this regional effort.

Thank you for the opportunity to testify and I welcome any questions you or the subcommittee members may have.

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**STATEMENT OF DR. HERBERT C. FROST  
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BEFORE THE HOUSE SUBCOMMITTEES ON  
NATIONAL PARKS, FORESTS AND PUBLIC LANDS  
AND WATER AND POWER  
OF THE  
HOUSE COMMITTEE ON NATURAL RESOURCES  
ON THE  
CHALLENGES FACING GRAND CANYON NATIONAL PARK**

**APRIL 8, 2010**

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Chairman Grijalva and Chairwoman Napolitano and members of the subcommittees, thank you for the opportunity to present testimony on the challenges facing Grand Canyon National Park and what the Department of the Interior is doing to meet them. My name is Bert Frost, and I am Associate Director, Natural Resource Stewardship and Science for the National Park Service (NPS). Issues involving the Grand Canyon are frequently interdisciplinary, which is the reason that two subcommittees are joining together today for this hearing. Reflecting the need for experts from a variety of fields to address the management challenges ahead, I am accompanied today by colleagues from other bureaus within the Department of the Interior. I have with me today Andrea Alpine, Senior Science Advisor, US Geological Survey, Jim Kenna, Arizona State Director for the Bureau of Land Management, and Larry Walkoviak, Upper Colorado Regional Director for the Bureau of Reclamation.

**Introduction**

The first expedition of European Americans through the Grand Canyon was organized in 1869 by John Wesley Powell, explorer of the American West and second director of the U.S. Geological Survey. Writing in 1895, Powell described the canyon's splendor in stirring prose:

The wonders of the Grand Canyon cannot be adequately represented in symbols of speech, nor by speech itself. ...The rainbow is not more replete with hues. But form and color do not exhaust all the divine qualities of the Grand Canyon. It is the land of music. ... the music of waters. The adamant foundations of the earth have been wrought into a sublime harp, upon which the clouds of the heavens play with mighty tempests or with gentle showers... Its colors, although many and complex at any instant, change with the ascending and declining sun... You cannot see the Grand Canyon in one view...but to see it you have to toil from month to month through this labyrinth...[I]f strength and courage are sufficient for the task, by a year's toil a concept of sublimity can be obtained never again to be equaled on hither side of Paradise.

Powell's illustrations and descriptions of the canyon were so inspiring that the first attempts to make the Grand Canyon a national park occurred in 1882 when then Senator Benjamin Harrison introduced legislation in Congress. Shortly thereafter, Theodore Roosevelt, a great lover of animals and their natural environments, began his efforts to preserve parks and recreational spaces in this country. He wanted to make sure these places would be around for his children and everyone's children to see forever. In a speech President Roosevelt made at the Grand Canyon, Arizona, on May 6, 1903 he expressed the following:

In the Grand Canyon, Arizona has a natural wonder which, so far as I know, is in kind absolutely unparalleled throughout the rest of the world. I want to ask you to do one thing in connection with it in your own interest and in the interest of the country - to keep this great wonder of nature as it now is... Leave it as it is. You can not improve on it. The ages have been at work on it, and man can only mar it. What you can do is to keep it for your children, your children's children, and for all who come after you, as one of the great sights which every American if he can travel at all should see.

Crafted by the immense power of the Colorado River, the Grand Canyon and the greater ecosystem that surrounds it have long been recognized as one of the nation's most treasured landscapes, a symbol of our country's majesty. President Theodore Roosevelt made the Grand Canyon a National Monument in 1908, and the canyon became a national park in 1919. Grand Canyon National Park is not only known as a premier World Heritage Site, but is also one of the gems in the crown jewels of the National Park System. This place also has a cultural heritage on the Colorado Plateau that goes back thousands of years; the Grand Canyon and its environs are known as home or a sacred place of origin to many Native Americans including the Havasupai, Hualapai, Navajo, Hopi, Zuni, Southern Paiute, and others.

In this desert environment, water plays a key role in forming and keeping the Grand Canyon as we know it today. The river that charges through the canyon is constantly shaping and reshaping the landscape. Both the surface water and the groundwater escaping through seeps and springs offer refuge to native wildlife species and habitat for plants that are crucial to their survival.

There are few places in the country where the resource management challenges are more difficult or the stakes greater than in the area surrounding the Grand Canyon. Underground aquifers and watersheds extend beyond the boundaries of Grand Canyon National Park (Park), and as a result of this interconnection, land and water use management decisions being made throughout this desert region impact the Park ecosystem. The Federal lands surrounding the Park, largely managed by the Bureau of Land Management (BLM) and the U.S. Forest Service (FS), contain substantial uranium deposits. The area contains important potential energy resources, but mining raises the risk of contamination from uranium and other trace elements. The Colorado River is now regulated by dams operated by the Bureau of Reclamation (Reclamation), which provide important water supply, flood control, recreation, and hydropower benefits but also alter the natural hydrograph, decrease the fine sediment that forms beaches, and lower the downstream water temperature, all of which impact the ecosystem.

This statement will discuss two of the major challenges now facing the Grand Canyon. The first section will discuss the history and status of uranium mining near the Park. The second section

will discuss Colorado River management, focusing on ongoing efforts to utilize scientific understanding of water management tools to maintain and improve the Colorado River ecosystem.

## **Uranium Mining**

Historically, uranium exploration and mining have occurred along the Colorado Plateau of Arizona, Colorado, New Mexico, and Utah, including areas surrounding the Park. Much of the area immediately around the Grand Canyon has long been protected from mineral development. In 1906, President Theodore Roosevelt withdrew the North Rim Ranger District of the Kaibab National Forest from mineral entry when he created the Kaibab Game Preserve. Tribal lands bordering the Park are also not available for mineral entry, and mineral entry on other Federal lands was withdrawn when the Paria Canyon-Vermilion Cliffs Wilderness was designated in 1987 and the Grand Canyon Parashant and Vermilion Cliffs National Monuments were created in 2000.

Since 2003, the market price for uranium ore has increased more than three-fold, from \$12/lb. in 2003 to \$43/lb in 2010, and this has driven renewed interest in mining on the Colorado Plateau. The BLM manages federal land to the north of the Park, an area known as the “Arizona Strip,” and the Forest Service manages forest lands south of the Park. Over the last several years, there has been an increase of activity in mining claims on these lands—7,200 active claims in 2010, up from 400 active claims in 2005—and it is believed that many of these new active claims are primarily for uranium.

BLM has approved three mining operations on the Arizona Strip in the late 1980’s: the Arizona 1 Mine, which is currently operating, having received a required air-quality permit from the Arizona Department of Environmental Quality (ADEQ) on September 1, 2009, as well as two mines that still need to receive ADEQ air quality and aquifer protection permits before they can start mining operations. BLM’s authorization of mining requires operators to obtain and comply with all applicable Federal and State permits to ensure that mining activities will not cause unnecessary or undue degradation of the public lands. On January 8, 2010, the BLM received notification that ore from the Arizona 1 Mine has been mined and transported to a mill in Blanding, Utah.

### *Secretary’s Segregation and EIS Preparation*

Effective on July 21, 2009, Secretary Salazar segregated nearly one million acres of federal lands in the Arizona Strip and Kaibab National Forest managed by the BLM and the FS from location of any new mining claims for two years. Only Congress can make a permanent withdrawal of this size from mineral entry, but under current law the Department of the Interior can withdraw these lands for a maximum of 20 years, subject to valid existing rights. During the two years of segregation, these lands are being evaluated for withdrawal from location and entry under the 1872 Mining Law for up to this 20 year period, subject to valid existing rights. The segregated lands are located within portions of the Grand Canyon watershed adjacent to the Park in northern Arizona, and include 633,547 acres north of the Grand Canyon managed by the BLM and 360,002 acres south of the Grand Canyon managed by the FS. Neither the Secretary’s two year

segregation nor a 20-year withdrawal will prevent the holder of a valid pre-existing mining claim from conducting mineral exploration or extraction operations in the segregated area.

During the two-year segregation period, the BLM is preparing an Environmental Impact Statement (EIS) and conducting or coordinating various studies to assess the potential effects of the proposed withdrawal on the Grand Canyon watershed. On February 18, 2010, the USGS released a study on uranium resources on Federal lands near Grand Canyon and the effects of past uranium mining activities. The BLM is using information from the USGS study in the preparation of the EIS. The NPS also conducted assessments of the critical resources within the affected area, including wildlife, aquatic, vegetation, soundscape, hydrogeologic, and ethnographic. The BLM is developing an economic assessment of withdrawing the lands from locatable mineral development. The Draft EIS is scheduled to be released for public review in August or September, 2010. It is expected that the EIS process will take up the entire two years established for the segregation.

The EIS will use the best available science and agency information to identify potential impacts that the proposed withdrawal would have on the human environment, including socio-economic considerations and impacts on natural and cultural resources. The EIS will also identify alternatives to the proposed withdrawal. The BLM is the lead agency on preparing the EIS, working in cooperation with the FS, the USGS, the U.S. Fish and Wildlife Service (FWS), and the NPS to prepare the EIS. The EIS will be the basis for the Secretary of the Interior to make a final decision on whether and to what extent to make a withdrawal of these lands for up to 20 years. A private consultant, SWCA Environmental Consultants, has been contracted to produce the EIS under the BLM's direction.

In accordance with the National Environmental Policy Act, the EIS preparation process includes participation by the public, tribes, environmental groups, industry, state and local government, and other stakeholders. In addition to the Federal agencies, cooperating agencies in this EIS process include the Kaibab Paiute Tribe, the Hualapai Tribe, Coconino and Mohave counties (AZ), Washington, San Juan and Kane counties (UT), the Arizona Department of Mines and Mineral Resources, the Arizona State Land Department, the Arizona Geological Survey, and the Arizona Game and Fish Department. Members of the public have participated in two public scoping meetings and the BLM has received more than 83,000 comments about the proposed withdrawal by mail and through its EIS web site. The Arizona Resource Advisory Council has provided recommendations on issues and alternatives for the BLM to consider in preparing the EIS.

The BLM and FS, along with the NPS, USGS, FWS, Tribes and other cooperating agencies, are committed to maintaining the integrity of the EIS process by analyzing the various information reports and scientific studies through an interdisciplinary team approach. This collaboration will ensure that the Secretary of the Interior will have an objective and science-based foundation to make an informed decision on whether or not to withdraw the segregated area from mineral entry for the next 20 years. The Draft Environmental Impact Statement (DEIS) will provide information on a range of alternatives, together with analysis of the effects of adopting each alternative, for the public to consider. The DEIS is scheduled to be available in August or September 2010.

## **Colorado River Management**

The Colorado River system is one of the most controlled river systems in the world. Nine national park units have been established along the Colorado River and its major tributaries. In addition to playing a central role in forming and maintaining the aquatic and riparian ecosystems within Grand Canyon National Park and the other Colorado River parks, the Colorado River is also critical to the lives of tens of millions of people in 7 states and Mexico who depend upon it for water for drinking, irrigation, and industrial use as well as for hydropower produced by multiple dams and sold to those who provide for a significant portion of the electrical power needs of much of the rural Rocky Mountain and Desert Southwest.

Before the completion of Glen Canyon Dam in 1963, the Colorado River ran as a muddy torrent through Grand Canyon and Glen Canyon, swelling in most years with spring snowmelt from the Rocky Mountains, producing floods and transporting large quantities of sand that created and maintained sandbars in both canyons. These sandbars provide camping beaches for hikers and whitewater rafters and a substrate for riparian vegetation and backwater habitat for fish and other wildlife. Long-term monitoring has revealed an ongoing loss of fine sediment in the Grand Canyon. Approximately 90 percent of the sediment that once entered the Grand Canyon is now deposited in Lake Powell, behind Glen Canyon Dam.

In addition, flow dynamics and water temperatures in the river system below Glen Canyon Dam have been altered. High spring floods and low summer/winter flows have been replaced with controlled flow regimes that provide water to meet Colorado Compact requirements. Where pre-dam river temperatures formerly ranged from near freezing in the winter to over 80 degrees in the summer, they now remain relatively constant throughout the year, between 46 to 59 degrees, depending on reservoir elevation.

The changes created by the Glen Canyon Dam, the introduction of non-native sport fish, and the invasion of exotic plant and animal species affect endangered fish and the resources of Grand Canyon National Park. Addressing the impacts requires that multiple federal agencies, including NPS, Reclamation, the FWS, the Bureau of Indian Affairs, USGS, and the Western Area Power Administration of the Department of Energy, work together, seeking the input of individuals from a variety of disciplines, to find and recommend to the Secretary the most appropriate balance of resource use and protection in the best interests of the American public. Coordination occurs through a number of mechanisms, including formal and informal interagency discussion forums and working groups, consultation under the Endangered Species Act and the National Historic Preservation Act, government-to-government consultation with Native American tribes, preparation of environmental compliance documents under the National Environmental Policy Act, and through the Glen Canyon Dam Adaptive Management Work Group (AMWG).

The AMWG, which includes representatives from Tribal nations, Colorado River Basin states, environmental groups, recreation and fishing interests, and contractors for federal power from

Glen Canyon Dam, as well as cooperating federal agencies, provides an organization and process for discussion and input to the agencies responsible for the integration of dam operations, downstream resource protection and management, and monitoring and research information. Through the AMWG, now chaired by Assistant Secretary for Water and Science Anne Castle, the Department receives input and recommendations from federal, tribal, state, and non-governmental entities regarding the management of resources and the operation of Glen Canyon Dam. The formation of the AMWG has provided a forum for discussion and for bringing key issues to resolution. The Secretary of Interior has been charged with meeting many statutory requirements with respect to how the dam is operated and the Colorado River is regulated, managed and protected. The AMWG gives the Secretary a mechanism to obtain input from varied interests on how to strike an appropriate balance.

### *Glen Canyon Dam Operating Criteria*

Glen Canyon Dam Operating Criteria are different from the Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs. The latter governs the coordinated operation of all federal reservoirs on the Colorado River. The Glen Canyon Dam Operating Criteria (Operating Criteria) are specific to the operation of Glen Canyon Dam. The Operating Criteria were required and adopted pursuant to the Grand Canyon Protection Act, enacted in 1992. The Operating Criteria include, among other provisions, specific operational constraints for Glen Canyon Dam. The Operating Criteria adopted a Modified Low Fluctuating Flow regime for releases of water from the Glen Canyon Dam, based upon a 1996 Record of Decision signed by then-Secretary Babbitt. Notice of the Operating Criteria was published in the Federal Register (*62 Fed. Reg. 9447 (March 3, 1997)*).

Precise monthly flow volumes were not established in the Operating Criteria. However, the 1995 EIS and 1996 Record of Decision did define the hydropower resource criteria used to establish monthly volume goals. Each year those criteria are used to establish monthly release volumes and patterns for three different inflow scenarios for input into the Glen Canyon Dam projection of annual operations. That projection of flows is then incorporated into the Annual Operating Plan for the Colorado River system. As the year unfolds, actual release volumes are generally made pursuant to one of the three release scenarios but are modified as necessary based on actual runoff in the Colorado River basin, and the fluctuation in required annual deliveries to the Lower Colorado River Basin pursuant to various applicable laws and agreements, and other river conditions.

The GCDAMP has continually conducted research and monitoring activities to evaluate the effects of dam operations on resources in the Grand Canyon. Among other experimental actions, (such as a period of steady flows in 2000), experimental releases from Glen Canyon Dam that diverge from the Operating Criteria were proposed and put into place in 2002 (with experimental flows in 2003, 2004 and 2005) and were again proposed five years later in 2007 (and approved in February 2008). The 2002 experiment also included a non-flow experiment (non-native fish removal). The 2002 experiment increased daily fluctuations above those provided for in the Operating Criteria in an effort to suppress non-native fish, and also established a sediment trigger for the testing of high flow releases from Glen Canyon Dam. The five-year experiment that began in 2008 addressed steady flows that deviate from the Operating

Criteria and also included a high flow release. Reclamation completed environmental compliance actions pursuant to the National Environmental Policy Act and the Endangered Species Act for each of these experimental releases. Public notice and opportunity to comment was provided to other Federal agencies, the members of the AMWG, and the general public. The next section discusses the series of experimental releases that have been conducted and are planned in more detail.

### *Experimental Releases and Flow Regimes at Glen Canyon Dam*

In an effort to evaluate the ability of changes in Glen Canyon Dam water releases to create sandbars and preserve fine sediment in the Grand Canyon, high flow experiments were conducted in 1996, 2004, and 2008. Those experiments released over 41,000 cubic feet per second (cfs) of water, which included 10,000 cfs in excess of powerplant capacity. The high flow experiment in 1996 lasted for one week, whereas high flow experiments in 2004 and 2008 were modified and had 60-hour peak flows based on the results of the earlier experiments. Sediment mobilization and conservation caused by high flow experiments is hypothesized to be important in creating sandbars, expanding and maintaining camping areas and the desert riparian zones, reworking rearing habitat for fish, and preserving cultural sites in the Grand Canyon. Preliminary results of the 2008 experiment showed a robust sandbar building response and sandbar development throughout the river corridor. However, considerable erosion occurred following the experiment. Initial research on the effect of the 2008 event on a range of resources – including native fish, vegetation, the Lees Ferry trout fishery, and more – was completed and published by the U.S. Geological Survey in early 2010 (summary of results available in USGS Fact Sheet FS-2010-3009, <http://pubs.usgs.gov/fs/2010/3009/>).

In addition, experiments involving the release of steady flows from Glen Canyon Dam have been conducted. The first steady flow experiment was conducted in the late spring and summer of 2000. A five-year experiment with steady flows during September and October was initiated on September 1, 2008. The primary goal of the five-year fall steady flow experiment is to gain a better understanding of the effects that steady releases have on native fish (particularly on the endangered humpback chub) habitat, survival, and recruitment.

In December of 2009, Secretary Salazar directed the development of a protocol for conducting additional High Flow Experimental releases from Glen Canyon Dam so that high flow releases could be conducted whenever suitable sediment conditions exist. Development of this protocol for a multi-year series of additional high flow experiments and the environmental compliance to implement the protocol is currently underway. These future experiments will be designed to build on the information gained from the earlier high flow experiments. It is hoped that through continued experimentation, research, and monitoring, the Department of the Interior will be able to develop better tools to improve resources in the Grand Canyon.

### **Conclusion**

A powerful and inspiring landscape, the Grand Canyon overwhelms our senses through its immense size; 277 river miles long, up to 18 miles wide, and a mile deep. The Department is

committed to using sound science as the basis for management decisions involving the Grand Canyon. In this statement, I have discussed two of the many pressing issues of concern to the Park. However, there are many other factors, including climate change, which may impact the greater Grand Canyon ecosystem. As we face the challenges ahead, collaboration and cooperation among Congress, federal agencies and partners will be critical at every step of the way. It is vital that we find a way to protect and maintain one of the world's most treasured landscapes – the Grand Canyon.

This concludes my statement. I would be pleased to answer any questions you may have.