CENTER FOR BIOLOGICAL DIVERSITY
GRAND CANYON TRUST
SIERRA CLUB

Sent Via Electronic Mail

30 October 2009

Ken Salazar, Secretary, Department of the Interior
Grand Canyon Mining Withdrawal Project
ATTN: Scott Florence, District Manager
Bureau of Land Management, Arizona Strip District Office
345 East Riverside Drive, St. George, UT 84790–6714
Electronic Mail: azasminerals@blm.gov

Re: Grand Canyon Mining Withdrawal Project

Dear Secretary Salazar:

Thank you for the opportunity comment on the Department of Interior's (Department) proposed mineral withdrawal to protect Grand Canyon and its watersheds from the impacts of uranium development. These comments are submitted on behalf of the Center for Biological Diversity, Grand Canyon Trust, and Sierra Club. On behalf of our collective membership, and for reasons detailed below, the undersigned organizations strongly support the Department's proposed mineral withdrawal across nearly one million acres of Grand Canyon's watersheds.

We hereby request to receive all future notices and analyses concerning this proposal. We also reserve the right to submit additional comments in the future as the administrative process progresses. Finally, all previous comments and materials submitted by the three groups to the Bureau of Land Management (BLM) and Forest Service regarding uranium exploration or mining in the proposed withdrawal area are hereby incorporated into the administrative record.

1. ORGANIZATIONS

The Center for Biological Diversity is a non-profit corporation with nearly 240,000 members and online activists dedicated to the preservation, protection, and restoration of biodiversity and ecosystems throughout the world. The Center's main office is located in Tucson, Arizona, and the Center also has an office in Flagstaff, Arizona. The Center works to insure the long-term health and viability of animal and plant species across the United States and elsewhere and to protect the habitat these species need to survive.

The Grand Canyon Trust is a non-profit corporation headquartered in Flagstaff, Arizona, with over 3,500 members. The mission of the Grand Canyon Trust is to protect and restore the canyon country of the Colorado Plateau – its spectacular landscapes, flowing rivers, clean air, diversity of plants and animals, and areas of beauty and solitude. One of the Trust's goals is to ensure that the Colorado Plateau is a region characterized by vast open spaces with restored, healthy ecosystems and habitat for all animals, including native fishes, as well as plants.

The Sierra Club is a non-profit, public interest environmental organization with over 700,000 members, 12,000 of which reside in Arizona, whose mission is to explore, enjoy, and protect the wild places of the earth; to practice and promote the responsible use of the earth's ecosystems and resources; and to educate and enlist humanity to protect and restore the quality of the natural and human environment. Sierra Club members enjoy the lands affected by this proposed action and utilize them for hiking, backpacking, hunting, fishing, and wildlife viewing, among other activities.

2. INTRODUCTION

Grand Canyon is a timeless national treasure. Its unparalleled natural beauty as well as its historic and cultural significance make the Canyon an American icon, and its jagged red cliffs and winding Colorado River offer recreational opportunities for visitors that range from hiking and rock climbing to camping and river rafting. The Colorado River provides drinking water for 25 million Americans living as far west as Los Angeles. Furthermore, the canyon and the surrounding areas are home to a rich diversity of plant and animal life, including 25 threatened and endangered animal species, and the visible strata in the canyon walls provide one of the most complete records of geological history in the world. Red Butte in the Kaibab National Forest contains Traditional Cultural Properties, shrines, historic trails, and archaeological sites that are threatened with uranium mining. Grand Canyon is a unique, valuable landscape that we treasure and must protect.

Due to the rising price of gold and uranium, the number of hardrock mining claims across the West has increased exponentially in recent years. As of January 2009, there were about 8,500 mining claims in the area proposed for withdrawal near Grand Canyon, up from about 100 claims in January of 2003. Most, if not all, of these claims are for uranium, and 1,100 of the claims are within five miles of Grand Canyon. Mining could seriously impair the region's ecosystems, wreaking havoc on the landscape, drying up critical seeps and springs, disturbing fish and wildlife, and releasing toxic chemicals into the environment. With mining claims positioned so close to the canyon and the Colorado River, a range of contaminants from heavy metals to uranium could also degrade the downstream water supply of millions of Americans.

We believe that a rigorous and comprehensive review of the potential impacts of an extended uranium mining boom will clearly demonstrate an unacceptable risk to Grand Canyon National Park. As the Department has noted, within the land area under consideration for withdrawal, there are an estimated 200 to 400 breccia pipes, the geologic formations of interest to the uranium industry. Though only a portion of these formations may hold mineable uranium, road-building, drilling, and other exploration activities in the vicinity of these potential deposits would significantly disrupt the park's delicate hydrologic balance and destroy important fish and wildlife habitat. Mine development of even a modest percentage of these pipes could result in a significant lowering of the water table and bring with it additional plans for uranium milling and permanent radioactive waste disposal within the area.

Your protection of nearly one million acres of land around Grand Canyon National Park for two years is a good first step to protect our drinking water, fish and wildlife, and this treasured national park. We applaud this action and, with the foregoing reasons and information in mind, we urge you to now protect the nearly one million acres by selecting the longest permissible withdrawal period: 20 years.

3. HISTORIC PUBLIC SUPPORT FOR THE MINERAL WITHDRAWAL

Protecting Grand Canyon and its watersheds from new uranium claims and development enjoys robust, historic public support. This support has been expressed at all levels of government, including Congress and elected officials locally and regionally; by Tribes and tribal activists; by municipal water districts; by academic and research scientists; by countless editorial boards regionally and nationally; and by the public and public interest organizations. The Coconino County Board of Supervisors passed a Resolution on February 5, 2008, opposing uranium mining in the area[1] and former Arizona Governor Janet Napolitano noted the "high level of public concern" relating to the impacts of uranium mining around Grand Canyon National Park,[2] as did the Arizona Game and Fish Department in a letter to Senator John McCain.[3] The Navajo,[4] Hualapai,[5] Havasupai,[6] Hopi,[7] and Kaibab Paiute[8] tribes have also expressed opposition to uranium mining around Grand Canyon, as has the House Natural Resources Committee,[9] based on uranium mining's potential impacts. The Metropolitan Water District of Southern California[10] and Southern Nevada Water Authority have also expressed concern about the impacts of proposed uranium mining on Colorado River water quality and the need for comprehensive environmental impact statements.[11] Thus, every level of government has expressed concern about or opposition to uranium mining near Grand Canyon.[12] This support has been codified in resolutions, testimony, letters, opinion pieces, protests, dance, art, and lawsuits. Taken together, support for

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1 Coconino County Resolution NO. 2008- 09 RESOLUTION OF THE COCONINO COUNTY BOARD OF SUPERVISORS OPPOSING URANIUM DEVELOPMENT IN THE VICINITY OF THOSE PORTIONS OF GRAND CANYON NATIONAL PARK AND ITS WATERSHEDS THAT LIE WITHIN COCONINO COUNTY.

2 Letter from Arizona Governor Janet Napolitano to Department of Interior Secretary Dirk Kempthorne (March 6, 2008).

3 Letter from Arizona Game and Fish Department to Senator John McCain (March 17, 2008).

4 Joe Shirley, Navajo Nation President. 2008. Testimony before the House Natural Resources Subcommittee on National Parks, Forests and Public Lands hearing on the Grand Canyon Watersheds Protection Act.

5 Charles Vaughn. 2008. Community Impacts of Proposed Uranium Mining Near Grand Canyon National Park. Testimony before the Natural Resources Subcommittee on National Parks, Forests and Public Lands.

6 Matthew Putesoy, Vice Chairman, Havasupai Tribe. 2009. Canyon's guardians press for protections. Arizona Republic (guest editorial). Available at: http://www.azcentral.com/arizonarepublic/opinions/articles/2009/07/25/20090725putesoy25.html

7 Benjamin Nuvamsa, Chairman, the Hopi Tribe. 2008. Testimony before the House Natural Resources Subcommittee on National Parks, Forests and Public Lands hearing on the Grand Canyon Watersheds Protection Act.

8 Letter from Ona M. Segundo, Chairwoman, Kaibab Band of Paiute Indians to Denison Mines (copied to Rody Cox, BLM Arizona Strip District) (July 21, 2008).

9 The House Committee on Natural Resources' rationale for passing its 25 June 2008 Emergency Resolution ordering the Secretary of Interior to withdraw over 1 million acres from mineral entry cites the potential for "direct impacts on sensitive habitat, listed and endangered species, groundwater, air quality, archeological resources, recreational opportunities, and the health and safety of visitors and residents near the park" from proposed uranium mining.

10 Letter from Jeffrey Nighlinger, General Manager for Metropolitan Water District of Southern California to Interior Secretary Kempthorne (Mar. 25, 2008).

11 Letter from Pat Mulroy, General Manager for Southern Nevada Water Authority to Interior Secretary Dirk Kempthorne (June 16, 2008).

12 When BLM issued its proposed rule to repeal the regulation that requires the Secretary of Interior to withdraw lands when directed by Congress, the controversy over potential impacts to the Grand Canyon and Colorado River again surfaced in comments submitted by the Arizona Governor; Senator Bingaman; the Metropolitan Water District of Southern California; Congressman Grijalva; and a number of environmental organizations.

protecting Grand Canyon's watersheds is an unprecedented affirmative for environmental policy and management proposals on the Colorado Plateau.

The Coconino County Board of Supervisors' Resolution made it clear the county was "opposing uranium development on lands in the proximity of the Grand Canyon National Park and its watersheds." The County recognized that "Grand Canyon National Park is an economic engine whose 5 million visitors per year contribute significantly to the economy of Coconino County" and that prior uranium operations "have contaminated creeks and aquifers providing public drinking water."[13] The County supports "the withdrawal of the Tusayan Ranger District of the Kaibab National Forest and the lands in House Rock Valley managed by the Bureau of Land Management from mineral entry."

On March 6, 2008, citing the County's lead and noting nationwide press on the issue, Arizona Governor Janet Napolitano (now former governor) requested that the Secretary of the Interior withdraw all federal lands surrounding Grand Canyon from uranium exploration and development. Concerned about "economic, cultural, and environmental repercussion" and the lack of an "overall environmental impact analysis" on uranium activities around the Park, the Governor noted the "high level of public concern." As noted above, the Arizona Game and Fish Department also expressed concerns in a letter to Senator McCain.

On March 17, 2008, Arizona Congressman Raúl Grijalva, Chairman of the Subcommittee on National Parks, Forests, and Public Lands of the House Natural Resources Committee, introduced legislation to preclude uranium activities on lands adjacent to Grand Canyon. A hearing was held on the proposed legislation, with at least five Native American Tribes (Hualapai, Navajo, Hopi, Havasupai, and Kaibab-Paiute) from the region expressing major concerns over additional uranium projects in this area. Because of the high controversy over environmental impacts, the House Committee on Natural Resources passed an Emergency Resolution in an attempt to protect the lands from the thousands of claims being filed while the legislation is considered.[14]

The Metropolitan Water District of Southern California, which serves over 18 million people in Los Angeles and surrounding areas, has similarly expressed concern over uranium mining activities on land adjacent to the Colorado River. In a June 2, 2009, letter to the Secretary of the Interior, the public water agency "reemphasize[d] the concerns previously conveyed to Secretary Kempthorne with regard to uranium exploration and its potential effects on source drinking water supplies. Past uranium mining activities have led to considerable environmental damage and subsequent cleanup efforts spanning decades."[15] The Metropolitan Water District requested that the Department:

> *". . .carefully evaluate the implication on Colorado River water quality prior to any federal authorization of mineral exploration or mining in areas near the Colorado River or its tributaries. Authorizations for exploration or mining should be contingent on a comprehensive environmental impact analysis that includes broad stakeholder review, including that of*

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[13] *Id.*

[14] When BLM issued its proposed rule to repeal the regulation that requires the Secretary of Interior to withdraw lands when directed by Congress, the controversy over potential impacts to the Grand Canyon and Colorado River again surfaced in comments submitted by the Arizona Governor; Senator Bingaman; the Metropolitan Water District of Southern California; Congressman Grijalva; and a number of environmental organizations.

[15] This June 2, 2009 was the third letter the District sent to Interior expressing concerns over the impact of uranium mining and Colorado River drinking water. Exh. * (March 25, 2008 letter); Exh. * (Oct. 23, 2008 letter) ("there have been previous examples in the Colorado River demonstrating uranium mining and milling operations having an adverse impact on drinking water supplies.).

downstream users of Colorado River water."

Like the Metropolitan Water District, the Southern Nevada Water Authority, which serves Las Vegas and over 2 million people and 40 million annual visitors, is objecting to uranium exploration and mining activities within the Colorado River watershed, stating.[16] "I respectfully request that Interior carefully evaluate the implication for water quality in the Colorado River before authorizing mining operations within its watershed."

Grand Canyon National Park recently completed an assessment in which they found a significant portion of Grand Canyon at risk from uranium mining. A map distributed by the Park Service at the October 15, 2009, public meeting hosted by the BLM illustrates the areas of threatened vegetation resources including threatened and endangered plant species, special plant populations, and plant species of concern. The map also highlights areas with significant wildlife resources at risk from uranium mining including California condor use areas, peregrine falcon territories, Mexican spotted owl habitat, southwest willow flycatcher habitat, northern goshawk nests, and mule deer habitat. The map also identifies seeps and springs throughout the park that are similarly at risk.

Indigenous Havasupai people held a gathering to stop uranium mining in Grand Canyon and to protect ancestral Havasupai Territory near the south rim of Grand Canyon in July 2009. Hundreds of indigenous peoples and activists came from all over, some from as far away as Hawaii and France, to voice their support to protect Grand Canyon from uranium mining. In September 2009, the Hualapai Tribal Council renewed a ban on uranium mining on its land near Grand Canyon, joining other Native American tribes in opposing what they see as a threat to their environment and their culture.

Thus, every level of government -- local, state, federal, and Tribal -- has opposed additional uranium projects and activities near Grand Canyon National Park due to the potential significance of the environmental impacts. The Environmental Impact Statement (EIS) must fully disclose the widespread public support for this million acre withdrawal and protection of Grand Canyon resources from uranium mining and must include and disclose in its analysis these specific (hyperlinked) examples of controversy and opposition:

Letter by previous Arizona Gov. Janet Napolitano
Letter by Los Angeles Water District
Coconino County Grand Canyon Uranium Resolution
Testimony of Dr. Larry Stevens 2008
Testimony of Dr. Abe Springer 2008
Testimony of Robert Arnberger, former Grand Canyon National Park superintendent 2008
Testimony of Roger Clark, Grand Canyon Trust 2008
Testimony of Chris Shuey 2008
Supplement to Chris Shuey Testimony 2008
Letter dated July 15th from Department of Interior 2008
Letter dated July 16th by Congressman Rahall 2008
Hopi Testimony on Grand Canyon Uranium Development 2008
Navajo Nation Testimony on Grand Canyon Uranium Development 2008
Hualapai Testimony on Grand Canyon Uranium Development 2008
Testimony of Carl Taylor, Coconino Country Supervisor 2008

[16] June 16, 2008 letter to Department of Interior, http://s3.amazonaws.com/propublica/assets/colorado_river/snwa_letter_080616.pdf

Testimony of Rob Elliot, Arizona Raft Adventures 2008
Testimony of Clarinda Vail, Tusayan Business Owner 2009
Testimony of Matthew Putesoy, Vice Chairman, Havasupai Tribe 2009
Testimony of Mark Trautwein Former Staffer to Congressman Morris Udall 2009
Testimony of Professor David K. Kreamer, Hydrologist and University Professor 2009
Testimony of Kay Brothers, Deputy General Manager, Engineering & Operations, Southern Nevada Water Authority

4. WATER QUALITY AND QUANTITY

A primary concern attending uranium development north and south of Grand Canyon National Park involves the contamination and depletion of groundwater including perched aquifers that discharge into Grand Canyon National Park and the Colorado River. We are concerned that breccia pipe mining will contaminate groundwater moving through mine shafts into connected ground or surface water sources. We are concerned that, owing to the complexities of hydrogeology and the inherent unfeasibility of predicting local subsurface flow regimes during rapid or slow recharge events, it would be impossible for public agencies or the mining industry to guarantee against groundwater contamination. Moreover, noting the lack of sufficient monitoring required for existing mines to detect groundwater contamination plumes and the failure of attempts to date by the Environmental Protection Agency (EPA) to successfully remediate uranium-contaminated aquifers in the Southwest, such as at the Homestake site[17], we are concerned that groundwater contamination, if it were to occur, would be permanent and irreversible, impacting water quality and biotic communities in springs, seeps, caves, and streams into which groundwater discharges.

There is also potential that exploratory drilling, mine shafts, and water wells associated with mines could puncture and drain perched aquifers, thereby drying springs and impacting biotic communities into which they formerly discharged. The draining of punctured perched aquifers through mine shafts where uranium and other contaminants have been mobilized has the further potential to transport contaminants into subtending aquifers, thereby impacting water quality and biotic communities at discharge points. Groundwater resources are irreplaceable. Risking them to uranium contamination is unacceptable. Allowing uranium exploration and development in the withdrawal area poses unacceptable risk to aquatic resources and present and future biotic and human communities that depend on them. Those risks argue strongly for implementing the proposed mineral withdrawal over the entire area.

Hydrogeologists and ecologists have spoken to and substantiated these exact issues. David Kreamer, PhD – a hydrology professor at the University of Nevada, Las Vegas (UNLV) who has written and instructed federal agencies on the likely effects of uranium mining on the hydrology in the area – drafted a comment letter to BLM in 2008 and testimony for the House Committee on Natural Resources in 2009 relating to the potential impacts of uranium mining around Grand Canyon.[18] Dr. Kreamer has been studying groundwater–surface water interaction in the Southwest, particularly in the national parks, and has conducted research on Grand Canyon springs for over 25 years. He has authored several publications related to Grand Canyon springs. His past affiliations include Director of

[17] Health Consultation, Homestake Mining Company Mill Site, Milan, Cibola County, New Mexico May 19, 2008

[18] Comments submitted to BLM by Dr. David Kreamer on BLM's proposed rule to remove its regulations regarding emergency withdrawals, 43 C.F.R. § 2310.5. 73 Fed. Reg. 60212 (Oct. 10, 2008).

Water Resources Management Graduate Program at UNLV, and professorships at Arizona State University and the University of Arizona in the 1970s and 80s. He is Secretary of the U.S. National Chapter of the International Association of Hydrogeologists and is on the Board of Directors of the National Ground Water Association and Association of Ground Water Scientists and Engineers. With regard to uranium development around Grand Canyon, Dr. Kreamer explained to BLM that "[b]ased on groundwater relationships in the area, your proposed action [uranium development] will produce serious and irrevocable damage to the ecosystems of the region." He explained:

> [I]n my best professional judgment, your proposed action poses considerable and grave threat to the springs, creeks, and groundwater resources of the region. To give one example, past uranium mining in the area has exploited breccia pipes which serve as important recharge areas for the aquifers underlying this region. These collapse features historically have been conduits for recharging water containing some dissolved uranium in the aqueous phase. When the downward infiltrating and percolating water reaches zones of low oxygen, these reducing conditions produce precipitation of solid uranium. Exploitation of this deposited uranium, therefore, impacts the crucial zone of recharge to the groundwater systems that feed the springs, and in turn, on which many of the ecosystems of the region depend.[19]

In July 2009 testimony presented to the House Committee on Natural Resources Subcommittee on National Parks, Forests, and Public Lands, Dr. Kreamer provided a more detailed description of the science underpinning those concerns:

> [S]cientific evidence suggests that the exploitation of uranium resources near the Grand Canyon will be intimately connected with the groundwater aquifers and springs in the region. The hydrologic impacts have a great potential to be negative to people and biotic systems. I believe that an assumption that uranium mining will have minimal impact on springs, people, and ecosystems in the Grand Canyon is unreasonable, and is not supported by past investigations, research, and data.

The testimony goes on to state the following:

> [P]revious uranium mining in the Grand Canyon region estimates that this water usage would be, at a minimum, over 2.5 million gallons per year for one mine. There are many springs and seeps in the Grand Canyon that, according to the US Geological Survey and other investigators, have discharge similar to these amounts, or even much less. Some of these springs and seeps are ephemeral, and the biotic communities associated with them are very vulnerable to the abstraction of water and reduction of flow. Multiplying potential mining water use by the number of potential mine sites, coupled with the up-gradient location of potential mine sites, a majority of springs and seeps in the Grand Canyon could be eliminated and/or critically diminished in flow.
>
> The work of our research group at the University of Nevada, Las Vegas with environmental tracers (including stable and radiogenic isotopes, trace elements, chlorofluorocarbons, and uranium isotope disequilibrium measurements) shows compelling supporting evidence for existence of a hydrologic connection between the aquifers surrounding the Canyon and the springs within the Canyon (Goings, 1985; Zukosky, 1995; Fitzgerald, 1996; Ingraham et al.,

[19] *Id.*

2001).

> Also, the deep, drilled wells associated with projected mining operations throughout the Grand Canyon region, and the mine shafts themselves, have the potential to pierce smaller perched aquifers in the overlying Coconino Sandstone (approximately one-quarter of the way down the Canyon vertically), which supplies water to springs higher up on the wall of the Canyon. In one uranium mine in the Grand Canyon a perched aquifer was encountered during exploratory drilling operations. Long-term downward drainage and water disruption potential of the mining operation was estimated to be over 1.3 million gallons per year. Piercing a perched aquifer would have the effect of draining the d Canyon region, perched aquifer, and disrupting flow to springs issuing from the Coconino Sandstone-Hermit.[20]

According to testimony provided by Dr. Abe Springer for the 2008 Congressional field hearing on the Grand Canyon Watershed Protection Act, there is potential for water quality impacts from uranium mining near the Grand Canyon.[21] Dr. Springer is a professor of hydrology at Northern Arizona University who has been studying northern Arizona aquifers since 1994. His testimony notes that, in contrast to earlier assumptions about aquifer recharge and spring discharge, it appears that groundwater to aquifer to spring discharge can in fact occur on a much shorter timescale – in a matter of days or months, rather than hundreds to thousands of years.

> [A]lthough there are multiple and very deep (over 3,000 foot deep) aquifers in the vicinity of the Grand Canyon, recharge to these aquifers tends to be mostly focused and very rapid through faults, fractures, and sinkholes. Recharge to these deep aquifers can be on the order of hours and days, not weeks or years. The faults, fractures, and sinkholes can be pervasive and any enhancement of them can lead to enhanced recharge to the aquifer.
>
> Except for a small amount of pumping of water through a few wells, most of the water in the aquifers to the North and South of the Grand Canyon discharge naturally through springs. Recent studies by the USGS and others give us reasonably good estimates of how much water is discharging from these aquifers. These springs in the middle of a very dry landscape support a diverse and rich abundance of plants, insects, birds and animals. They also provide important sources of water for many local tribes and backcountry recreation.

Dr. Springer points to numerous published academic studies which demonstrate rapid recharge of snow pack and rainfall through the karst limestone topography of the Kaibab Formation, into the underlying sedimentary strata, especially on the North Rim.[22] Roaring Springs, a perennial spring on the Bright Angel Fault that provides municipal water supply for both the North Rim and South Rim facilities of Grand Canyon National Park, is said to recharge over a very small area of the mesa. According to Ross 2005, "rapid groundwater recharge through fault and fracture systems [which] may mean that land use

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[20] Kreamer, D. 2009. Testimony before the House Natural Resources Subcommittee on National Parks, Forests and Public Lands hearing on the Grand Canyon Watersheds Protection Act. Shale contact and the underlying Supai Group.

[21] Springer, A. 2008. Testimony before the Subcommittee on National Parks, Forests, and Public Lands on the Grand Canyon Watersheds Protection Act. Flagstaff, AZ.

[22] Ross, 2005. LEV Ross. Interpretative Three-Dimensional Numerical Groundwater Flow Modeling, Roaring Springs, Grand Canyon, Arizona. Thesis paper, master of science degree in geology, Northern Arizona University, AE Springer, committee chair; December.
Huntoon, 2000. PW Huntoon. Large-Basin Ground Water Circulation and Paleo-Reconstruction of Circulation Leading to Uranium Mineralization in Grand Canyon Breccia Pipes, Arizona. *The Mountain Geologist*, The Rocky Mountain Association of Geologists, 33(3): 71-84, July.

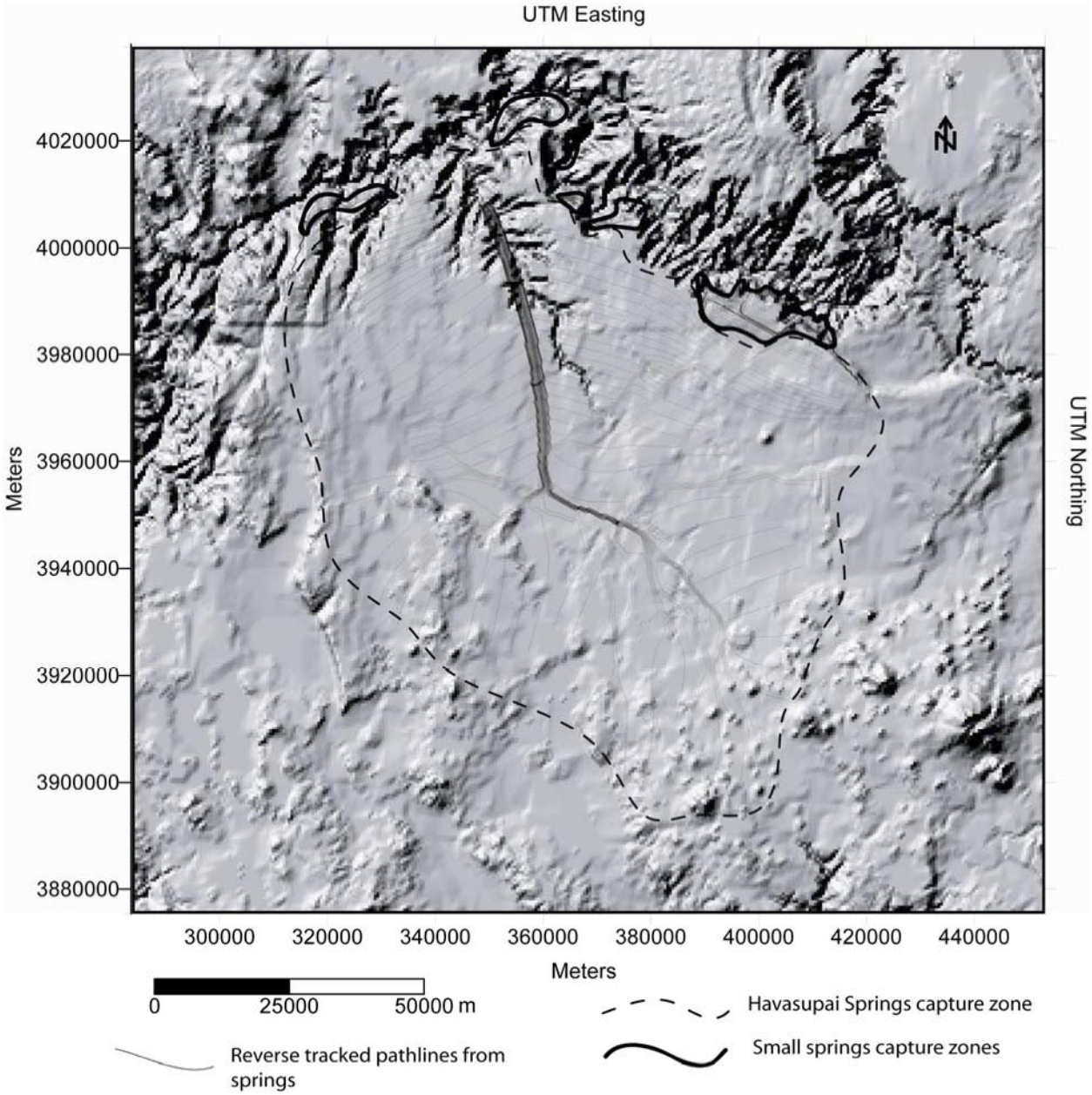

Figure 1. Pathlines and capture zones for Havasupai Springs and small springs of the Coconino Plateau Sub-basin (Kessler 2002).

occurring north of the park boundaries could significantly impact water quality."[23] Specifically, rapid groundwater recharge through faults and fractures that encounter uranium mine shafts or contaminated groundwater could transport contaminates through groundwater systems impacting surface water quality and biotic communities at discharge points north of the Colorado River.

The same holds true for the South Rim. Here, research has established connectivity between groundwater and surface water discharged at seeps and springs in Grand Canyon. For example, in the same testimony Dr. Springer provides the following map depicting the capture zone for Havasupai springs on the Havasupai Reservation in Grand Canyon (Figure 1). That capture zone encompasses

[23] Ross 2005.

much of the Tusayan Ranger District of the Kaibab National Forest – an area that has seen a sharp upturn in new uranium mining claims in recent years, that is now targeted for new exploratory drilling and uranium mining, and that is included, appropriately, in the proposed mineral withdrawal.

A number of new studies also demonstrate the seasonal variability of flow through the R-aquifer by sampling water at Roaring Springs. Brown 2008 shows connectivity between groundwater on the Kaibab Plateau with a number of North Rim springs.[24] These researchers found that the North Rim springs are sourced from water recharged on the Kaibab Plateau that travels a minimum of 900 vertical meters through conduits, faults, and fractures before discharging from the R-aquifer, a deep unconfined karstic carbonate aquifer. This same study also demonstrates seasonality and location of recharge. Roaring Springs, found on the North Rim, was found to have a distinct seasonal variation in isotopic signature with summer values more depleted in 2H and more enriched in 18O than winter values.

Uranium exploration and mining also has the potential to impact surface water in Grand Canyon's watersheds. Unplanned discharge of mining waste from mining or exploration sites resulting from flash floods or poor planning could be swept into waterways flowing into Grand Canyon and the Colorado River. Such an event could contaminate razorback suckers and flycatchers, and the toxins it would carry – including uranium, selenium, ammonia, arsenic, molybdenum, aluminum, barium, copper, iron, lead, manganese, vanadium, and zinc – could affect critical habitat for the sucker as well as for the three other endangered Colorado River fish species.[25] Contamination could occur through discharge directly into surface water, into groundwater that is subsequently transported into seeps, springs, and caves feeding Kanab Creek and Colorado River, or as dust transported by prevailing westerly or southwesterly winds into Hack Canyon and Kanab Creek and then by surface water into the Colorado River.[26]

Selenium is an element of particular concern, as elevated selenium can be taken up directly from water by aquatic organisms, resulting in acute toxicity at relatively low concentrations, thereby bioaccumulating in the aquatic (and riparian) food chain.[27] This can result in myriad adverse effects on fish populations, including impaired reproduction, deformities, reduced survival, and other problems.[28] Selenium contamination in the upper Colorado River Basin has been implicated in the decline of endangered Colorado River fish in particular and may be impeding their recovery by adversely affecting their reproduction and recruitment.[29]

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[24] Brown, C. R.; Springer, A. E.; Hogan, J.; Rice, S. E. 2008. Chemical and Isotopic Variability of Spring Discharge: Implications for Groundwater Flow Pathways and Residence Times in the R-aquifer, Grand Canyon, Arizona American Geophysical Union, Fall Meeting 2008, Abstract #H53E-1135.

[25] U.S. Fish and Wildlife Service. 2002. Razorback sucker (*Xyrauchen texanus*) Recovery Goals: amendment and supplement to the Razorback Sucker Recovery Plan. U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado.

[26] There is precedent for surface transport of uranium pollutants from mines in Hack Canyon into Kanab Creek and Grand Canyon National Park. A 1984 flash flood transported multiple tons of high grade uranium ore from mines in Hack Canyon into Kanab Creek and the Colorado River.

[27] Hamilton, SJ. 2004. Review of selenium toxicity in the aquatic food chain. Science of the Total Environment 326: 1-31. *See also* Lemly AD. 1999. Selenium impacts on fish: an insidious time bomb. Human and Ecological Risk Assessment 5: 1139-1151.

[28] *Id.*

[29] Hamilton SJ. 1999. Hypothesis of historical effects from selenium on endangered fish in the Colorado River Basin. Human and Ecological Risk Assessment 5: 1153-1180. Such effects may not be limited to the four endangered Colorado River fish species. Runoff or discharge of water with very low concentrations of selenium can result in adverse impacts on many species of fish and fish-eating waterfowl and mammals. One study in waters downstream from uranium mining and milling operations in Canada found that in areas where water concentrations of selenium are very low,

The prospect of such contamination occurring is not at all speculative. Indeed, in 1984 a flash flood swept four tons of high grade uranium ore from mines in Hack Canyon downstream into Kanab Creek and the Colorado River.[30] [31] [32] In considering the effects of uranium mining activities in Colorado, BLM has raised concerns about the threat of toxic contamination to the four endangered Colorado River fish species.[33]

Uranium exploration and mining have the potential to affect the water supply for several major cities in the Southwest, including Phoenix, Las Vegas, and Los Angeles.[34] Federal agencies concluded that uranium mining and exploratory activities will likely affect a significant number of known resources central to the integrity of Grand Canyon National Park, including the following: hydrology in the area, including seeps, springs, and groundwater; wildlife, including endangered California condors and Mexican spotted owls; vegetation, noting that "Grand Canyon supports the highest levels of diversity in both plant species and vegetative communities of any unit" in the National Park System; cultural resources, recognizing that mining activities can impact traditional cultural properties of the region's Native American tribes; nearby wilderness; the Grand Canyon viewshed; and natural soundscapes. Protecting the nearly one million acres of land via the proposed mineral withdrawal will protect these important resources.

5. Biological Values

The EIS for the proposed mineral withdrawal should evaluate the direct, indirect, and cumulative impacts of all alternatives to wildlife. In the case of alternatives that would allow uranium claims and development within the proposed withdrawal area, the BLM must fully analyze the potential impacts to wildlife that would attend the exploration and subsequent mining of thousands of uranium mining claims north and south of Grand Canyon. This analysis must include an evaluation of the impacts that would result from an increase in road construction and traffic that would be necessary to conduct exploration activities on all current mining claims within the withdrawal area. Those impacts would include, but are not limited to, direct mortality and other impacts[35] to species through road construction activities and vehicle collision, the introduction and spread of exotic plants such as cheat grass, the

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selenium has been incorporated into the food chain via primary producers, gradually built up in sediments and benthic biota, and reached levels that have the potential to cause reproductive impairment in fish. In addition, a short pulse event can quickly load an aquatic environment with selenium, and that selenium could then be conserved in the ecosystem for long periods of time. Muscatello JR, Belknap AM, Janz DM. 2008. Accumulation of selenium in aquatic systems downstream of a uranium mining operation in northern Saskatchewan, Canada. Environmental Pollution xx: 1-7.

[30] Gilles, et al., 1990b. Cate Gilles, Lena Bravo, Don Watahomigie. "Uranium Mining at the Grand Canyon – What Costs to Water, Air and Indigenous People?" *The Workbook*, Vol. 16, No. 1, 1990.

[31] Schmidt, 1993. Jeremy Schmidt. *The Grand Canyon National Park: A Natural History Guide*.1993 (ISBN 0395599326).

[32] Shuey, C. 2008. Supplemental Information for the Record of the Joint Oversight Field Hearing on "Community Impacts of Proposed Uranium Mining Near Grand Canyon National Park" at Flagstaff, Arizona, Available at: http://www.biologicaldiversity.org/programs/public_lands/mining/pdfs/ShueySupplementalTestimony041108.pdf

[33] Thus, in considering the effects of the Uranium Leasing Program administered in the Uravan Mineral Belt by the Department of Energy, BLM has been clear that "water depletion and/or toxic discharges [resulting from uranium mining] may affect 4 species of Colorado River fish downstream …." *See* Attachment A (Meeting/Telephone Conference Record (Sep. 6, 2005)).

[34] 40 C.F.R. § 1508.27(b)(2) (agencies must consider "impacts to public health and safety").

[35] Other impacts include disrupted foraging behavior, breeding behavior and success, prey availability and foraging success, migration, and rendering generally unsuitable habitat that would otherwise be used by misanthropic species.

fragmentation of wildlife habitat and populations, increased poaching and recreational killing of wildlife, increased human-caused fire starts, increased cross country off-road vehicle traffic, and increased litter and ground disturbing activity, such as fire ring construction, that would result from increased recreational use. The analysis must also evaluate the impacts of visual and noise disturbances that exploration and mining activity would have on wildlife. This includes impacts from all machinery and personnel during road construction, exploratory drilling, mining, and ore transportation. With regard to wildlife species whose ranges span both the Arizona Strip and Grand Canyon National Park and other nearby National Monuments, the analysis must consider those impacts in the context of proclamations and other enabling legislation intending to protect objects, such as those wildlife species and the natural ecosystems of which they are a part.

The analysis should include an evaluation of the impacts that would attend unplanned discharge of mining or exploration wastes into surface waters feeding into Grand Canyon National Park. As discussed earlier, unplanned discharge of mining waste from mining or exploration sites resulting from flash floods or poor planning could be swept into waterways flowing into Grand Canyon and the Colorado River.

Also as noted above, the prospect of such contamination is very real as was evidenced in the 1984 flash flood that swept four tons of high grade uranium ore from mines in Hack Canyon downstream into Kanab Creek and the Colorado River.[36] [37] [38] In considering the effects of uranium mining activities in Colorado, BLM has raised concerns about the threat of toxic contamination to the four endangered Colorado River fish species.[39] It must carry those concerns forward in this analysis for any alternatives which permit mining as well.

In analyzing a required no action alternative that would exclude lands from the proposed withdrawal, the EIS must pay particular attention to the potential impact of ground water depletion and contamination on biotic communities associated with or dependent on that water discharge. As discussed above, mining and exploration has the potential to deplete and contaminate ground water and the springs, caves, seeps and creeks into which they discharge. These are the most biologically important and spatially discrete habitats in the greater Grand Canyon ecosystem. BLM's analysis must identify and disclose species associated with springs, seeps, caves and creeks and describe their tolerances, if known, to all contaminates that could result from uranium mining. It should also describe for each species or taxa tolerance to groundwater depletion and corresponding spring, seep, or cave drying. The analysis should include, in addition to contamination and depletion impacts to special status species and the Colorado River's endangered fishes, newly discovered species, such as those in North Canyon and in cave ecosystems on the Arizona Strip, endemic and other species that use these unique habitats both obligatorily and facultatively. A partial list of species that should be included in this analysis is included below. This list was compiled by Dr. Larry Stevens and the Grand Canyon

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[36] Gilles, et al., 1990b. Cate Gilles, Lena Bravo, Don Watahomigie. "Uranium Mining at the Grand Canyon – What Costs to Water, Air and Indigenous People?" *The Workbook*, Vol. 16, No. 1, 1990.

[37] Schmidt, 1993. Jeremy Schmidt. *The Grand Canyon National Park: A Natural History Guide*. 1993 (ISBN 0395599326).

[38] Shuey, C. 2008. Supplemental Information for the Record of the Joint Oversight Field Hearing on "Community Impacts of Proposed Uranium Mining Near Grand Canyon National Park" at Flagstaff, Arizona, Available at: http://www.biologicaldiversity.org/programs/public_lands/mining/pdfs/ShueySupplementalTestimony041108.pdf

[39] Thus, in considering the effects of the Uranium Leasing Program administered in the Uravan Mineral Belt by the Department of Energy, BLM has been clear that "water depletion and/or toxic discharges [resulting from uranium mining] may affect 4 species of Colorado River fish downstream …." *See* Attachment A (Meeting/Telephone Conference Record (Sep. 6, 2005)).

Wildlands Council[40] and includes species of concern that do or may occur on the Arizona Strip. The BLM should work with the National Park Service, USGS, the USFS and other agencies, as appropriate, to compile a complete list of species of concern that may or do occur within the proposed withdrawal area to inform analysis.

Common Name	Scientific name	G Rank	S Rank	Source
Plants				
Aravaipa Wood Fern	*Thelypteris puberula* var *sonorensis*	G4T4	S1	AZ Heritage
Atwood Wild-Buckwheat	*Eriogonum thompsonae* var *atwoodii*	G2	S2	AZ Heritage
Blackrock Ground Daisy	*Townsendia smithii*	G5T3T4	S2	AZ Heritage
Blue Curls	*Trichostema micranthum*			BLM
Bunch Flower Evening-Primrose	*Camissonia confertiflora*	G2	S2	AZ Heritage
Darrow's Buckwheat	*Eriogonum darrovii*	G2	S1	AZ Heritage
Fickeisen Pincushion Cactus	*Pediocactus peeblesianus* var *fickeiseniae*	G3	S3	AZ Heritage
Brady's Pediocactus	*Pediocactus bradyi*	G3	S3	AZ Heritage
Fredonia Catseye	*Cryptantha semiglabra*	G2	S1	AZ Heritage
Grand Canyon Rose	*Rosa stellata* ssp *abyssa*	G4QT3	S3	AZ Heritage
Gumbo Milk-Vetch	*Astragalus ampullarius*	G1	S1	AZ Heritage
Holmgren Milk-Vetch	*Astragalus holmgreniorum*	G1	S1	AZ Heritage
Hopi Sunflower	*Helianthus anomalus*	G2G3Q	S2	AZ Heritage
Juniper Buttercup	*Ranunculus juniperinus*			BLM
Kaibab Sedge	*Carex scirpoidea* var *curatorum*	G2	S2	AZ Heritage
Kearney Mustard	*Thelypodiopsis purpusii*	G4T2	S2	AZ Heritage
King Clover	*Trifolium kingii* ssp *macilentum*	G5TUQ	SU	AZ Heritage
King Snapdragon	*Antirrhinum kingii*			AZ Heritage
Least Evening Primrose	*Camissonia parvula*			BLM
Longspine Cotton Thorn	*Tetradymia axillaries* var *longispina*	G4T2	S2	AZ Heritage

[40] Stevens, L. 2001. An Inventory, Assessment, And Development Of Recovery Priorities For Arizona Strip Springs, Seeps And Natural Ponds: A Synthesis Of Information. AWPF GRANT NUMBER 99-074WPF: TASK 2 3 March 2001 *Prepared by* Grand Canyon Wildlands Council, Inc. Flagstaff, AZ.

Marston Beehive Cactus	*Coryphantha missouriensis* var *marstonii*	G2	S2	AZ Heritage
Mt. Trumbull Beardtongue	*Penstemon distans*	G3G4Q	S1	AZ Heritage
Navajo Mountain Phlox	*Phlox cluteana*	G4?	S2	AZ Heritage
Nevada Bluegrass	*Poa nevadensis*			BLM
Nevada Moonpod	*Selinocarpus nevadensis*			BLM
North Kaibab Prickle Poppy	*Argemone arizonica*			NPS
Scarlet Wild-Buckwheat	*Eriogonum zionis* var *coccineum*	G2	S2	AZ Heritage
Sentry Milk-Vetch	*Astragalus cremnophylax* var *cremnophylax*			NPS
Sheep Range Beardtongue	*Penstemon petiolatus*	G3T3	S1	AZ Heritage
Shrub Gilia	*Ipomopsis frutescens*	G2T2	S2	AZ Heritage
Siler Pincushion Cactus	*Pediocactus sileri*	G3	S2	AZ Heritage
Tawny Turpentine Bush	*Haplopappus cervinus*	G2G3	S1	AZ Heritage
Two-Leaf Bedstraw	*Galium bifolium*			BLM
Virgin Narrows Spike Moss	*Selaginella leucobryoides*	G4T2	S1	AZ Heritage
Watson Spike Moss	*Selaginella watsoni*			BLM
	Heuchera rubescens			BLM
Arthropoda				
Grand Canyon Cave Pseudoscorpion	*Archeolarca cavicola*			BLM
Mollusca				
Desert Springsnail	*Pyrgulopsis deserta*	G2	S1	AZ Heritage
Grand Wash Springsnail	*Pyrgulopsis bacchus*	G2	S1	Hershler and Landey 1988
Kanab Ambersnail	*Oxyloma haydeni kanabensis*	G3T3	S3S4	Stevens et al. 1997
Fish				
Colorado Pikeminnow	*Ptychocheilus lucius*	G3T3	S3S4	Minckley 1991
Humpback Chub	*Gila cypha*	G3T3	S3S4	Minckley 1991
Bonytail Chub	*Gila elegans*	G3T3	S3S4	Minckley 1991
Razorback Sucker	*Xyrauchen texanus*	G3T3	S3S4	Minckley 1991
Virgin Roundtailed Chub	*Gila robusta seminud*			Minckley 196_
Virgin Spinedace	*Lepidomeda m. mollispinis*			Minckley 196_
Woundfin	*Plagopterus argentissimus*			Minckley 196_
Herpetofauna				
Arizona Toad	*Bufo microscaphus microscaphus*	G4T3T4	S3S4	AZ Heritage
Chuckwalla	*Sauromalus obesus obesus*			
Desert Tortoise	*Gopherus agassizii*			BLM
Northern Leopard Frog	*Rana pipiens*			BLM
Relict Leopard Frog	*Rana onca*			BLM
Utah Milk Snake	*Lampropeltis triangulum taylori*			BLM
Utah Mountain Kingsnake	*Lampropeltis pyromelana infralabialis*			BLM
Avifauna				
American Bittern	*Botaurus lentiginosus*			BLM
Bald Eagle	*Haliaeetus leucocephalus*			BLM
Belted Kingfisher	*Megaceryle alcyon*			BLM
California Condor	*Gymnogyps californianus*			BLM/Peregrine Fund
Common Black Hawk	*Buteogallus anthracinus*			BLM

Ferruginous Hawk	*Buteo regalis*			BLM
Mexican Spotted Owl	*Strix occidentalis lucida*	G3T3	S3S4	BLM
Northern Goshawk	*Accipiter gentilis*			BLM
Peregrine Falcon	*Falco peregrinus anatum*			BLM
Sage Grouse	*Centrocercus urophasianus*			Huey 1939
Snowy Egret	*Egreta thula*			BLM
Southwestern Willow Flycatcher	*Empidonax trailii extimus*	G3T3	S3S4	BLM
Mammals				
California Leaf-Nosed Bat	*Macrotus californicus*			BLM
Great Basin Gray Wolf	*Canis lupis*	Extinct		Hoffmeister 1986
Colorado River Otter	*Lontra canadensis sonora*	Extinct?		Hoffmeister 1986
Greater Western Mastiff Bat	*Eumops perotis californicus*	G5T4	S1S2	AZ Heritage
Merriam Kangaroo Rat	*Dipodomys merriami frenatus*			BLM
Red Bat	*Lasiurus borealis*			BLM
Spotted Bat	*Euderma maculata*			BLM

6. Cultural Values and Tribal Consultation

A mineral withdrawal that includes the entire segregation area will afford the greatest protection for cultural values and archaeological sites.

Most of the 670 members of the Havasupai Tribe live in Supai Village, which is located in Cataract or Havasu Creek Canyon. All of the springs and seeps on the Havasupai Reservation and on the Traditional Use Lands, which include areas of the Tusayan Ranger District, are sacred and necessary to the Havasupai Tribe. They are all necessary to the preservation of the religion, culture of the Tribe and livestock and wildlife on the reservation. Red Butte and the lands surrounding it on the Tusayan Ranger District is one of the most sacred areas to the Havasupai, so protection of this area from mining will result in protection of these sites and values. The Tribe's aboriginal lands are included in the segregated area and should be included in any mineral withdrawal.[41] Not withdrawing them from mining will result in injury to the land and will result in great harm to the Havasupai.

The Navajo Nation has been severely affected by past uranium activities. According to the Environmental Protection Agency, there are 520 abandoned uranium mines throughout the Navajo Nation. The Navajo people have suffered significant health impacts associated with past uranium mining and contamination. When the most recent uranium mining boom began, the Navajo Nation Council passed the Diné Natural Resource Protection Act, which places a ban on all uranium mining within the Navajo Nation boundary, and within "Navajo Indian Country." These lands include lands in the proposed mineral withdrawal area.[42]

The Hopi people have also suffered significantly from past uranium mining activities. Two Hopi Villages are threatened by uranium mining contamination from the Tuba City Landfill, which received waste from the nearby Rare Metals uranium mine. The Grand Canyon is one the Hopi Tribe's

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[41] Letter to the Arizona Department of Environmental Quality dated July 22, 2009 regarding Canyon Mine Draft Discharge Authorization Type 3.04 General Aquifer Protection permit (P-100333)

[42] Navajo Nation Testimony on Grand Canyon Uranium Development 2008

Traditional Cultural Properties and the seeps and springs of the area are important to the Hopi culture.[43] This should be considered in the EIS.

The Grand Canyon is also sacred to the Hualapai Tribe whose traditional lands are on the southern side of Grand Canyon and whose current reservation encompasses nearly a million acres along more than 100 miles of the Colorado River. The Canyon and River are also significant in the tribe's creation stories. As the tribe has indicated, the "Hualapai Reservation encompasses approximately one-seventh of the aboriginal territory of the Hualapai Tribe," and many lands that are not included in the reservation include places that have religious and cultural significance. The Hualapai Tribe has expressed its opposition to mining around Grand Canyon both in testimony and in a resolution passed by the tribal council on September 3, 2009.[44] The National Congress of American Indians also passed a resolution which supports the Hualapai Tribes opposition to exploratory drilling and uranium mining during their annual meeting, October 11-16, 2009.[45] This resolution also "commends the Secretary of the Interior for the proposed withdrawal of federal lands from claims under the 1872 Mining Law and calls for the Secretary to make a final decision to proceed with the withdrawal."

The Kaibab Paiute are part of the Southern Paiute Nation and have a small reservation in northern Arizona on the Arizona Strip. Their lands and the people of the Kaibab Paiute tribe will be especially affected by any mines on the Arizona Strip, especially as much of their economy is connected to tourism. As with many of the tribes in northern Arizona, the Kaibab Paiute also consider Grand Canyon an important cultural area – the Canyon and the Colorado River are significant in their creation stories. The Paiutes' traditional lands included much more than the current reservation and extended north and west of the Colorado River.

A no action alternative or an alternative that leaves out significant areas will result in the greatest impact to traditional lands, sites and values. The draft EIS must analyze potential impacts of continued mining and exploration on archaeological sites and cultural values associated with those sites. The draft EIS must assess potential impacts to traditional cultural properties and other effects on Tribal resources. The EIS must evaluate, and disclose when appropriate and in accordance with the wishes of Tribal officials, the impact uranium exploration and associated development would have on traditional cultural properties for each affected tribe as well as the consequence of uranium development in the Grand Canyon region for traditional cultural beliefs and practices.

It is of critical importance that the BLM consult with the tribes and provide ample time for them to comment on the Draft Environmental Impact Statement. Consultation should include, at a minimum, the Havasupai, Hualapai, Kaibab-Paiute, and Hopi tribes, as well as the Navajo Nation. A longer comment period to allow the tribal government to digest and process the proposal, write comments and get government approval for final comments should be considered.

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[43] Hopi Testimony on Grand Canyon Uranium Development 2008

[44] Hualapai Tribal Council Resolution of the Governing Body of the Hualapai Tribe Of The Hualapai Reservation {Position of the Hualapai Tribal Council on Uranium Exploration and Mining}, September 3, 2009.

[45] The National Congress of American Indians, "Hualapai's Opposition to Uranium Exploration and Mining on Sacred Land and Sensitive Sites," Resolution PSP-09-088c, October 11-16, 2009.

7. Recreation

The EIS should fully analyze the impacts of the proposed mineral withdrawal on recreational values within Grand Canyon National Park and on public lands in the proposed withdrawal area. The withdrawal would prevent widespread industrialization of public lands that are now wildlands and, given their adjacency to the National Park, currently contribute to the wild and remote character of lands within the Park. This industrialization—roads, ore trucks, drill rigs, mines, other associated machinery and vehicle traffic—would fundamentally change the character of public lands bordering the Park thereby diminishing the opportunity for quiet, human-powered recreation both within and outside the Park. It would foreclose significant opportunities for art activities such as painting or photography that depends on expansive, undeveloped wildlands as a subject. Mines would be visible from Grand Canyon National Park and nearby Wilderness Areas and areas managed for wilderness characteristics, thereby conflicting with visual resource management class and scenery management system management objectives and impairing visitor experience to them. Noise resulting from mining machinery and aircraft used in exploration could impact quiet zones within Grand Canyon National Park. Uranium contamination of groundwater could render (more) Grand Canyon seeps, springs and creeks unusable by backcountry recreationists. Because some springs are the only water source along otherwise dry routes, the elimination of certain water sources to pollution could render some backcountry routes unusable. Contamination of creeks could impact where private and commercial river runners can safely hike and drink, displacing and concentrating recreational pressures onto (an ever decreasing number of) uncontaminated creeks. Notably, the National Park Service already advises against drinking or bathing in the Little Colorado River, Horn, Salt and Kanab Creeks owing to radionuclide concentrations.

An alternative that protects the nearly one million acres from future mining activities would also protect the recreational value of these lands in and around Grand Canyon.

8. Public Health and Safety

The EIS must analyze the public health and safety impacts that would attend increased traffic volume and the potential for traffic accidents and uranium spills along haul routes between the withdrawal area and regional uranium mills, including the White Mesa Mill in Blanding, Utah for any alternative that allows mining. This analysis should evaluate the potential for increased traffic accidents given the coincidence of mining and exploration related vehicles with civilian traffic. It should also analyze the potential frequency of unintended uranium spills, and it should estimate the amount and the cumulative impacts of uranium ore dust accumulation along roads and within communities through which ore trucks would pass.

Millions of people a year drive from the Grand Canyon National Park through Kanab on their way to southern Utah's national parks. The number of visitors to all of these national parks, and thus traffic volume, has increased dramatically since the environmental assessments for the proposed Arizona Strip mines, Pinenut and Arizona 1, were prepared in the mid-1980s.[46]

[46] In 1986, at the time the Environmental Assessment for Canyon and Pinenut Mines were being prepared, the Grand Canyon National Park had 3,966,209 visitors in 1986, Zion National Park had 1,670,503 visitors and Bryce had 578,018. Grand Canyon National Park now has close to 5 million visitors per year, Zion NP has nearly 3 million, and Bryce NP has nearly 1.75 million visitors annually. Visitation at Arches National Park, just north of Blanding, has doubled since 1986 from 419,444 to 928,795 in 2008.

Haulage distance from Arizona 1 and Pinenut Mines to the White Mesa mill at Blanding, Utah, for example, is more than 300 miles. The EIS should analyze the total number of ore truck trips that would be required through the life of these and other proposed mines in the area. The road to Mt. Trumbull and the Grand Canyon-Parashant National Monument would be congested with ore trucks and passenger vehicles going to see the monument. The route passes through the Kaibab-Paiute reservation, Fredonia, Page, across the Glen Canyon Dam, through the Navajo reservation, and through the main street of Bluff, Utah—which includes residences and an elementary school—on its way to Blanding. Beyond the motorists heading to these national parks, there are also hundreds of rafting groups driving through northern Arizona and southeastern Utah heading to Lee's Ferry, Bluff and to Mexican Hat. This is a very large increase in the number of vehicles on the roads which will be shared with an undetermined number of trucks carrying radioactive ore, if these mining activities are allowed to proceed.[47]

Southeastern Utah roads are already at critical capacity. According to a report by the Southeastern Utah Association of Local Governments:

> [A]ddressing the issue of the high volume of traffic, especially commercial local and interstate truck traffic, on the district's two-lane highways is also a high priority. Besides the current inadequacies of the district's highways, continued economic development is discouraged because of the real and perceived problem of moving goods and materials to and from suppliers and market centers. Truck traffic, especially … Hwy 191 through Moab (Grand County), Monticello, and Blanding (San Juan County) … is a special concern.[48]

The roads in the area of Page, Arizona are also heavily travelled. U.S. Highway 89 is the primary access corridor for the City of Page, Lake Powell, and other popular recreational areas. The highest truck volume of 46 percent is reported on US-89 between the City of Page and the Arizona-Utah border. On U.S. Highway 89A, an Average Daily Traffic (ADT) of 5,800 vehicles was reported at the junction at SR-389 south of Arizona/Utah State line. The highest truck volume of 12 percent is reported west of US-89.[49]

9. Economics

BLM's analysis of the socioeconomic consequences of a mineral withdrawal should include a rigorous analysis of the regional tourism economy connected to Grand Canyon, and the potential for an alternative which allows uranium mining to impact that important economy. This analysis should include an analysis of jobs and annual revenues and tax revenues across different tourism sectors; it should also evaluate related support industries and jobs and revenues therein. BLM's analysis should include a look at the long-term and more sustainable jobs associated with the tourism sectors versus the short-term and limited nature of those associated with uranium mining activities.

The analysis should estimate the costs that would attend remediating or replacing contaminated ground

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[47] NPS STATS: http://www.nature.nps.gov/stats/park.cfm.

[48] Southeastern Utah Association of Local Governments - 2005-2009 Consolidated Plan 2005: Community Development. 2005. http://seualg.utah.gov/COMMDEV/2005_ConPlan/2005%20ConPlan%20Community%20Development.pdf

[49] Statewide Transportation Planning Framework - Northern Region - Existing and Future Conditions http://www.bqaz.gov/PDF/Northern_WP2_ExistingRdSystem_2_4_1.pdf.

water upon which the community of Tusayan depends. It should evaluate the socioeconomic consequences that would attend contaminating Havasupai Springs, the impacts on reduced tourism and reduced tourism revenues for the Havasupai Tribe. The analysis must also include an economic analysis of uranium's full life cycle costs, including the ongoing costs of disposal and storage once used. BLM must disclose in the EIS where uranium mined from the Grand Canyon region would be sold, where it would be processed, for what purposes, and where it is likely to be stored. If uranium mined from the Grand Canyon region is to be sold in an open international market, and if the country in which uranium will be processed, used, and stored is unknown, the BLM must disclose this fact too. In that case, the BLM must evaluate any potential Homeland Security, environmental and economic impacts that would attend uranium being processed, used, stored and potentially re-used and deployed in weaponry by entities other than the United States of America.

10. Air Quality

The proposed mineral withdrawal will help to protect the Grand Canyon's spectacular panoramic vistas. It will prevent further deterioration of visibility in Grand Canyon National Park as mandated in the 1977 amendments to the Clean Air Act, which established the national goal of "the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas which impairment results from manmade air pollution" (42 U.S.C § 7491).

All activities associated with mineral exploration, mining, hauling, and milling contribute to declining air quality in the Grand Canyon region. Hydrocarbon emissions from vehicles, drill rigs, diesel generators, pumps, and other machinery reduce visibility, increase ozone, and stress ecosystems in and around the Grand Canyon. The EIS should evaluate cumulative effects of all mining activities in any alternative which allows for mining and then assess their effects in combination with preexisting emissions from coal plants, cities, traffic, and other sources of regional air pollution.

Dust from uranium ore is a well-documented carcinogen that must be evaluated in considering the cumulative effect of thousands of uranium mines in the proposed withdrawal area. Adverse and irreparable harm to human and ecological health must be considered in the EIS. Fugitive sources of uranium dust can only be minimized but not eliminated. Therefore, cumulative risks must be calculated as the number of potential mine sites increases exponentially with each incremental rise in uranium prices.

All surface disturbing activities associated with mineral exploration, mining, hauling, and milling contribute to airborne dust in the Grand Canyon region. Combined with off-road vehicle use, grazing, and other uses, the cumulative effects include severe soil loss, early release of snowpack in the Rockies, dust storms, reduced runoff in the Colorado River Basin, and overall negative impact on species diversity as our region becomes hotter and drier due to climate change (please see http://sbsc.wr.usgs.gov/crs/news_info/dust_storms/). The EIS must consider these impacts.

11. Human Health Impacts

In addition to the human health impacts of direct inhalation of dust associated with uranium mining, as part of any alternative that allows mining to go forward, the EIS must analyze and disclose the potential human health impacts that would attend the accumulation of uranium in water and dust in the Grand

Canyon and Colorado River as well as in the seeps and springs of the areas. Because there is very real potential that uranium mining could contaminate surface and ground water sources feeding the Colorado River, the analysis should evaluate the possibility, feasibility and costs that would attend undertaking a clean-up effort and any costs for additional treatment of drinking water.

Uranium is a Class A human carcinogen because of its radioactive properties, and also because it is a potent kidney toxicant. Its Environmental Protection Agency limit in drinking water is based on uranium's chemical toxicity to the human kidney. [50] Uranium mines generate wastes in the form of overburden, waste rock and low-grade ore. When exposed to air, the hazardous and radioactive substances native to the rock are oxidized and released to the environment through runoff and wind dispersion. The toxic constituents of mine waste include uranium, arsenic, cadmium, lead, molybdenum and selenium, and the radioactive constituents include uranium, thorium, radium, and lead.

There is an abundance of data from the Four Corners region, particularly on the Navajo Nation, concerning the impacts of uranium mining on human health. Thousands of uranium mines were developed on the Colorado Plateau since the 1940s, and a large proportion of these were abandoned by the mid-1980s. Since 1978, more than 50 "inactive" and "active" uranium mills and tailings disposal facilities — more than half of which are located on the Colorado Plateau — have been consolidated and covered to mitigate releases of radioactive tailings and radon gas. Every one of these uranium mills has extensive, localized groundwater contaminant plumes that are still years, if not decades, from being fully remediated.[51]

A Northern Arizona University researcher found a New Mexico State Tumor Registry data on the New Mexico portion of the Navajo Reservation which showed a 17-fold increase in childhood reproductive cancers compared to the U.S. average.[52] Another set of registry data from 1970-1982 showed a 2.5-fold increase in these cancers among all New Mexico Native Americans.[53]

The largest possible withdrawal area will afford the greatest protection of Colorado River and the drinking water for millions of people. This should be a consideration in the EIS as well.

12. Conclusion

Thank you for the opportunity comment on the Department of Interior's proposed mineral withdrawal to protect Grand Canyon and its watersheds from the impacts of uranium mining development. We appreciate your time and consideration evaluating these comments; please do not hesitate to contact any of us should you wish to discuss them more.

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[50] US EPA Drinking Water Standard, Federal Register/Vol. 65, No. 236/Dec. 7, 2000/ Rules and Regulations, Table I-1: p. 76710. http://www.epa.gov/fedrgstr/EPA-WATER/2000/December/Day-07/w30421.pdf.

[51] Shuey, C. 2008. Testimony before the Subcommittee on National Parks, Forests and Public Lands. March 28, 2008. http://www.biologicaldiversity.org/programs/public_lands/mining/pdfs/Shuey-Written-Statement.pdf

[52] Williams, F., "On Cancer's Trail", High Country News, May 26, 2008 http://www.hcn.org/servlets/hcn.Article?article_id=17708, pg 8.

[53] *Ibid.*

Respectfully,

Taylor McKinnon
Public Lands Campaigns Director
Center for Biological Diversity
P.O. Box 1178
Flagstaff, AZ 86002-1178
Phone: (928) 310-6713

Sandy Bahr
Chapter Director
Sierra Club, Grand Canyon Chapter
202 E. McDowell Rd, Suite 277
Phoenix, AZ 85004
Phone: (602) 253-8633

/s/
Roger Clark
Air and Energy Director
Grand Canyon Trust
2601 N. Ft. Valley Rd.
Flagstaff, AZ 86001
Phone: (928) 774-7488