

**U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION**

**Mid-Pacific Region
Lahontan Basin Area Office, Carson City, Nevada**

**Finding of No Significant Impact
Walker River Basin Cloud Seeding Project**

FONSI NO: LO-10-05



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12/27/2010
Date



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Date



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01/05/11
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INTRODUCTION

In accordance with the National Environmental Policy Act (NEPA) of 1969, as amended, the Lahontan Basin Area Office of the United States Bureau of Reclamation (Reclamation) has prepared an *Environmental Assessment for the Walker River Basin Cloud Seeding Project* (EA) dated December 2010, which is hereby incorporated by reference. The EA describes the environmental effects of Reclamation's action to provide federal funding to the Desert Research Institute (DRI) for ground-based and airborne cloud seeding that is intended to enhance precipitation, primarily in the form of snowfall, in a portion of the Walker River Basin in California and Nevada. The benefit of the seeding operations would be evaluated using a hydrologic model developed specifically by DRI for predicting stream flow for the Walker River.

BACKGROUND

Under the Proposed Action in the EA, Reclamation proposes to provide \$1,358,000 in funding to DRI to conduct the Walker River Basin Cloud Seeding Project over a period of five years. The grant funding would allow DRI to extend their cloud seeding program which has been used in the upper Walker River Basin from 1992-2009, with minor changes. The Walker River Basin is located in eastern California in Mono County and in western Nevada in Lyon, Mineral, Douglas and Churchill Counties. Airborne cloud seeding is also proposed to be conducted over Tuolumne County, California which is expected to result in additional snowfall within the Walker River Basin.

Reclamation would provide the funding to DRI from Desert Terminal Lakes legislation related to the Walker River Basin. The public laws related to the proposed Cloud Seeding project include PL 107-171 (Farm and Rural Security Investment Act enacted in 2002) Section 2507 which provided \$200 million to Reclamation to provide water to at-risk natural desert terminal lakes; PL 108-7 (Omnibus Appropriations Bill enacted in 2003) Section 207 clarified that the money provided in PL 107-171 could only be used for Pyramid, Summit, and Walker Lakes in Nevada; PL 110-246 (Food, Conservation, and Energy Act of 2008) amended PL 107-171 to provide an additional \$175 million to benefit at-risk natural desert terminal lakes; and, PL 111-85 (Energy and Water Development Appropriations Act of 2010) amended previous Desert Terminal Lakes legislation including adding that permitted uses of funding is for efforts consistent with researching, supporting, and conserving fish, wildlife, plant, and habitat resources in the Walker River Basin.

The cloud seeding project is expected to provide water to Walker Lake by providing some additional water for all decreed rights that are supplied by the Walker River which would include augmenting decreed rights acquired or leased by the National Fish and Wildlife Foundation (NFWF) for intended transfer to Walker Lake (the benefits to the lake would occur during years after the acquired

water right transfers are approved and implemented). NFWF is authorized in legislation to make acquisitions from willing sellers that NFWF determines are the most beneficial to environmental restoration in the Walker River Basin. The cloud seeding project is also expected to augment flows to Walker Lake during potential high run-off events during the non-irrigation winter months when Walker Lake typically receives the bulk of its inflows.

During each winter season of the project, DRI would install and operate five ground-based seeding generators in the Walker River Basin and implement airborne seeding. Based on prior research results DRI would evaluate the benefits of the seeding operations based on a modeling system developed specifically for predicting stream flow for the Walker River.

SUMMARY OF EFFECTS

In support of the environmental assessment, a review of research on the effects of cloud seeding was conducted to evaluate issues concerning the potential toxicity of silver iodide used for cloud seeding material; the estimated increases in precipitation expected from cloud seeding; safety precautions; predicted precipitation enhancement areas; and downwind effects of cloud seeding. The Proposed Action includes a research component, where DRI would collect and model data to assess the change in stream flow in the Walker River. DRI's modeling efforts through this proposed project could contribute new knowledge and information to the existing research on cloud seeding.

Key findings and conclusions from the review of cloud seeding research on these topics include:

The contribution of silver iodide (AgI) to the environment from cloud seeding is negligible (i.e., in quantities too small to be measured) compared to background levels and are well below threshold limits for human safety, aquatic organisms, and water quality standards.

An estimated 5% to 15% increase in annual precipitation in the Walker River Basin could result from the cloud seeding project. This range of potential increase is smaller than the annual range of variability in precipitation expected under natural conditions.

DRI utilizes safety guidelines, also known as "suspension criteria," to stop cloud seeding when there are concerns about predicted flood conditions in or around the project area, avalanche danger, warm winter storm predictions, high winds, adverse wind direction, excessive water content in the snowpack, and major winter holiday periods due to traffic concerns and potential effects on roadways.

Studies indicated there is a high degree of confidence in the accuracy of predicting the precipitation enhancement area, where snow is expected to fall following cloud seeding activities.

Based on the most recent literature, the assumption is that there would be no measurable change to background precipitation downwind of the target area. Any changes to downwind precipitation are expected to be within the annual range of variability of precipitation.

Vegetative Communities. There would be no effect on vegetation from the ground-based cloud seeding generator sites, as no new construction would occur and access is provided by existing roads. Enhanced precipitation from cloud seeding is expected to be within the existing range of variability for seasonal precipitation and therefore no discernable effect on upland vegetation is expected. While cloud seeding could add an estimated 5% to 15% in precipitation, it is unknown how much water would reach the Walker River or Walker Lake. Cloud seeding could augment water used for agricultural vegetation, but is not expected to have a measurable effect on riparian vegetation or noxious weeds along the Walker River, or on vegetative communities around Walker Lake. Therefore, there are no significant impacts on vegetative communities from the proposed project.

Water Resources. Soil moisture and surface runoff in the precipitation enhancement area may increase but it is unlikely the project would result in major inflows to Walker Lake that would significantly reduce the rate of decline in lake level. Increased precipitation held in the snowpack could result in increased agricultural diversions from the Walker River. Water rights acquired or leased by NFWF could be augmented by the increased precipitation and would be transferred to Walker Lake during any years that they are transferred. Enhanced precipitation from cloud seeding could have a slight improvement in water quality but these effects are not expected to be measurable. The project is not expected to have a discernable effect on stream erosion and sediment transport. Cloud seeding material (AgI) has been studied for many years and has been found to be present in well below background levels of naturally occurring silver in the environment, is in an insoluble form that is not toxic to the environment, and does not bio-accumulate. DRI mixes chemicals off-site and provides secondary containment in the event of a spill. Therefore, there are no significant impacts on water resources from the proposed project.

Fish and Threatened Fish Species. A variety of native and introduced fish species occupy the aquatic habitat in the Walker River Basin. Special-status fish species within the project area include Lahontan cutthroat trout (*Oncorhynchus clarki*) listed as a threatened species under the Endangered Species Act (ESA). It is unlikely the project would result in significantly increased flows in the Walker River that would show a discernable positive effect on fish habitat or populations. The same situation applies to increased inflows to Walker Lake, where water

quality could be positively affected, but likely not to a level that could be measured or have a discernable positive effect on fish habitat or populations. Any increased precipitation that is held in the snowpack and is subject to diversion during the irrigation season may not benefit fisheries in a measurable or significant way. The ground based generator sites are located on mountain tops or ridges, removed from watercourses. Studies indicate that cloud seeding material (AgI) occurs in an insoluble form that is not toxic to the environment, does not bio-accumulate, and does not contribute to accumulation of silver in the environment. Therefore, there are no significant impacts on fish and threatened fish species from the proposed project.

Wildlife and Endangered, Threatened, Candidate Wildlife Species. A large number of wildlife species occupy the varied habitat encompassed by the Walker River Basin. Special-status species include Sierra Nevada bighorn sheep, (*Ovis Canadensis*), endangered; Greater sage-grouse, (*Centrocercus urophasianus*), Bi-state Distinct Population Segment DPS, Candidate; Yosemite toad, (*Bufo canorus*), Candidate; Mountain yellow-legged frog (Sierra Nevada DPS), (*Rana muscosa*), Candidate. Pygmy rabbit (*Brachylagus idahoensis*), which had been under status review for listing under the ESA, the northern sagebrush lizard listed by the Bureau of Land Management (BLM) as a sensitive species, bald eagles and golden eagles, and migratory birds are also of concern.

Terrestrial wildlife and the plants that constitute their habitat are adapted to annual changes in precipitation that are expected to occur from the cloud seeding project. Additional precipitation generated from cloud seeding is expected to remain within the annual range of variability associated with natural precipitation. Excessive amounts of precipitation from cloud seeding activity would not occur because project suspension criteria would be in place, so the project would not contribute to severe weather events that could adversely affect wildlife species. Additional precipitation from cloud seeding could provide increased moisture for both native plants and irrigated agriculture that would be beneficial for these different types of wildlife habitat.

Studies indicate that cloud seeding material (AgI) occurs in an insoluble form that is not toxic to the environment, does not bio-accumulate, and does not contribute to accumulation of silver in the environment.

Ground-based cloud seeding generator sites could have potential negative effects on greater sage-grouse depending on proximity to occupied habitat. The primary concerns are habitat for avian predators, disturbance from winter cloud seeding noise, and disturbance from vehicle traffic for site support. Mitigation measures include removing the equipment during non-use, lowering the antenna if equipment removal is not feasible, and minimizing site support traffic. The BLM will evaluate existing and proposed ground cloud seeding sites for possible effects to pygmy rabbit and northern sagebrush lizard and determine if any additional protection measures should be incorporated in their land use permit to DRI.

Therefore, there are no significant impacts on wildlife and endangered, threatened, candidate wildlife species resulting from the proposed project.

Pursuant to Section 7 of the Endangered Species Act of 1973, Reclamation completed a Biological Assessment to analyze the effects of the proposed action on species listed by the U.S. Fish and Wildlife Service (FWS) as threatened, endangered or candidate species and concluded the proposed project would have “no effect” on these species.

Land Uses and Socio-Economics. The primary target area for enhanced precipitation is the upper Walker River Basin in Lyon and Mineral Counties, Nevada, and in Mono County, California. The Proposed Action is not expected to affect the local economies and socioeconomics of the area. Cloud seeding has been conducted in the area in the past with no apparent effects to these resources. The proposed ground based cloud seeding generator site east of Conway Summit is expected to have no physical effect on communications equipment located at the site because it would always be downwind of existing tower structures during seeding operations. Therefore, there are no significant impacts on land uses and socio-economics from the proposed project.

Air Quality, Climate Change and Greenhouse Gases. The emissions from cloud seeding operations would be minimal relative to background levels from traffic on nearby roads and highways, commercial and military aircraft flying over the project area, and propane used by businesses and residences in and near the project area.

The estimated increase in annual precipitation resulting from the cloud seeding project is smaller than the annual range of variability in natural precipitation, therefore there would be no significant impacts on climate change resulting from implementation of the Proposed Action. Therefore, there are no significant impacts on air quality, climate change and greenhouse gases.

Cultural Resources. Section 106 of the National Historic Preservation Act requires Federal agencies to consider the effects of an action or activity on historic properties which include archaeological sites, built environment, and sites of religious and cultural significance eligible for inclusion on the National Register of Historic Places. Reclamation archaeologists have determined the proposed action to fund the Walker River Basin Cloud Seeding Project has no potential to affect cultural resources.

Indian Trust Assets. The project is a continuation of many years of similar cloud seeding activities in the Walker River Basin and adjacent areas in Nevada and California. The primary cloud seeding material (AgI) has been studied for many years and has been found to be present in well below background levels of naturally occurring silver in the environment, is in an insoluble form that is not toxic to the environment, and does not bio-accumulate. Increases in precipitation are expected to have minor beneficial effects to a variety of trust assets including:

native plants, instream flows, fisheries, wildlife habitat, and associated hunting and fishing. Suspension criteria would be in place if meteorological conditions indicated a risk of unacceptably severe weather. Therefore, there are no significant impacts on Indian trust assets from the proposed project.

Environmental Justice. The Proposed Action's impacts on increased precipitation and stream flow would be within the range of annual variability and unlikely to be discernable from background conditions. There would be no expected downwind reduction in precipitation from the cloud seeding project. There would be no adverse human health or environmental effects to minority or low-income populations as a result of the proposed project. Therefore, there are no significant impacts on environmental justice from the proposed project.

Cumulative Effects. The contribution of the enhanced precipitation from the cloud seeding project would be minor compared to the contribution of other programs and projects. The effects of the Proposed Action are individually and cumulatively limited in scope, scale and duration. The effect of cloud seeding on increased precipitation and stream flow would be within the range of annual variability and would not contribute to a significant cumulative impact in combination with other past, present, and reasonably foreseeable projects.

FINDINGS

Based on the analysis of the environmental impacts as described in the EA for the Walker River Basin Cloud Seeding Project, Reclamation has determined that the proposed federal action will not significantly affect the quality of the human environment, thus an environmental impact statement is not required. This Finding of No Significant Impact (FONSI) is supported by the *Environmental Assessment for the Walker River Basin Cloud Seeding Project*.

DECISION

It is Reclamation's decision to provide funding from Desert Terminal Lakes legislation in the amount of \$1,358,000 to the Desert Research Institute to conduct ground based and airborne cloud seeding in the Walker River Basin for a period of 5 years. The cloud seeding project is intended to enhance precipitation in the western portion of the Walker River Basin and ultimately benefit flows to Walker Lake. As part of the Walker River Basin Cloud Seeding Project, DRI will evaluate project effectiveness using a unique hydrologic model to provide an objective assessment of project benefits to stream flow in the Walker River.