Noxious Weed Management Plan for Bá'azh chíní (Piute Creek) Canyon Watershed

DRAFT Environmental Assessment

March 2023

U.S. Department of the Interior
Bureau of Indian Affairs – Navajo Region
Western Navajo Agency
Branch of Natural Resources

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Prepared for:

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1 Purpose and Need

1.1 Introduction

The Bureau of Indian Affairs (BIA) Western Navajo Agency (WNA) serves the western portion of the Navajo Nation. The BIA WNA is comprised of 18 Chapters across 5.2 million acres of the Navajo Nation in Utah and Arizona. Noxious weed species (herein after weeds) have increased in number and cover in recent years with noxious weed populations documented on over 70,000 acres on the Navajo Nation, and preliminary analysis estimating noxious weeds cover 5 to 6 times this size (BIA 2022a). Past noxious weed surveys in the BIA WNA identified 54,049 acres of noxious weeds with 32.3% weed cover in mapped areas (BIA 2022a). The establishment and spread of noxious weeds cause problems on riparian areas, rangelands, farmlands, and community areas for the Navajo people. The current noxious weed treatment approach is land user request driven with the BIA WNA Branch of Natural Resources providing project coordination with local Chapter Houses and land use permit holders (Navajo Tribe agricultural land use and grazing permittees).

The BIA WNA Branch of Natural Resources (BNR) is proposing to treat noxious weeds in riparian areas along Bá'azh chíní (Piute Creek) and its tributaries and streams within Bá'azh chíní Canyon HUC 10 Watershed (Figure 1). The proposed project area is located in San Juan County, Utah and Navajo and Coconino counties, Arizona within Navajo Mountain community of the Land Management District (LMD) 2-1, Shonto community LMD 2-2, and Inscription House/Tsah Bi Kin community LMD 2-3 (Figure 1) defined as Land Management District 2. The BIA WNA BNR proposes to treat target weed species identified from field reconnaissance and/or potential noxious weed species that could occur in the project area. The target weed species include 45 species identified by the BIA through previous weed mapping efforts and Southwest Exotic Plant Information Clearinghouse managed by the U.S. Geological Survey Colorado Plateau Research Station (Appendix A for list). The targeted weed species have been placed into 3 categories—A, B, or C—by the BIA Navajo Region. The three categories are based on the following management goals (Final Navajo Nation Integrated Weed Management Plan Programmatic Environmental Impact Statement (FPEIS-NNIWMP):

- A—Weeds currently not present or limited distribution on the Navajo Nation but may occur in neighboring areas. The management goal is to prevent new and eradicate existing infestations. The BIA will emphasize eradication, prevention, education, awareness, identification, monitoring, and treatment.
- B—Weeds are limited in range across the Navajo Nation. The management goal is to contain existing infestations and stop further spread. The BIA will emphasize immediate control, prevention of seed spread, and eradication.
- C—Weeds are wide-spread and well established across the Navajo Nation. The management goal is to locally contain infestations and monitor populations. Management is determined locally and is based on the feasibility of control and level of infestation. The BIA will emphasize management, education, awareness, and identification and monitoring.

Weed mapping inventories conducted of the project area identified 13 targeted weed species with weeds covering about 345 acres of the mapped areas.

The Navajo Nation Integrated Weed Management Plan (NNIWMP) outlines criteria for prioritizing target sites for weed removal. The proposed project area meets the criteria for two priority weed management areas—watersheds and designated agricultural areas (areas managed for livestock

grazing and farming). The project area has the potential to spread noxious weeds downstream of the creeks and streams. The NNIWMP also identifies five fundamental requirements that dictate the feasibility of a successful weed removal project: 1) funding for treatment, monitoring, and maintenance; 2) committed land manager; 3) regulatory compliance permits; 4) capacity to conduct work; and 5) site accessibility. The project area meets all five requirements for weed removal feasibility.

The BIA Navajo Region and Navajo Nation prepared a Final Programmatic Environmental Impact Statement for the Navajo Nation Integrated Weed Management Plan (FPEIS-NNIWMP; BIA 2022a), and the Record of Decision (ROD) for that document was signed by the Secretary of the Interior (Secretary) on November 28, 2022. The FPEIS-NNIWMP identifies environmental and human impacts related to treatment of noxious weeds using manual, mechanical, chemical/herbicide use, cultural, and/or biological treatments and appropriate mitigation measures and species conservation measures for avoiding minimizing adverse impacts. The FPEIS-NNIWMP is available for review on the World Wide Web at ROD and FPEIS. This site-specific analysis contained herein tiers to and incorporates by reference the information and analysis in the BIA–Navajo Region FPEIS-NNIWMP.

This Environmental Assessment (EA) describes potential impacts to the environment from management of weeds on Tribal trust and Indian allotments within the project area. This EA has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91–90, 42 U.S.C. 4321 *et seq.*), Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 CFR 1500–1508), and Indian Affairs NEPA Guidebook, 59 IAM 3-H.

Purpose and Need

The purpose of the proposal is to manage noxious weed species in the Bá'azh chíní Canyon HUC 10 Watershed project area. The establishment and spread of noxious weeds along the waterways in the project area has impacted overall ecological health of the streams and watershed, native vegetation communities, wildlife habitat, and water availability for animals and groundwater recharge. Streams in the project area are dominated by noxious weed species, which threaten important habitat for listed and sensitive species by altering soils and growth of native grasses and trees. Stream areas infested with weeds also have the potential to serve as a seed source for areas downstream. The control of noxious weeds would improve long-term health of the watershed and streams by increasing water flow, native plant productivity and diversity, and enhancing wildlife habitat and rangelands.

The BIA WNA is required to treat weed infestations on the Navajo Nation under the Federal Noxious Weed Act (Pub. L. 93-629), the Plant Protection Act (Pub. L. 106-224), and the Noxious Weed Control and Eradication Act (Pub. L. 108-412) as outlined in BIA 54 IAM 1-H. In addition, the BIA, under the authority of the American Indian Agricultural Resource Management Act (P.L. 103-177) and the Indian Self Determination Act (P.L. 93-638) provides support for Tribal agricultural programs under Tribal contracts and direct implementation, covering lands used for farmland and rangeland. The BIA WNA BNR provides support for Tribal agricultural and range programs, in addition to a wide variety of other natural resource-related disciplines. Part of this responsibility is to help protect and improve the ecological health of rangelands and farmlands through implementation of management activities, which includes control of noxious weeds.

1.2 Decision to be Made

In accordance with NEPA, the BIA is responsible for determining if a proposed project might have a significant impact on Tribal and adjacent lands. If the parties decide that the effects of the project would not be significant, BIA will prepare a Finding of No Significant Impact (FONSI) for approval of their proposed federal actions enabling the NEPA process to conclude. The Federal actions that require BIA approval are to 1) approve weed management activities for site-specific project areas in Bá'azh chíní Canyon HUC 10 Watershed; and 2) identify mitigation measures and stipulations that will be implemented during weed management activities.

1.3 Regulatory Compliance

A variety of laws, regulations, executive orders, and other types of requirements apply to federal actions and form the basis of the analysis presented in this PEA. NEPA requires federal agencies to consider the potential environmental consequences of proposed actions and to enhance the environment through well-informed federal decisions. The CEQ was established under NEPA to implement regulations (40 CFR) and to oversee federal policy in this process.

Federal regulations and laws include DOI Department Manual Part 516; BIA NEPA Handbook, IAM 59, 3-H; Migratory Bird Treaty Act of 1918; Bald and Golden Eagle Protection Act of 1940; Clean Air Act of 1970 as amended; Clean Water Act of 1970 as amended; Antiquities Act of 1906; Native American Graves and Protection and Repatriation Act of 1990; Executive Order 12898 of 1994 (Environmental Justice); Endangered Species Act (ESA) of 1973 as amended; and National Historic Nation Act of 1966 as amended.

In addition, the Proposed Action, described in Chapter 2, is in compliance with the Navajo Nation Forest Management Plan and Navajo Nation policies and regulations.

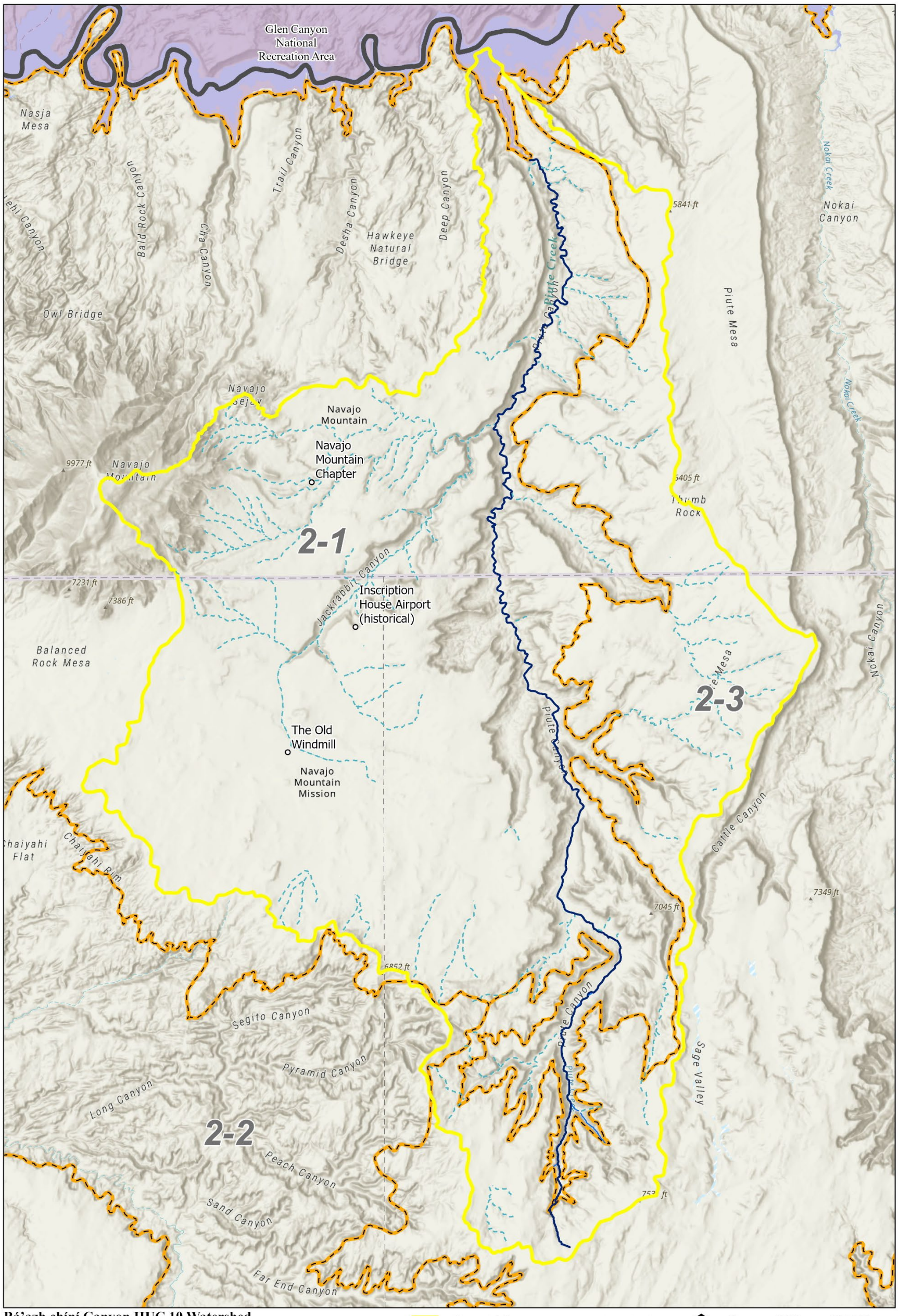

Figure 1. Western Navajo Agency Bá'azh chíní Canyon Watershed Project Vicinity Map

2 Alternatives

2.1 Alternative A: No Action Alternative

The No Action Alternative provides a baseline reference, enabling decision makers(s) to compare the magnitude of environmental effects of the Proposed Action. Under the No Action Alternative, the BIA would not approve integrated weed management for the Bá'azh chíní Canyon HUC 10 Watershed project area. Noxious weeds would continue to occur and likely increase in density and abundance along streams, including Bá'azh chíní and its tributaries. The noxious weed populations would continue to displace native vegetation communities, alter soil properties, impact water quality, and water resources, and increase wildfire risk.

2.2 Alternative B: Proposed Action Alternative

Under the Proposed Action, the BIA WNA Branch of Natural Resources would authorize weed treatments within Bá'azh chíní Canyon HUC 10 Watershed on approximately 200 miles of streams (hereafter planning area; Figures 2 to 3). Thirteen of the 45 targeted noxious weed species identified by the BIA were detected, with 2,891 noxious/invasive weed infestations mapped that covered 2,879 acres of the planning area. Out of the 2,879 acres surveyed, only 345 acres had noxious/invasive weed infestations. The annual goal is to treat up to 50 acres. An integrated weed management approach would allow for selection from manual, mechanical, herbicide, cultural and/or biological treatments. A combination of methods could be used for each project site depending on site conditions and weeds present. Noxious/invasive weeds would be treated using the best available control technique(s) based on their life history and cost-effectiveness. Repeated treatments are often necessary due to the spread of seeds, lack of complete root kill, and residual weed seeds in the seed bank. Treatment methods are described below. The noxious/invasive weed species known to occur within the project area and their potential treatment methods are listed in Table 1.

Table 1. Noxious/Invasive Weed Species Known to Occur in the Project Area and Best Treatment Methods

Weed	Best Treatment Methods
Bull thistle	Manual, Mechanical, Herbicide, Cultural, and Biocontrol
Canada thistle	Mechanical, Herbicide, and Cultural
Cheatgrass	Manual, Mechanical, Herbicide, and Cultural
Common Mediterranean grass	Mechanical and Herbicide
Halogeton	Mechanical, Cultural, and Herbicide
Kochia	Manual, Mechanical, Herbicide, and Cultural
Puncturevine	Manual and Herbicide
Red brome	Manual, Mechanical, Herbicide, and Cultural
Russian knapweed	Manual, Mechanical with Herbicide, and Biocontrol
Russian olive	Mechanical and Herbicide
Russian thistle	Manual and Herbicide with Cultural
Salt cedar	Mechanical and Herbicide
Scotch thistle	Manual, Mechanical, and Herbicide

2.2.1 Treatment Methods

The proposed noxious weed management treatment methods would incorporate mitigation measures and conservation measures to limit impacts to natural and cultural resources (see Chapter 5 and Appendix B). All treatments should include native plant restoration where native vegetation covers less than 75% of the treated area. Retreatment and restoration would be included for each type of treatment as funding allows.

Manual Treatment

Manual treatments would use hand tools and hand-operated power tools, including handsaws, loppers, shovels, brush shook, machetes, grubbing hoes, mattocks, Pulaskis, weed whackers, and axes. Manual tools would be used to cut, prune, or remove herbaceous and woody species. Treatments would include cutting undesired plants above ground level; pulling, digging, or grubbing out root systems to prevent resprouting and regrowth; or cutting at the ground level or removing competing plants around desired plants.

Manual treatments would typically be used on small, isolated infestations, where native plant species would be retained. Manual treatments would be used for annual or biennial species with tap roots or shallow roots that do not resprout from tissue remaining in the soil, or weeds growing in sandy or gravelly soils that allow for easier root removal. Manual treatments are most effective on small weed infestations and when complete root removal is possible (Rees et al. 1996). Repeated treatments are often necessary due to soil disturbance and residual weed seeds in the seed bank. All weeds removed by manual treatments would be bagged and sent to a certified incinerator to prevent reinfestation from seeds or other plant materials.

Mechanical Treatment

Mechanical treatments would involve the use of power tools and heavy equipment to remove large areas where weeds are widespread and dense. Tractors or vehicles with attached implements (e.g., root rippers, plows, mowers) would be used to grub, till, or mow herbaceous and woody weed species. Grubbing would be used to remove perennial plants with deep root systems on areas with dense populations. Tilling would be used to remove shrubs and dense monocultures on deep, rock free soils. Mowing would be used to remove annual and biennial weed species along riparian areas and roads. Heavy equipment, such as chippers, roller choppers, feller bunchers, bulldozers, or masticators and extracting equipment could be used to treat dense woody vegetation or tree weed species.

Mechanical treatments are typically used to remove thick stands of weed infestations. Mechanical methods are appropriate where a high level of control over vegetation removal is needed, such as in sensitive wildlife habitats or near home sites and are often used instead of herbicide treatments for vegetation control in the wildland urban interface. Repeated treatments are often necessary due to the spread of seeds by machinery, lack of complete root kill, and residual weed seeds in the seed bank.

Chemical/Herbicides

Chemical treatments involve the use of herbicides to kill or suppress targeted weed plants. Herbicides could be used selectively to control specific vegetation types or non-selectively to clear all vegetation in a particular area. There are 20 herbicides that may be used on the on the Navajo Nation, and out of the 20 only 4 of them would be used on the proposed stream sites in the planning area (Appendix C). Selection of a specific herbicide and application rate for site-specific use

would depend on its effectiveness on a particular weed species, success in previous similar applications, habitat types, soil types, and proximity to water. All herbicides will be used according to their labels, and a Navajo Nation Certified Pesticide Applicator will be on site. Water for mixing herbicide and cleaning herbicide equipment would be potable water obtained off-site or through a Water Use Permit. For remote sites, a Water Use Permit may be obtained with the local water code. An anti-siphon and back flow preventer device are required to prevent contamination of the water source. Treatment methods would be targeted herbicide techniques including cut stump, basal bark, frill or "hack and squirt", foliar spray, pelletized treatment, or pre-emergent treatment. Cut stump, basal bark, and frill or "hack and squirt" treatment methods would be used in areas where heavy machinery is not feasible or are sparsely populated with trees. Foliar spray treatment method could be used on large areas with weed infestations. The treatment methods are described below.

- Cut Stump—Trees are cut as close to the ground as possible using a chainsaw or loppers. The cut stump would be sprayed or painted with a systemic herbicide within 30 minutes to prevent resprouting.
- Basal Bark—Basal bark spraying would be used on dormant or leafless woody plants less than 6-inches in diameter. This method would spray the bottom 12–18 inches of a stem with herbicide. The herbicide would be mixed with a penetrating oil that allows it to pass through the bark. This method results in a dead standing snag.
- Frill or "Hack and Squirt" —This method would use an axe, machete, or hatchet to space cuts around a dormant or leafless tree trunk less than 6 inches in diameter. It is important that the cut penetrates to the cambium layer. Herbicide would then be applied to the cuts using a spray bottle or similar tool.
- Foliar Spray—Herbicide would be applied directly to the leaves using a backpack sprayer, spray bottle, a boom or boomless sprayer mounted on an all-terrain vehicle (ATV) or truck, fixed winged airplane, or helicopter to distribute over a large area.
- Pelletized Treatment—Herbicides that are small pellets would be buried around target weed shrub or tree's base.
- Pre-emergent Treatment—Herbicide would be applied to the soil before the target noxious weed species germinates or emerges.

All herbicide treatments would have a treatment plan submitted to the Navajo Nation Environmental Protection Agency (NNEPA) Pesticide Program that outlines the proposed herbicides to be used, application method and concentration levels, and timing of herbicide treatments. All herbicides used would be U.S. Environmental Protection Agency (EPA) approved and would be applied following the specified label conditions. Herbicide applications would comply with the Navajo Nation Pesticide Act as enforced by the NNEPA, which includes annual reporting on projects that use herbicide treatments and proper disposal of unused herbicide. Herbicides would be applied by applicators with a state applicators license and a U.S. EPA Certified Pesticide applicator card for the Navajo Nation. In addition, herbicides would be applied using proper equipment and personal protective equipment.

Activity Fuel Disposal

Vegetation removed by manual or mechanical treatments could be placed into piles to be burned under prescribed fire conditions. Prescribed burning of piled vegetation debris would remove the potential of contributing to existing hazardous fuel loads and posing as a fire hazard. Piles would be ignited using hand ignitions such as hand-held drip torch, helitorch, or backpack propane tanks. Pile

burning may be conducted at any time in some locations, though most burning occurs during the winter to reduce the risk of escape fire. All prescribed pile burning would be implemented with a prescribed fire burn plan and a smoke management plan in accordance with BIA procedures (2006) and the *Programmatic Pile Burn Agreement with Navajo Nation* and would comply with federal and state air quality regulations. All prescribed pile burns would be performed by the BIA Navajo Region/Navajo Nation Forestry Burn Boss. If prescribed pile burning is not an option, vegetative material would be disposed of properly.

In dense areas treated with cut-stump methods, debris could be stacked in piles for burning. Vegetation debris should be allowed to dry out for a month or more before burning; some piles could be left intact for wildlife habitat. Debris piles intended for burning should be stacked away from active floodplains to reduce the amount of ash that can enter the water channel. Russian olive vegetation can resprout from adventitious buds contacting soil, so all cut debris of this species should be burned. Prescribed pile burning may be impractical in some places because of weather, terrain, and logistics.

Areas with isolated or sparse tamarisk infestations interspersed with native vegetation should not be managed for prescribed burning of debris piles. In these cases, cut tamarisk debris may be left on the ground to avoid disturbing soils and native vegetation, which could occur from dragging and moving debris into piles. However, arranging debris from several close trees into small piles may be appropriate for creating wildlife habitat. In areas where the floodplain may be left bare from woody weed removal, piling some cut tamarisk debris along the edge of low terraces beside floodplains is recommended to reduce bank erosion during flood events. Ultimately, which type of debris management used would depend on conditions, density of stands, and decision by managers on the ground.

Cultural Treatments

Cultural treatments could include targeted grazing, restoration by seeding and planting of native plants, use of weed free hay and seed, and mulching. Use of domestic animals could be used to selectively suppress, inhibit, or control vegetation, seeding and planting of native species, cultivation and crop rotation, use of weed free hay and seeds, and mulching. The use of domestic animals requires a "prescribed grazer," such as sheep or goats, to control the top-growth of certain weeds. Sheep consume a variety of forbs, as well as grasses and shrubs, and goats can eat large quantities of woody vegetation; their daily diets can include up to 50% of the weed (BLM 1991). In order for domestic animals to be effective, the right combination of animals, stocking rates, timing (i.e., high intensity and short-duration grazing), and rest must be used to control a particular weed species while minimizing impacts to perennial native vegetation. Grazing should occur when plants are palatable, and grazing can damage or reduce viable seeds. Targeted grazing would only be used in Community Development Areas and agricultural fields and prohibited in waterways, Highly Sensitive Areas, and where sensitive species occur.

Biological Treatments

Biological treatments involve the use of biological control agents that are U.S. Department of Agriculture (USDA)-approved insects and pathogens (e.g., bacteria, fungi) to selectively suppress, inhibit, or control noxious weeds. The BIA would only use biological agents approved by USDA Agricultural Plant Health Inspection Service (APHIS) (USDA Biological Control Agent List), which are listed in Appendix D. These biological control agents can reduce weed populations by feeding on the plant, by destroying vital plant tissues and function, or by planting eggs in seedheads to

reduce reproductive potential. These control agents are commonly used on sites where the population of target plants are large enough to support a viable population of the control agent, and when adequate numbers of the agents can be obtained. All biological control agents used by the BIA under the Proposed Action will have been tested to ensure that they are host specific, and they will feed only on the target plant, and not on crops, native flora, or sensitive plant species. Introductions of all biological control agents would be done in accordance with guidelines provided by USDA APHIS. Information on the APHIS program and approval process is available at: http://www.aphis.usda.gov. Prior to the release of any biological control agent, the BIA will obtain a permit from APHIS.

Biological control agents are most suitable for large sites where the target plant is well established and very competitive with native species. However, biological control agents such as insects can take up to 20 years to become established and to have the desired level of control but may initially reduce the size or density of a weed infestation. Biological treatments are most effective when used in combination with other treatments. The BIA would not consider the use of the tamarisk leaf beetle (*Diorhabda carniulata*) based on lessons learned from treatments in 2004 along the Colorado River. Prior to the release of any biological control agent, the BIA will obtain a permit from APHIS.

Treatments would begin in Fiscal Year 2024. Treatments would be followed with monitoring to evaluate project success.

2.3 Alternatives Considered but Dismissed

The alternative element below was dismissed.

Prescribed broadcast burning—Prescribed broadcast burning means to implement human ignited prescribed fires on a large or landscape scale. Prescribed broadcast burning of debris from mechanical treatments was dismissed due to the remote location and rough terrain of the planning area that would not allow timely response by fire fighters if a prescribed fire escaped.

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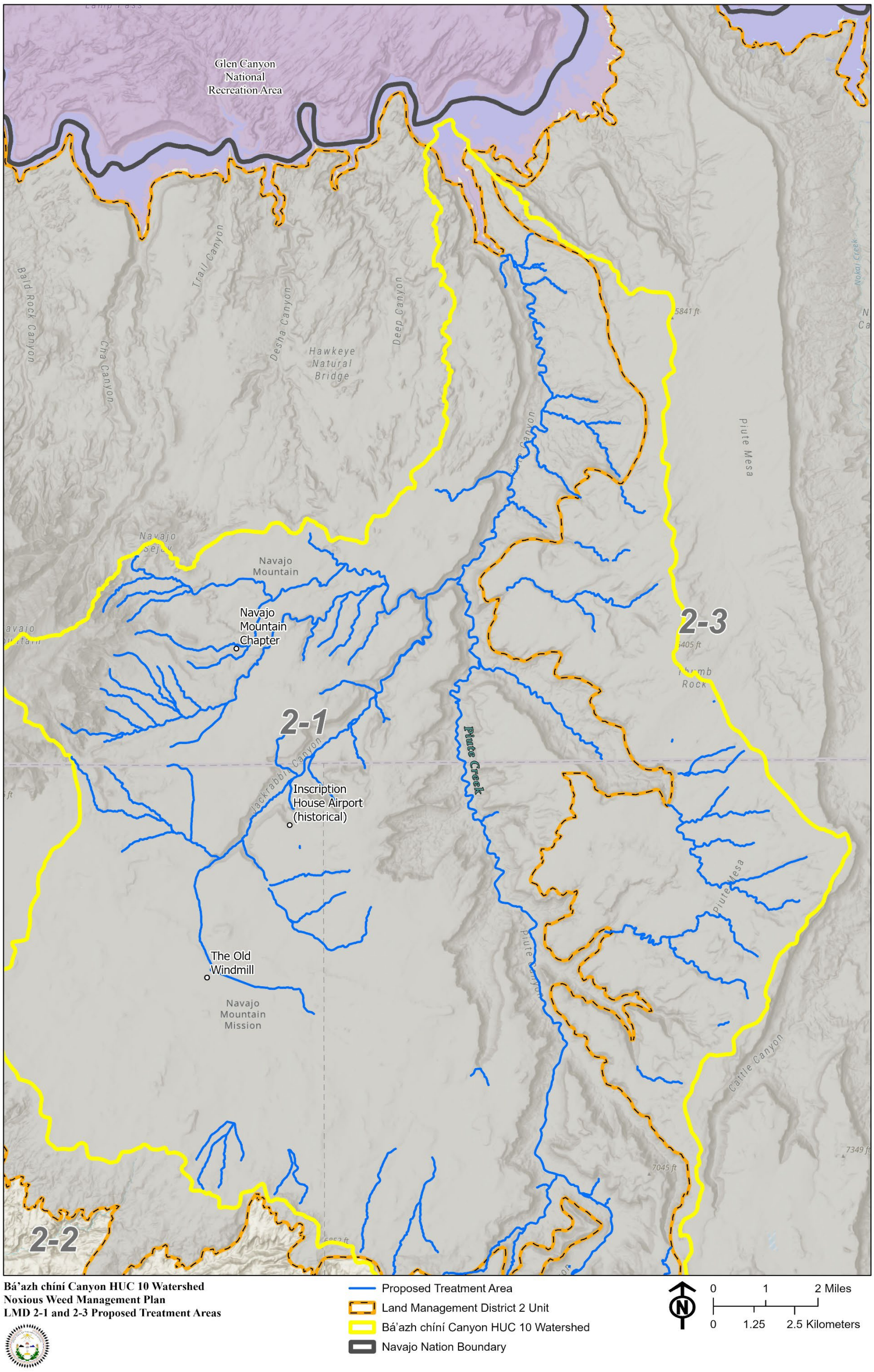

Figure 2. Land Management District 2-1 (Navajo Mountain Community) and 2-3 (Shonto Community) Proposed Weed Treatment Areas

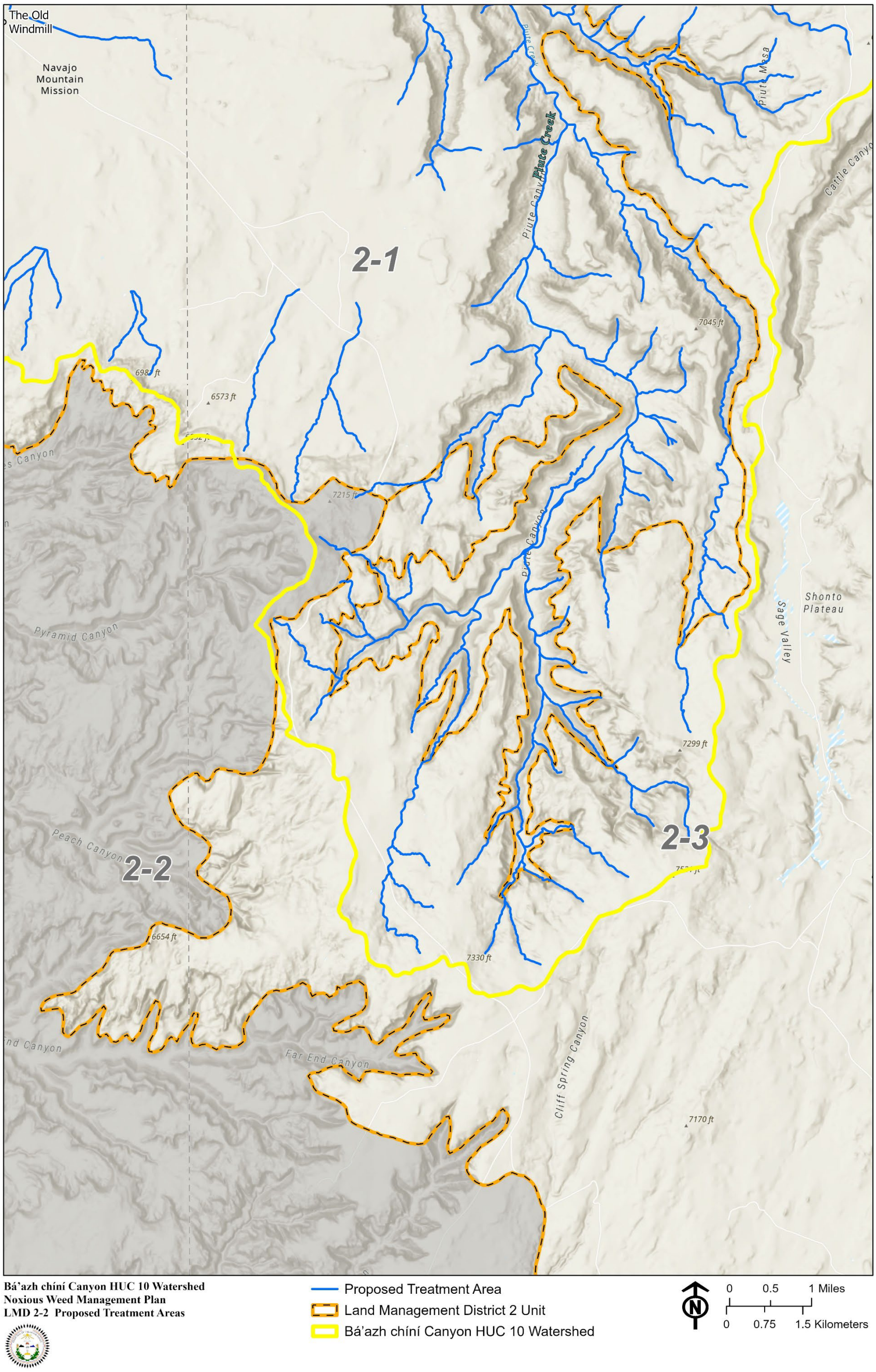

Figure 3. Land Management District 2-2 (Inscription House Community) Proposed Weed Treatment Areas

3 Affected Environment

This chapter describes the existing natural, cultural, and human built environment on LMD 2-1, 2-2, and 2-3 that could be affected by the Proposed Action and No Action alternatives.

Per NEPA Guidebook 59 IAM 3-H, the BIA is required to consider specific resources of the environment that may be affected by the Proposed Action. In compliance with NEPA and CEQ guidelines (40 CFR 1501.7[3]), only those resources and conditions having the potential to be affected by the action are discussed and analyzed within this section. Table 2 identifies the resources that were considered and dismissed and provides the rationale for dismissing the resource for further analysis.

Table 2. Resources Dismissed for Further Analysis

Resource	Rationale
Land Resources	
Topography	Implementation of the Proposed Action does not have the potential to change the existing topography.
Geology, Mineral, Paleontological Resources	Implementation of the Proposed Action does not have the potential to change the existing geology or minerals (i.e., coal, oil, natural gas).
Socioeconomic Conditions	
Demographic Trends	Implementation of the Proposed Action does not have the potential to impact demographic trends because noxious weed management activities are unlikely to lead to shifts in population structure.
Community Infrastructure	Noxious weed management activities associated with the Proposed Action do not have the potential to impact public services and utilities provided to Tribal members.
Environmental Justice	Noxious weed management activities associated with the Proposed Action would not have disproportionate health or environmental effects on minorities or low-income populations or communities.
Resource Use Patterns	
Timber Harvesting	Timber harvesting is managed under the 10-Year Forest Management Plan – Navajo Indian Reservation (Navajo Forestry Department 2006). The Proposed Action, as discussed in Section 1.3, is in compliance with the10-Year Forest Management Plan and would not impact timber harvesting opportunities.
Mineral Extraction	The Proposed Action would not affect mineral resources.
Land Use Plans	As described in Section 1.3, the Proposed Action complies with Tribal ordinances related to natural and cultural resource management. The Proposed Action adheres to all other applicable federal and Tribal laws, regulations, and plans to the maximum extent possible.
Transportation Networks	The integrated weed management activities under the Proposed Action would use existing roads and would not create new roads. The maintenance of transportation networks would not change compared to current management activities.
Other Values	
Wilderness	There is no designated wilderness within the LMD 2.

Resource	Rationale
Noise and Light	All weed treatments would be conducted during normal business hours, so light pollution would not be a concern. Noise from heavy machinery and traffic on treatment sites would occur but would be minimal and temporary only lasting during treatment activities.
Visual Resources	The Proposed Action would not impact visual resources as treatment areas would be spread across the planning area and not all would be treated at once. Noxious weed treatments would not dominate the visual landscape and should not alter the color, texture, line, or form of the treatment sites.
Climate Change	Noxious weed management activities in general contribute to greenhouse gas (GHG) emissions, but it is currently not feasible to predict with certainty the net impacts from the action alternative on global or regional climate. Equipment used for noxious weed management activities would emit emissions and would discontinue at the completion of the treatment. The contribution of GHGs would be temporary and would not produce climate change impacts that differ from the No Action Alternative. This is because climate change is a global process that is impacted by the sum of GHGs in the atmosphere.
Indian Trust Assets	The Proposed Action would not affect Tribal lands, assets, resources, or treaty rights held in trust by the U.S. for Native American tribes or individual Native Americans.
Hazardous Wastes	The Proposed Action would not contribute to hazardous or solid waste.

3.1 Land Resources

3.1.1 Soils

Soil information on Bá'azh chíní Canyon HUC 10 was gathered from the Web Soil Survey operated by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). The LMD 2 has 20 soil mapping units (Table 3 and Figure 4; NRCS 2022). Soil textures within the planning area predominately include fine sand, sand, loamy fine sand, and very gravelly loam and are well drained, with excessively drained soils along the southern portion of Bá'azh chíní and portions of Jack Rabbit Fork.

The arid climate combined with well drained soils in the planning area make it prone to erosion during wind and rain events. Sensitive soil surfaces—susceptible to wind and water erosion—erode easily and would regenerate slowly unless protected by vegetation or well-developed biological soil crusts. Soil disturbances and compaction in the planning area have occurred from land use, livestock grazing, and overland travel by vehicles, which may damage biological soil crusts. Biological crusts have a significant influence on soil quality in arid and semi-arid lands. Biological soil crusts consist of a variety of cyanobacteria, green algae, lichens, mosses, microfungi, and other bacteria. They positively affect the soil environment by reducing erosion (both wind and water), fixing atmospheric nitrogen, retaining soil moisture, and providing a living organic surface mulch (Belnap et al. 2001).

Table 3. Soil Map Units for Bá'azh chíní Canyon Planning Area

Soil Map Unit Name	Parent Material	Texture
Anasazi very stony very fine sandy loam, 10 to 25 percent slopes	eolian deposits derived from sandstone and/or residuum weathered from sandstone	Very Stony, very fine sandy loam
Anasazi very stony very fine sandy loam, 3 to 10 percent slopes	eolian deposits derived from sandstone and/or residuum weathered from sandstone	Very stony very fine sandy loam
Begay loamy fine sand, 3 to 8 percent slopes	eolian deposits derived from sandstone	Loamy fine sand
Jaconita-Anasazi association, 2 to 20 percent slopes	alluvium or colluvium derived from limestone and sandstone	Very gravelly fine sand
Lithic Torriorthents-Typic Torriorthents-Rock outcrop association, steep	colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock	Not Rated
Mespun-Bispen-Rock outcrop complex, moist, 1 to 15 percent slopes	alluvium and/or eolian sands derived from sandstone	Sand
Mido-Radnik-Riverwash complex, 1 to 8 percent slopes	alluvium and/or eolian sands derived from sandstone	Fine sand
Namon-Rock outcrop complex, 3 to 25 percent slopes	alluvium and/or colluvium derived from sandstone and shale	Very cobbly very fine sandy loam
Namon-Rock outcrop complex, low rainfall, 25 to 55 percent slopes	alluvium and/or colluvium derived from sandstone and shale	Very cobbly very fine sandy loam
Oljeto-Sheppard association, sloping	alluvium derived from sandstone and shale	Loamy fine sand
Pinepoint-Parkwash-Rock outcrop complex, 1 to 10 percent slopes	Not Rated	Fine sand
Piute-Rock outcrop complex, 3 to 25 percent slopes	eolian deposits derived from sandstone and/or residuum weathered from sandstone	Loamy fine sand
Piute-Rock outcrop complex, high rainfall, 3 to 25 percent slopes	eolian deposits derived from sandstone and/or residuum weathered from sandstone	Loamy fine sand
Redbank-Shedado association, sloping	alluvium and/or eolian deposits	Very fine sandy loam
Rock outcrop-Mathis-Nalcase complex, 10 to 50 percent slopes	Not Rated	Not Rated
Rock outcrop, sandstone-Lithic Torriorthents, association, steep	Not Rated	Not Rated
Shedado loamy very fine sand, 1 to 8 percent slopes	eolian deposits derived from sandstone and/or residuum weathered from sandstone	Loamy very fine sand
Sogzie very fine sandy loam, 1 to 8 percent slopes	eolian deposits derived from sandstone	Very fine sandy loam

Soil Map Unit Name	Parent Material	Texture
Ustic Torriorthents-Rock outcrop complex, 2 to 65 percent slopes	colluvium derived from shale and/or sandstone	Very gravelly loam
Ustollic Haplargids-Ustic Torriorthents-Rock outcrop association steep	colluvium derived from sedimentary rock and/or residuum weathered from sedimentary rock	Not Rated

[1]Source: NRCS Web Soil Surveys

3.2 Water Resources

Groundwater

The Bá'azh chíní Canyon Watershed is underlain by the Colorado Plateau aquifer system, a water bearing sandstone (USGS 1995). In general, hydrologic conductivity of sandstone is low to moderate and water is highly mineralized. Although the quantity and chemical quality of water in the Colorado Plateau aquifer system is extremely variable, much of the land in this sparsely populated region is underlain by rocks that contain aquifers capable of yielding usable quantities of water of a quality suitable for most agricultural or domestic use (USGS 1995). Water availability depends on annual precipitation to refill surface water and groundwater reservoirs.

A main concern in the planning area for groundwater is the risk for chemical contamination. A study conducted by the Bureau of Reclamation (Blanchard 2002) estimated that 72% of the Navajo Nation was at risk for groundwater contamination from pesticides, including herbicides. Stream courses on the Navajo Nation, including Bá'azh chíní, were identified as most potential for ground water contamination. The BIA WNA monitors herbicide use and surface and groundwater quality for domestic, commercial, agricultural, and industrial uses.

Surface Water

One drainage basin occurs on the Bá'azh chíní Canyon Watershed Project Area—Lower San Juan—which covers 1,502,448 acres. Of which 148,303 acres (9.9%) of the drainage basin encompasses the planning area. Bá'azh chíní is the main water body in the planning area with only the southern portion of the creek being perennial, holding water year-round. A spring along a tributary to Bá'azh chíní in the northern reach also provides water year-round. All other water bodies in the planning area are intermittent, containing water during wet portions of the year.

The U.S. Fish and Wildlife Service National Wetlands Mapping Inventory identified freshwater forested/shrub, freshwater ponds, and riverine wetlands in the planning area. Wetlands and other waters are ecological habitats protected under both federal and state laws and regulations (Sections 401 and 404 of the Clean Water Act); management considerations also must comply with Executive Order 11990, Protection of Wetlands. The purpose of this EO is to "minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, EO 11990 requires federal agencies to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. The filling or destruction of wetlands is not part of any activities or treatments under the Proposed Action.

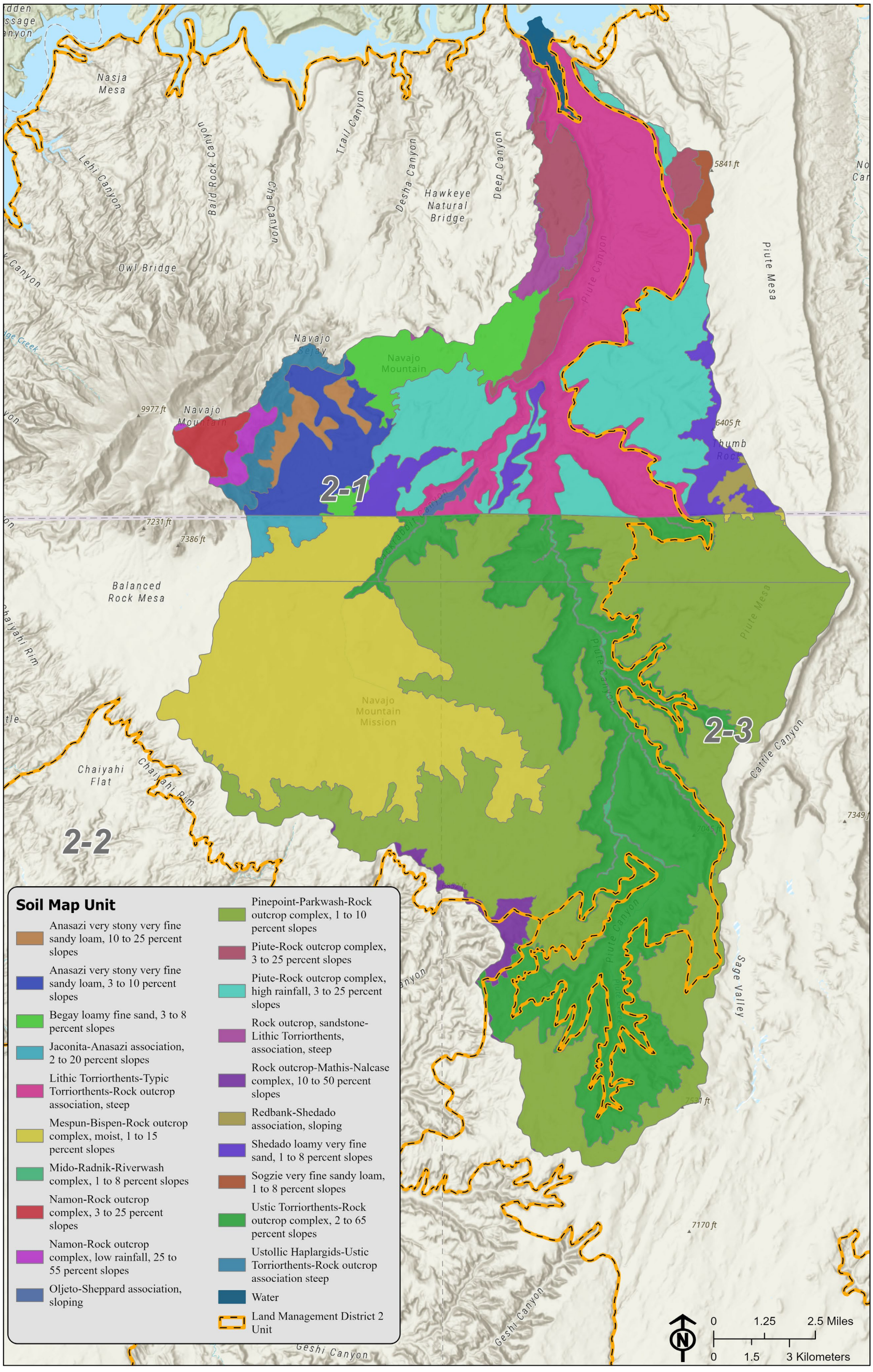

Figure 4. Soil Map Units in the Bá'azh chíní Canyon Planning Area

3.3 Air Quality

The planning area is classified as a Class II area under the 1977 amendments to the Clean Air Act (42 U.S.C 7401 et seq.) and is in attainment for all criteria pollutants. While Class II areas are allowed moderate deterioration of air quality as long as the National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency are not exceeded. The criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). The Navajo Nation Environmental Protection Agency monitors air emissions based on the Federal Clean Air Act and the Navajo Nation Clean Air Act. Air quality in the planning area is generally good. Primary sources of air pollutants in the planning area are from dust storms, vehicle and equipment emissions, and open burning, and wood and coal burning stoves.

3.4 Living Resources

3.4.1 Native Vegetation

The vegetation community is mapped as Great Basin conifer woodland and Great Basin Desert scrub (Brown 1994). Dominant vegetation includes pinyon pine (*Pinus edulis*), Utah juniper (*Juniperus osteosperma*), big sagebrush (*Artemisia tridentata*), and black sagebrush (*Artemisia nova*). Sub-dominant vegetation includes Indian ricegrass (*Achnatherum hymenoides*), blue grama (*Bouteloua gracilis*), fourwing saltbush (*Atriplex canescens*), broom snakeweed (*Gutierrezia sarothrae*), mountain mahogany (*Cercocarpus montanus*), soapweed yucca (*Yucca glauca*), desert trumpet (*Eriogonum inflatum*), Russian thistle (*Salsola tragus*), longleaf jointfir (*Ephedra trifurca*), prickly pear (*Opuntia* spp.), rubber rabbitbrush (*Ericameria nauseosa*), eastern cottonwood (*Populus deltoides*), salt cedar (*Tamarix* spp.), cheatgrass (*Bromus tectorum*), and Russian olive (*Elaeagnus angustifolia*).

Changes to native vegetation communities is a concern on the Navajo Nation. The Tribal members and residents in the planning area rely on healthy vegetation communities for economic and cultural activities. Overall, vegetation communities on the Navajo Nation have been impacted by noxious weeds with native grasslands and riparian communities shifting to noxious weed dominated communities (BIA 2022a). Changes to native vegetation communities could be in response to land use practices, such as livestock grazing, and increasing drought conditions (Paruelo and Lauenroth 1995, El Vilaly et al. 2018).

3.4.2 Wildlife

The planning area provides habitat for a variety of wildlife species due to location within two geographic areas—Great Basin conifer woodland and Great Basin Desert scrub—and variability in elevation. A wide variety of birds, reptiles, amphibians, and mammals may occur within the planning area. Big game species that may occur within the area include but are not limited to mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), pronghorn (*Antilocapra americana*), black bear (*Ursus americanus*), and mountain lion (*Puma concolor*). Primary aquatic habitat for fish in the surrounding area includes the San Juan River and tributaries, which is about 3 miles north of the planning area.

Wildlife observed during the site reconnaissance included American crow (*Corvus brachyrhynchos*), northern mockingbird (*Mimus polyglottos*), white-crowned sparrow (*Zonotrichia leucophrys*), black-throated sparrow (*Amphispiza bilineata*), mourning dove (*Zenaida macroura*), rock wren (*Salpinctes obsoletus*), and ash-throated flycatcher (*Myiarchus cinerascens*Aquatic).

Migratory Birds

All migratory birds are protected under the 1918 Migratory Bird Treaty Act (16 USC 703), as well as the Neotropical Migratory Bird Conservation Act (16 USC Chapter 80) and the Bald and Golden Eagle Protection Act of 1940 (16 USC 668). The planning area includes riparian areas, desert scrub, and pinyon-juniper woodlands that could provide nesting and foraging habitat for a wide variety of migratory, breeding, and resident bird species. The planning area is located in the Central Flyway for migratory birds, with migrating bird species transient during spring and fall. Migratory birds found on breeding bird surveys in proximity to the planning area include but are not limited to red-tailed hawk (*Buteo jamaicensis*), Say's phoebe (*Sayornis saya*), lark sparrow (*Chondestes grammacus*), black-throated sparrow (*Amphispiza bilineata*), ash-throated flycatcher (*Myiarchus cinerascens*), pinyon jay (*Gymnorhinus cyanocephalus*), and western kingbird (*Tyrannus verticalis*). More detailed information on migratory birds that may be found within the planning area can be found on the USGS Patuxent Wildlife Research Center, Breeding Bird Survey route (https://www.pwrc.usgs.gov/bbs/rawdata/Choose-Method.cfm). Noxious weeds may impact migratory birds by replacing preferred native forage, reducing forage availability; and modifying habitat structure (Duncan et al. 2004). In addition, noxious weed dominated habitats decrease the diversity of bird feeding guilds, overall bird abundance, and insects for food (Ellis 1995, Flanders et. al. 2006).

3.4.3 Threatened and Endangered Species

Under the ESA of 1973, any federally funded project has the responsibility to address impacts to federally listed and proposed species. A list of threatened and endangered species for Bá'azh chíní Canyon Watershed was acquired from the Navajo Nation Department of Fish and Wildlife (NNDFW; Appendix D). The NNDFW identified 28 tribally listed species that could occur within the planning area, 6 of which are also federally listed (Table 4). There is no designated critical habitat within the planning area. There were 17 species retained for further analysis that are known to occur within proximity to the planning area (Table 4).

The BIA Navajo Region consulted with the U.S. Fish and Wildlife Service (USFWS) and NNDFW as part of the FPEIS-NNIWMP, pursuant to Section 7 of the ESA, and prepared a programmatic biological assessment (PBA; BIA 2022b) to evaluate likely impacts to federally and tribally listed or proposed threatened or endangered species as a result of noxious weed treatments. The species conservation measures recommended by the USFWS and NNDFW in the FPEIS-NNIWMP are implemented in this EA as appropriate in Chapter 5 and Appendix B. A Biological Evaluation (BE) for the Bá'azh chíní Canyon Watershed Noxious Weed Management Plan (BIA WNA 2023) has been prepared, which tiers off the PBA that was prepared for the NNIWMP. Refer to the referenced BE for additional information regarding the Federal and Tribal listed species that could potentially occur within the planning area (see BE Appendix F).

Table 4. Special Status Species that May Occur Within or Near the Planning Area

Common/Scientific Name	*Status	Occupied Range on the Navajo Nation	Potential Impacts (Y/N)
Birds			
Northern saw-whet owl (*Aegolius acadicus*)	N G4 MBTA	Nests in Ponderosa pine, Douglas fir or mixed conifer forests; sometimes old-growth riparian woodlands. No documented breeding on Navajo Nation, but potential habitat in forests wooded canyons in Chaska Mountains, Defiance Plateau, Black Mesa, and Navajo Mountain. There is no old-growth riparian woodlands and mixed-conifer forests preferred by this species within the project area. Treatments would not occur on Navajo Mountain.	N
Golden Eagle (*Aquila chrysaetos*)	N G3 MBTA BGEPA	Nests on steep cliffs in a variety of habitats across the Navajo Nation. There is no documented breeding on the Navajo Nation (NNDFW 2020). The project area contains potential foraging and nesting habitat; however, nesting is unlikely to occur in or near treated areas. The project would follow NNDFW Golden and Bald Eagle Nest Protection Regulations to prevent risks to golden eagles during the breeding season. Aerial herbicide spraying would not occur during the breeding season and would require a ¾ mile (1.2 km) buffer from a nesting site during non-breeding season.	N
Ferruginous hawk (*Buteo regalis*)	N G3 MBTA	Nests in badlands, flat or rolling desert grasslands, and desert scrub. Most hawks breed and winter in northwestern New Mexico and may also occur in Chinle Valley and Dilkon area. The project area contains potential foraging and nesting habitat; however, nesting is unlikely to occur in or near treated areas. Additionally, ground nesting is unlikely due to residences scattered throughout the project area, and some grazing activities. Aerial herbicide spraying would not occur during the breeding season and would require a ¾ mile (1.2 km) buffer from a nesting site during non-breeding season.	N
American dipper (*Cinclus mexicanus*)	N G3 MBTA	Nests near clear streams with a variety of riffles, pools and waterfalls with substrate of rock, sand and rubble. The American Dipper is known to nest in the Upper Piute Canyon near Navajo Mountain along the San Juan River. The planning area does not have perennial waterbodies with riffles, pools, or waterfalls. However, this bird has elements occurring within 3 miles of the Oak Springs Quadrangle	Y
Bald Eagle (*Haliaeetus leucocephalus*)	N G2 MBTA, BGEPA	Nests in trees in forested areas, especially mature and old-growth stands, adjacent to large bodies of water that contains suitable forage of waterfowl and fish. There are few nesting records on the Navajo Nation. Winters along the San Juan and Colorado rivers. The project area does not contain adequate foraging and nesting habitat due to lack of forested areas adjacent to large water bodies. Additionally, the species conservation measures, including buffer distances would eliminate potential impacts to nesting eagles.	N
Band-tailed pigeon (*Patagioenasa fasciata*)	N G4 MBTA	Nests in Montane conifer or mixed-species forests dominated by pines and oaks. Known to occur in the Chuska Mountains on the	N

Common/Scientific Name	*Status	Occupied Range on the Navajo Nation	Potential Impacts (Y/N)
		Navajo Nation and has potential to occur in the Defiance Plateau and possibly Navajo Mountain and Black Mesa.	
Three-toed woodpecker (*Picoides dorsalis*)	N G4 MBTA	Nests in spruce, fir, aspen or mixed conifer forests, ideally in mature or old-growth stands, fire-killed trees, and bark-boring beetles. Known only to occur in Chuska Mountains on Navajo Nation. The planning area does not contain suitable mixed conifer high elevation forest.	N
Mexican Spotted Owl (*Strix occidentalis lucida*)	N G3 ESA T MBTA	Nests in mature mixed-conifer or pine-oak forests dominated by Douglas fir, Ponderosa pine, or Gamble oak in mountains and canyons (USFWS 2012) The forests are multistoried with moderate to high density canopies. On the Navajo Nation, they use three habitat types: 1) mid-aged to mature mixed-conifer stands dominated by Douglas fir, typically on mountain slopes with moderate to dense canopies and multiple canopy layers; 2) steep-walled narrow canyons, or side and hanging canyons in wide canyons, often with riparian vegetation and cool microclimates; and 3) moderately sloped drainages with Douglas fir in pinyon-juniper woodland (e.g., Black Mesa) (NNHP 2020). Known to occur within or adjacent to Chuska Mountains, Defiance Plateau, Canyon de Chelly, Black Mesa, and canyonlands to the north. No protected activity centers occur within the planning area. The planning area likely contains adequate Mexican spotted owl habitat in riparian areas in canyons in the planning area.	Y
Southwestern Willow Flycatcher (*Empidonax traillii extimus*)	N G2 ESA E MBTA	Nests in dense riparian habitats near or adjacent to perennial rivers or underlain by wet soil (USFWS 2002). Southwestern willow flycatchers are known to primarily nest along the San Juan and Colorado rivers. There are no known breeding sites along Bá'azh chíní. Furthermore, there is no dense riparian vegetation or streamside habitat with moist soils adjacent to perennial waterbodies that supports suitable nesting habitat in the planning area. However, southwestern willow flycatchers may use riparian areas or patches of riparian vegetation during migration that would be unsuitable for nesting (USFWS 2017).	N
Mammals			
Banner-tailed kangaroo rat (*Dipodomys spectabilis*)	N G4	Inhabits Great Basin Desert grassland or desert scrub, particularly areas with heavier soils. Small remnant populations known to occur just west of Chinle and possibly near Navajo Mountain, with patches of desert lands in New Mexico. In Navajo Mountain they use dense shrub patches in ponderosa pine forests (NNDFW 2020). Noxious weed treatments would occur along stream banks and riparian areas and is unlikely that treatments would have a significant impact on this species.	Y
Navajo Mountain Vole (*Microtus mogollonensis*)	N G4	Inhabits dry grassy vegetation in conifer forests and dense shrub patches in ponderosa pine forests. Occurs on Black Mesa,	Y

Common/Scientific Name	*Status	Occupied Range on the Navajo Nation	Potential Impacts (Y/N)
		Navajo Mountain, Defiance Plateau, and Chuska Mountains on the Navajo Nation. This species could potentially occur in the planning area, but occupancy is unlikely due to lack of grassy areas, and conifer and ponderosa pine forests.	
Fish			
Zuni bluehead sucker (*Catostomus discobolus*)	N G2	Wide range of water conditions within river/stream habitats, including variable water temperatures (16–26° C), and stream volumes. On the Navajo Nation, occurs only in the Kinlichee Creek Watershed in perennial sections of Kinlichee Creek, Black Soil Wash, Red Clay Wash, and Scattered Willow Wash. The only perennial stream in the planning area is the southern portion of Bá'azh chíní. The planning area is outside the geographic range for this species and there are no aquatic treatments proposed.	N
Roundtail chub (*Gila robusta*)	N G2	Inhabits permanent waters in cool- to warm-water mid-elevation streams, and typically frequent open areas in the deepest pools and eddies of middle sized to larger streams adjacent to rapids and boulders. Occurs in the San Juan and Mancos rivers on the Navajo Nation. The only perennial stream in the planning area is the southern portion of Bá'azh chíní. The planning area is outside the geographic range for this species and there are no aquatic treatments proposed.	N
Colorado pikeminnow (*Ptchocheilus lucius*)	N G2 ESA E	Backwaters and flooded riparian areas during spring runoff and migrates large distances (15–64 km in the San Juan River) to spawn in riffle-run areas with cobble/gravel substrates. On the Navajo Nation, occurs throughout the San Juan River from Shiprock to Lake Powell, and the mouth of the Mancos River. The only perennial stream in the planning area is the southern portion of Bá'azh chíní. Bá'azh chíní flows into the San Juan River when it has water.	Y
Razorback sucker (*Xyrauchen texanus*)	N G2 ESA E	Occupies low-flow areas; shallow to deep runs over sandbars and seasonally flooded shorelines are also important in mainstream portions of rivers for pre- and post-spawning suckers especially during spring runoff. No known wild occurrences on the San Juan River, but razorback suckers are stocked annually in the river. Historically occurred in San Juan River in Bluff, Utah. The only perennial stream in the planning area is the southern portion of Bá'azh chíní. Bá'azh chíní flows into the San Juan River when it has water.	Y
Reptiles			
Northern leopard frog **(***Lithobates pipiens***)**	N G2	Inhabits wetlands with permanent water and aquatic vegetation, ranging from irrigation ditches and small streams to rivers, small ponds, marshes, lakes or reservoirs.	Y
Chuckwalla (*Sauromalus ater*)	N G4	Inhabits low desert lands and rocky canyons, and margins of grass-oak woodlands	Y

Common/Scientific Name	*Status	Occupied Range on the Navajo Nation	Potential Impacts (Y/N)
Invertebrates			
Kanab ambersnail (*Oxyloma kanabense*)	N G4 ESA E	Inhabits perennially wet soil surfaces or shallow standing water and decaying plant matter associated with springs and seep-fed marshes near sandstone or limestone cliffs. The planning are does not have suitable habitat.	N
Plants			
Alcove death camas (*Anticlea vaginatus*)	N G3	Hanging gardens in seeps and alcoves; mostly on Navajo Sandstone at 3,000 to 6,700 feet in elevation. There is potential for hanging gardens in the canyons within the planning area where proposed noxious weed treatments would occur.	Y
Cutler's milk-vetch (*Astragalus cutleri*)	N G2	Warm desert shrub communities on sandy seleniferous soils derived from Shinarump and Chinle Formation. Only known to occur in Copper Canyon and Nokai Canyon in San Juan County, UT on the Navajo Nation. Chinle Formation exists along portions of Bá'azh chíní and some tributaries. There is potential habitat on the north end of Bá'azh chíní and tributaries.	Y
Welsh's milkweed **(***Asclepias welshii***)**	N G3 ESA T	Active sand dunes derived from Navajo sandstone in sagebrush, juniper, and ponderosa pine communities. No noxious weed treatments on sand dunes.	N
Navajo sedge (*Carex specuicola*)	N G3 ESA T	Seeps and hanging gardens on vertical sandstone cliffs and alcoves. On the Navajo Nation, known to occur from Natural Bridges National Monument in the north to Moenkopi Wash upstream of Cow Springs Wash in the southwest, and Canyon de Chelly in the southeast. There is potential for hanging gardens in the canyons within the planning area where proposed noxious weed treatments would occur.	Y
Rydberg's thistle (*Cirsium rydbergii*)	N G4	Hanging gardens and seeps and sometimes stream banks below hanging gardens. There are waterfalls in the canyons within the planning area where proposed noxious weed treatments would occur.	Y
Navajo penstemon (*Penstemon navajoa*)	N G3	Rocky, open places in ponderosa pine, aspen, and Douglas fir communities from 7,000 to 10,300 feet in elevation. Only known to occur on upper slopes of Navajo Mountain. Noxious weed treatments will not occur on the upper slopes of Navajo Mountain.	Y
Alcove bog-orchid (*Platanthera zothecina*)	N G3	Seeps, hanging gardens, and moist stream areas from desert shrub to pinyon-juniper and ponderosa pine/mixed conifer communities. On the Navajo Nation, known to occur in hanging gardens surrounding Navajo Mountain. There is potential for hanging gardens in the canyons within the planning area where proposed noxious weed treatments would occur.	Y
Cave primrose (*Primula specuicola*)	N G4	Hanging gardens and occasionally stream banks below hanging gardens, but mostly in alcoves. Occurs in canyons surrounding Navajo Mountain.	Y

Common/Scientific Name	*Status	Occupied Range on the Navajo Nation	Potential Impacts (Y/N)
		There is potential for hanging gardens in the planning area where proposed noxious weed treatments would occur.	
Parish's alkali grass (*Puccinellia parishii*)	N G4	Alkaline seeps, springs, and seasonally wet areas such as washes. Closest known populations occur in Navajo County, AZ near Shonto.	Y
Welsh's American-aster (*Symphyotrichum welshii*)	N G4	Wet meadows, stream banks, seeps, and hanging gardens. Currently, only known to occur in Tsegi Watershed in northern Navajo County, AZ.	Y

* G 2–4 = Navajo Endangered Species List rankings: G 2 = endangered, G 3 = threatened, G 4 = candidate. G 4 species are not protected under Tribal Code but should be considered in project planning. ESA E = Endangered species and ESA T = threatened species. MBTA = Migratory Bird Treaty Act. BGEPA = Bald and Golden Eagle Protection Act.

3.4.4 Agriculture (Livestock, crops, prime and unique farmlands)

Livestock grazing and farming are important economic and cultural activities in the planning area. Livestock and farming are important ways of life for many Navajo people, providing cultural knowledge, food, and materials for traditional arts and crafts, such as jewelry making and weaving. The BIA WNA has 365 grazing permittees and 79 agricultural land use permittees for LMD 2. The livestock that graze within the planning area are sheep, cattle, domestic horses, and goats.

There are no lands classified as prime farmland in the planning area (NRCS 2022). Dry land farming occurs in the planning area, which requires water delivery systems to capture and transport water for irrigation. These farm plots produce subsistence crops that subsidize food sources for individual homes and families. Livestock grazing and farming will continue to occur on lands in the planning area as they have and are not expected to differ from current practices.

3.5 Cultural Resources

Preservation of cultural resources is an issue of extreme importance to the Navajo Nation. The term, cultural resources, is a broad category that includes prehistoric and historic archaeological sites, buildings, districts, structures, locations, or objects considered important to a culture or community for scientific, traditional, religious, or other reasons.

The primary responsibility of the Navajo Nation and BIA WNA is to manage cultural properties on Indian trust lands utilizing Section 106 of the National Historic Preservation Act, as amended in 1992 (16 USC 470 *et seq.*) and in accordance with policy and guidance described in BIA Indian Affairs Manual: Part 59, Chapter 8—Protection of Historical and Archeological Resources. Section 106 requires the consideration of impacts on historic properties that are listed, or eligible to be listed, in the National Register of Historic Places (NRHP) through identification, significance determination, and inventory and management. The National Register is the nation's inventory of historic places and the national repository of documentation on property types and their significance. The above-mentioned policies and regulations require federal agencies to coordinate consultation with the Navajo Nation Heritage and Historic Preservation Officer (THPO) regarding the potential effects to properties listed on or eligible for the NRHP. Noxious weed management activities will comply with the American Indian Religious Freedom Act, NRHP, and other legislation pertaining to cultural resources. The potential for individual undertakings to result in adverse effects would be minimized or entirely avoided by mitigation measures stipulated in Chapter 5 to include, but not limited to avoidance/conservation of traditional resources; identifying alternative locations

for traditional resource gathering; timing restrictions on vegetation treatments; transplanting traditional resources to other locations; and negotiation with local communities.

The Section 106 process includes the steps below.

1. Project specific cultural surveys and Tribal consultation would be conducted prior to noxious weed treatments following the Section 106 process below to prevent impacts to known cultural resources in the planning area. Section 106 process includes four steps:
2. Initiate process: establish undertaking, define the area of potential affect (APE), and begin consultation.
3. Identify historic and traditional cultural properties within the APE.
4. Assessment of project effects on historic and/or traditional cultural properties.
5. Resolution of adverse effects, if necessary.

There are 58 previously recorded sites in the planning area, according to current Navajo Nation Heritage and Historic Preservation Department (NNHHPD) records. Out of the 58 previously recorded sites, 23 (40%) were recommended as eligible and 3 (5%) were recommended as ineligible for listing in the NRHP. There were no recommendations for 32 (55%) sites. Most of the sites found in the planning area are historic, and when determined to be eligible for NRHP listing, it is typically under Criterion D—having the potential to yield information important to prehistory or history.

The temporal range of human occupation spans over 11,000 years in the planning area, and the variety and numbers of cultural properties reflects the wide range of environments and resources utilized over millennia of human occupation. Prehistoric site types include temporary and long-term residential, agricultural, and resource procurement. Historic site types are related to Navajo occupation and include residential, agricultural, and herding. Table 5 lists the archaeological site types and time frames documented in the planning area.

Table 5. Age and Type of Cultural Properties in the Planning Area

Age	Number of Sites	Percentage of Total	Comments
Prehistoric	46	79.3	BCE 6000 to CE 1300
Historic	48	13.8	CE 1800 to Present
Unknown	4	6.9	No Diagnostic information or not listed
Single Component	49	84.5	
Multicomponent	9	15.5	7 prehistoric/historic and 2 prehistoric elements

Cultural, Sacred, and Traditional Cultural Properties

Traditional Cultural Properties (TCPs) are a separate class of cultural resources and are places that have cultural values that transcend the values of scientific importance that are normally ascribed to cultural resources such as archaeological sites and may or may not coincide with archaeological sites (Parker and King 1998).

A TCP is defined as a property that is listed on or is eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that are: (1) rooted in that community's history; and (2) important in maintaining the continuing cultural identity of the community (Parker and King 1998). Native American communities are most likely to identify TCPs, although TCPs are not restricted to those associations. Some TCPs are well known, while others may only be known to a small group of traditional practitioners, or otherwise only vaguely known. Native American tribal perspectives on what is considered a TCP are not limited by a place's age or its NRHP eligibility or lack thereof.

TCPs cover a wide range of locales and use areas. Properties may include sacred landforms (e.g., mountains, rivers, lakes, outcrops, or naturally discolored rocks), places associated with deities, plant gathering areas, places mentioned in traditional histories, habitation sites, and ceremonial/offering places. In the planning area, there are culturally significant plants that are used for medicines, food, and traditional crafts.

3.6 Resource Use Patterns

3.6.1 Recreation

Recreational opportunities include hiking and ATV use on informal off-road trials found throughout the planning area. Primarily grazing permittees that manage livestock in the area use these informal trails. Other dispersed recreation activities that could occur in the planning area include hunting, fishing, and gathering.

Hunting, Fishing, and Gathering

The planning area is part of Hunting Unit 6, which covers approximately 2,500 square miles, with the planning area covering approximately 24%. Tribal members can hunt on Tribal trust lands for food and traditional purposes. Game animals include but are not limited to mule deer, elk, and mountain lion, and game bird species include mourning doves. Hunting season on the Navajo Nation is from September to early January.

None of the streams within the planning area are currently designated as fishing waters by the Navajo Nation Department of Fish and Wildlife. While NNDFW does permit fishing in all waters of the Navajo Nation with a valid permit, there is only a portion along south end of Bá'azh chíní that is perennial and a spring along a tributary in the north portion of Bá'azh chíní. Bá'azh chíní is mainly intermittent and therefore does not support fish populations.

Local community members may use areas in the planning area for the collection of traditional or culturally important plants. Members of the local communities may come to the planning area to also hold various ceremonies related to the Navajo religion and culture.

3.7 Other Values

3.7.1 Public Health and Safety

Noxious weeds pose risk to human health from allergies or cuts. Noxious weeds that have thorns, such as thistles, can cause irritation and scratches as they poke skin or through clothing. The severity of harm depends on the species, the size of the infestation, and how the plants are encountered. Additionally, noxious weed management activities could pose risks directly to human safety from use of heavy equipment or application of herbicides. The use of handheld equipment and heavy equipment. The use of sharp tools or heavy equipment could lead to injuries from misuse of the

equipment. The treatment method that poses the most risk to human health is herbicide use. Individuals could be exposed to herbicides from direct contact of the treated vegetation or inhaling herbicides in the air that have drifted from the treatment area.

4 Environmental Consequences

This chapter provides a comparative analysis of the direct, indirect and cumulative impacts of the alternatives. Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable.

4.1 Land Resources

4.1.1 Soils

No Action

There would be no direct impacts to existing soil conditions because no weed treatments would occur within the planning area. Noxious weed density and abundance would likely continue to increase in the planning area along riparian areas in Bá'azh chíní and its tributaries. This could result in changes to species composition and structure of native plant communities, increasing the potential for soil erosion and compaction, and changing soil composition. Weed infestations can indirectly affect native plants communities by altering soil stability, promoting erosion, colonizing open substrates, affecting the accumulation of litter, salt, or other soil resources (Brooks et al. 2004, Draut et al. 2012).

Changes to species composition and structure of native plant communities could also alter wildfire behavior to more frequent and intense wildfires that could consume large tracts of vegetation. The removal of vegetation could increase erosion and reduce soil productivity. The indirect impacts due to increased potential for intense wildfire effects on soil, include physical alteration of soil structure and development of hydrophobic layers, and damage to nutrient and biotic soil characteristics. Overall soil impacts would depend on the timing, location, intensity, and extent of the wildfire.

Proposed Action

Common to all Treatments

An integrated weed management approach could potentially affect soils by altering their physical, chemical, and/or biological properties. Changes could include loss of soil through erosion due to short-term removal of vegetative cover or changes in soil structure, porosity, or organic matter content. The degree of impacts to soil resources from an integrated weed management approach would depend on the treatment method, frequency of retreatments, and soil type in treatment area. Whether such changes are beneficial or harmful would depend on the method of treatment, the soil type, and in some cases (e.g., tamarisk) the noxious weed species being treated. However, most soil impacts resulting from the Proposed Action are expected to be beneficial; these would include more stable soils, nutrient cycling, and reduced hazardous fuels.

Manual Treatment

Manual treatments would have short-term impacts to soil resources because soil disturbances would be limited to small, isolated infestations of targeted noxious weed species. Removing the targeted

noxious weed species would have positive long-term impacts to soils. The increased organic matter caused initially by leaves, stems and roots of the treated plants and secondarily by the increased production of grasses and forbs would improve the fertility of the soil.

Mechanical Treatment

Mechanical treatments, such as grubbing and tilling, would remove all vegetation in treatment areas. Soils in mechanical treatment areas would experience soil compaction from heavy equipment use and grubbing and tilling could remove topsoil increasing potential erosion. Soil compaction could reduce water infiltration capability of soils, soil aeration, and root penetration. The magnitude of soil compaction would depend on the soil texture and the type and weight of the equipment used. The lightest/smallest off-road vehicles or tractors possible would be used, and no heavy equipment would be used on wet, solid or cryptobiotic crusts. Additionally, topsoil and vegetation removal could degrade soil quality and function and increase the potential for both wind and water erosion. However, implementing mitigation measures for mechanical treatments, such as watering soils to reduce dust, stabilize sandy or loose soils and reduce topsoil loss would minimize the risk of soil erosion during mechanical treatments.

Soils could also be contaminated by oils and fuels associated with mechanical equipment. However, implementing BMPs, such as not fueling or servicing equipment in the field and cleaning up spills immediately, would be expected to reduce potential impacts to soils from petroleum products.

Chemical/Herbicides

Impacts to soils from herbicide use is based on their ability to bind to soil particles, breakdown and persist in soils at treated sites, and if environmental factors change their chemical properties. The chemical characteristics of the 21 proposed herbicides are summarized in Appendix C. Herbicide applications may result in contact with soils, either intentionally for systemic treatments, or unintentionally as spills, overspray, drift, or windblown dust. Contact may also occur because of herbicide transport through plants to their roots where herbicide may be released into the soil (BLM 2007). The treatment method with the greatest potential for adverse short-term effects on soils is herbicide use on dense monotypic stands (e.g., Russian olive or tamarisk) leading to substantial loss of vegetation cover. Proposed herbicides, 2, 4-D, clopyralid, picloram, and atrazine are relatively non-persistent in soil and would be expected to move through soils quickly. Impacts to soil resources from herbicides would depend on the herbicide used, method of application, and frequency of retreatments. The proposed action provides 21 different herbicides that could be used, limiting long-term impacts of one herbicide at a treatment area. Additionally, the use of herbicides in combination with other treatment methods and following the mitigation measures in Chapter 5 would minimize potential long-term herbicide use impacts to soils in treatment areas.

Herbicide use may also affect soils through increased erosion as vegetation is removed and there is less plant material to intercept precipitation and less to contribute to organic matter that protects soils from erosion. The increased potential for erosion would be temporary lasting until vegetation was reestablished. Re-establishing the native plant community could improve soil stability compared to sites dominated by noxious weed species.

Activity Fuel Disposal

Prescribed pile burning would impact soils, primarily as a result of removing the protective surface vegetation and litter and organic matter in the soil beneath a pile. Soils under the pile could be

exposed to greater soil heating in the B Horizon causing localized soil sterilization by destroying the microbial populations, organic matter, and seed banks in the soil and potentially creating hydrophobic characteristics. Higher soil temperatures occur when debris piles or thick layers of duff burn for long periods of time. The impacts to soils would depend on duration and intensity of burning materials and the soil and fuel moisture content at the time of burning. However, prescribed pile burning would be designed for low to moderate intensity fires that should not adversely affect the B horizon or sterilize the soils. Potential increased erosion from removal of vegetation would last until re-vegetation of the pile burn area occurred. Prescribed pile burn areas should re-vegetate with a vegetation composition likely composed of species from the surrounding area. Treatment sites that do not have greater than 50% native plant cover should be reseeded and restored immediately after treatments to reduce potential adverse impacts.

Cultural Treatments

The use of domestic animals could cause soil disturbance and compaction, increasing the potential for erosion; alter the nutrient cycle by depositing organic urine from feces; or damage biological soil crusts at treatment sites. However, implementing the mitigation measures in addition to limiting the number and amount of time animals remain on a site and using fences and supplemental nutrition (salt blocks) to restrict livestock to treatment areas would reduce potential adverse impacts to soils. Other cultural treatment methods could include planting native perennial plants to replace annual noxious weeds, which would reduce potential soil erosion and topsoil loss, increase water holding capacity and soil organic matter at treatment areas, and improve overall soil health. Mitigation measures (see Chapter 5) would be implemented to minimize soil erosion and runoff from treatment site.

Biological Treatments

Biological control agents would not likely affect soils as APHIS permits use of biological agents following testing to ensure that biological agents are host-specific and do not affect non-target plant species. Soil erosion would not likely increase as targeted noxious weed species would slowly degrade over time. In the long-term, biological control agents would increase the quality and abundance of native plant communities on a treatment site.

4.2 Water Resources

No Action

There would be no direct impacts to existing water resource conditions because no weed treatments would occur within the planning area. Noxious weed density and abundance would likely continue to increase in the planning area along riparian areas in Bá'azh chíní and its tributaries. The continued spread of noxious weeds would affect the overall ecological health of the streams and watershed, native riparian vegetation communities, and water availability for animals and groundwater recharge. Noxious weed communities, such as Russian olive, could continue to expand, creating a monoculture and displacing native riparian vegetation communities, which would lead to a decline of riparian functions and values. Salt cedar and other weeds would continue to expand along stream corridors, which could impact ground water levels and modify stream channels. Salt cedar has been shown to use more groundwater resources compared to native plant communities (DeLoach et al 2001) and to retain more sediment along riparian corridors, reducing nutrient inputs and increasing potential flood intensity (Shafroth et al. 2005). Stream areas infested with weeds also have the potential to serve as a seed source for areas downstream.

Indirect effects would be that fuel loadings—woody overgrowth and over abundant flammable weeds (tamarisk, bromes)—would continue to increase and more intense wildfires could occur. Wildfire impacts depending on the size and severity could increase sediment erosion and runoff, resulting in degraded water quality and functions and values of riparian zones.

The current uncoordinated management of undesirable or noxious plant species within the planning area would increase the risk of water contamination. Non-judicious use of herbicides for control of noxious weed species would lead to surface water contamination by a number of chemical control agents, such as glyphosate and 2,4-D, which can pose health risks to livestock and humans who make use of the streams.

Proposed Action

Common to All Treatment Methods

The removal of vegetation could temporarily increase water quantity available by altering the flow rates and frequency of peak flows. Removal of large woody noxious weeds, such as Russian olive or tamarisk, could also temporarily increase water loss on the treatment site from evapotranspiration. In addition, vegetation removal could cause short-term increases in surface runoff, which could lead to increased erosion and sedimentation. Increased erosion and sedimentation could reduce surface water quality. However, these impacts would be temporary until treatment sites revegetate naturally or are planted with native plant species and would not likely impact overall water availability and water quality.

Removal of streamside vegetation could also increase water temperatures resulting from the loss of stream shade. However, the removal of weeds along the stream corridors would reduce the hazardous fuel load, resulting in a beneficial, long-term impact to surface water quality by reducing the risk of intense wildfires. Intense wildfires could remove most of the plant community, causing an increase in stream sedimentation and discharge.

The long-term benefits of weed removal include reducing sedimentation, improving nutrient cycling, improving water availability for animals and groundwater recharge, restoring native plant communities in density and abundance, and decreasing potential wildfire risk.

Manual Treatment

Manual treatments would involve minimal soil disturbance or vegetation removal due to the small size treatment sites. Individual, non-targeted plants could be injured or killed by the treatment or trampling by crew personnel. Typically, manual treatments could remove weeds without disturbing the native plant species. Adverse impacts to surface water and groundwater resources would be short term and minimal as plant materials would remain in the treatment areas and exposed soil areas are not anticipated.

Mechanical Treatment

Impacts on water quality from mechanical treatments would depend on the technique used to remove the vegetation, the proximity of the treatment site to a waterbody, and the slope of the site. Soil disturbance would occur from equipment used to grub or till the treatment areas and from wheeled or tracked equipment creating ruts. This soil disturbance increases the likelihood of surface runoff (soils, plant materials) into nearby streams. In addition, heavy equipment could compact soils, increasing the likelihood of surface runoff by reducing the infiltration capacity of soils. Risks to

water quality associated with use of heavy machinery or mechanized equipment could occur from fuel leaks or spills. However, all refueling, oil changes, and lubrication of wheeled and tracked equipment (e.g., tractors, passenger vehicles) would be avoided in the field when possible; refueling would not occur near streams. All equipment would be checked daily for leaks and equipment with leaks would not be utilized.

Chemical/Herbicides

Herbicide use could indirectly affect surface water quality through drift, runoff, leaching into the soil, and misapplication and spills. Ground water could be affected only by leaching. Three factors that may contribute to herbicide drift are application technique, weather conditions, and applicator error. Terrestrial applications may also affect surface water and groundwater, primarily as a result of unintentional spills or movement of herbicides from upland sites into aquatic systems, as well as through additional sedimentation stemming from loss of vegetation cover. Herbicides that have low soil adsorption or high-water solubility could leach into the groundwater.

The impacts of the proposed herbicides on water quality depends on the herbicide's chemical properties (see Appendix C), application method, application rate, and environmental factors. The aerial application of non-aquatic herbicides near surface waters could increase the risk of contamination. Herbicides that are highly soluble in water could move from upland areas to surface water during heavy precipitation events, especially on large treatment sites. To protect water quality, only approved aquatic herbicides that are designed to breakdown quickly in water, would be used within 25 feet of surface water and for aerial applications (see Mitigation Measures, Chapter 5). In addition, herbicides that are non-toxic to fish and other approved aquatic herbicides would only be used within 25 to 300 feet of streams. All other herbicides must be applied at least 300 feet way from streams, reducing the risk for runoff or drift into water. Other mitigation measures would be implemented, such as restricting herbicide use before precipitation events or windy conditions and storing herbicides away from streams and open water, to reduce the potential for drift, accidental spills, or runoff of herbicides that could contaminate streams.

Activity Fuel Disposal

Prescribed pile burning following mechanical treatments are unlikely to affect wetland or riparian zones because the potential to increase surface erosion is low due to the size of piles, the low to moderate intensity burns, and the buffer that would be placed between piles and perennial and intermittent waterbodies. Vegetation piles that burn at high intensities have the potential for temporary loss of soil fertility leading to lack of vegetation regrowth, causing localized erosion and loss of soil infiltration capacity. In the long term, the pile burn areas should re-colonize with native vegetation surrounding the area. Treatment sites that do not have greater than 50% native plant cover should be reseeded and restored immediately after treatments to reduce potential adverse impacts.

Cultural Treatments

Targeted livestock grazing could affect water quality and quantity depending on the duration and intensity of grazing and the location proximity to a stream. Livestock could affect surface runoff through trampling, soil disturbance, and soil compaction. Use of grazing animals would follow mitigation measures listed in Appendix B to minimize negative impacts to water quality and quantity.

Other cultural treatment methods could include restoration activities, such as planting native perennial plants to replace annual noxious weeds, which would increase water holding capacity at treatment sites, increasing water available for native plant communities, and improving overall ecological health. Planting native plant species could also increase the amount of water available to groundwater recharge because overall native plant community density would be expected to be less than dense stands or thickets of noxious weeds, thus a decrease in water interception by native plants.

Biological Treatments

Biological control agents would have temporary impacts to water quality as soil disturbance would be minimal due to the small size of areas treated. Target plants are typically killed slowly and usually remain in place reducing the likelihood of impacting runoff or sedimentation.

4.3 Air Quality

No Action

There would be no direct impacts to existing air quality conditions because no weed treatments would occur within the planning area. Weed infestations would likely continue to expand, which could contribute to hazardous fuel loads in the planning area. Salt cedar and Russian olive found along Bá'azh chíní and its tributaries could increase the ladder fuels present and cheatgrass patches could increase fine fuels (Brooks 2008). Noxious weed infestations could increase the potential for intense burning wildfires that could impact air quality and impair visibility within and adjacent to the planning area from produce particulate matter (ash) and smoke emissions. Degradation of visibility could temporarily affect how far and how well landscape features may be seen as well as visibility along transportation corridors, such as Navajo Route 16. In addition, air quality standards for particulate matter and ozone may temporarily be exceeded within and adjacent to the wildfire area, which could affect smoke sensitive receptors and communities downwind, such as Tribal residences and surrounding towns. The extent of impacts on air quality would depend on the wildfire location, size, fuel type (trees, brush), vegetation moisture content, and wind direction.

Proposed Action

Manual and Mechanical Treatments

Manual and mechanical treatments would have small, localized, and temporary impacts due to particulate matter associated with vehicle and equipment exhaust, and fugitive dust from driving on unpaved roads to treatment sites.

Chemical/Herbicides

Herbicide treatment impacts originate from ground vehicle and aircraft exhaust and fugitive dust from driving on unpaved roads to treatment sites for herbicide application. Drift and volatilization (evaporation of liquid to gas) from spraying may temporarily result in herbicides in the air. The amount of drift is dependent on pesticide form and volatility, weather conditions, and application method. Herbicide drift from ground applications would not be expected to impact ambient air quality since drift is temporary and is limited to areas immediately adjacent to treatment sites. Herbicide drift from aerial applications would increase local exposure to herbicides immediately after treatments but would be short-term and would dissipate once applications were completed. Following mitigation measures (see Chapter 5) for aerial spraying would reduce these impacts by

prohibiting applications during weather conditions that increase the chances of evaporation or sublimation of herbicide. In addition, only aquatic herbicides would be used for aerial treatments, such as 2,4-D, glyphosate, imazapyr, and triclopyr, which would reduce potential impacts to air quality due to the lower risk of health impacts form these formulations. Additionally, aerial applications would require a 300-foot buffer around riparian and native sagebrush vegetation communities to further protect native wildlife species.

Activity Fuel Disposal

Impacts on air quality from pile burning would be localized, short-term, and quickly dispersed throughout the immediate area. Air pollutants from smoke emissions include carbon dioxide, carbon monoxide, and particulate matter. Particulate matter (PM) was identified as the most serious air pollutant from prescribed fires in the BLM Vegetation Treatment EIS (BLM 2007). Particulate matter are small particles and liquid droplets, 2.5 and 10 micrometers in diameter, that are suspended in the air. $PM_{2.5}$ are finer than PM_{10} and could travel farther and have more potential negative health impacts to sensitive receptors (e.g., residents, schools). Prescribed pile burns would follow all BIA protocols to reduce impacts to air quality from smoke, including developing a prescribed burn plan as required by the Navajo Nation Environmental Protection Agency, *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (July 2017), and BIA's Wildfire Prevention 10-Year Plan for the Navajo Region. A plan for prescribed pile burns would include mitigation measures to minimize impacts on public safety when winds have the potential to carry significant smoke that could impact traffic corridors, smoke modeling, coordinating with regional fire support programs, and restricted seasons for when pile burns could occur.

The amount and duration of smoke impacts should be limited by conducting pile burning only during atmospheric conditions that are conducive to good smoke dispersion, by limiting the number of piles burned at one time, scheduling ignitions earlier in the day to allow for more complete combustion during daytime conditions and planning the ignition during low wind conditions. These factors, combined with the mitigation measures (see Appendix B) would minimize potential impacts.

Cultural and Biological Treatments

Cultural and biological treatments would have small, localized, and temporary impacts on air quality associated with emissions generated from vehicles used to transport animals, and fugitive dust generated from driving on unpaved roads to treatment sites.

4.4 Living Resources

4.4.1 Native Vegetation

No Action

There would be no direct impacts to existing native vegetation conditions because no weed treatments would occur within the planning area. Noxious weeds would continue to occur and likely increase in density and abundance along Bá'azh chíní and its tributaries. Over time native riparian vegetation communities in the planning area could continue to decline in species composition and diversity as well as their overall health and vigor as noxious weeds displace native plant species. Additionally, noxious weed infestations could contribute to hazardous fuel loads, increasing wildfire risk. The spread of noxious weeds could make the riparian areas more vulnerable to wildfire by altering the fuelbed structure (Brooks 2008, Zouhar et al. 2008). Over time, salt cedar and Russian

olive found along Bá'azh chíní and its tributaries could alter the fire regime to frequent and high intensity crown fires from increased ladder fuels (Brooks 2008). Cheatgrass and Mediterranean grass patches could also alter the fire regimes from increased continuous, fine fuel loads (Brooks 2008). Enhanced fuel loads could increase the potential for intense wildfires that could remove large tracts of vegetation and soil organic matter (duff/litter), altering soil resources (e.g., kill rhizomes and mycorrhizae) and native vegetation species composition, structure, and diversity. Removing most standing vegetation and organic matter could also create bare and burned soils susceptible to increased opportunities for noxious weed plant species to become established.

Proposed Action

Common to All Treatment Methods

All the noxious weed treatment methods have the potential to disturb native plant communities by damaging or killing non-target vegetation. Impacts to vegetation would depend on the treatment method, frequency of retreatments, and time of application. Mitigation measures would be implemented to reduce impacts from noxious weed treatments. Mitigation measures would include but are not limited to establishing buffers around native plant populations and following herbicide label instructions. In the long-term removal of noxious weed species would help facilitate the restoration and establishment of native vegetation and improve the health and vigor of native plant communities. In addition, indirect beneficial impacts from an integrated approach to noxious weed management would be to increase the desired native plant species in treated riparian areas, reduce competition for resources with noxious weeds, create a more stratified age structure and abundance of native vegetation, increase native plant diversity, and reduce hazard fuel loads. The noxious weed treatments would also improve the productivity of each treatment site by serving to stabilize and protect the soil substrate from erosional losses.

Manual Treatment

Manual methods would use manual and hand-operated power tools to remove the entire plant and to minimize seed production. Direct impacts to vegetation could include trampling, damage, or removal of native plant species. There could also be the potential for spilling oil and fuels from hand-held equipment, which could kill or harm native plants. Indirect, adverse impacts could include replacement of noxious weed species with other, more competitive noxious weed species. Implementing mitigation measures (see Chapter 5), such as flagging native vegetation for avoidance in treatment sites, would reduce potential adverse impacts to native vegetation. Overall, adverse impacts would be short term and minimal to native vegetation.

Mechanical Treatment

Mechanical treatments using heavy equipment (e.g., tillers, grubbers, tractors) could disturb the ground from rutting and compacting soils, which could injure or kill non-targeted native plants or promote growth of noxious weeds. Mowers and mulchers cut vegetation above the surface, reducing soil disturbance, but could still cause soil compaction. As stated above, mitigation measure would be implemented to reduce impacts to native plant communities, including flagging native plant populations for avoidance and establishing buffers around sensitive plant populations (see Chapter 5 and Appendix B).

Chemical/Herbicides

Herbicides could affect non-target plant species through drift, runoff, wind transport, or accidental spills and direct spraying. Possible adverse effects could include one or more of the following: mortality, loss of photosynthetic foliage, reduced vigor, abnormal growth, or reduced reproductive output. Potential adverse impacts would depend on the selectivity of the herbicide used, extent and method of application, soil types present, and weather conditions at time of application. Implementing mitigation measures (see Chapter 5) to ensure that spraying does not occur under conditions favorable to drift and providing an adequate buffer between target and non-target areas is expected to reduce potential adverse risks.

Indirectly, treatments would likely affect plant species composition of a treatment area and may or may not affect plant species diversity. Selective herbicides that target certain types of plants (for example, broadleaf species; 2,4-D) while leaving others such as grasses unaffected have the greatest potential to impact species composition, both positively and negatively. To minimize negative impacts, where necessary multiple herbicides should be used to prevent domination by undesirable species. Indirectly, the use of herbicides would benefit native plant communities by decreasing the growth, seed production, and competitiveness of target weed plants, thereby releasing native species from competitive pressures (e.g., water, nutrient, and space availability) and aiding in the reestablishment of native species. The degree of beneficial impacts would depend on the toxicity of the herbicides to the target noxious weed species, impacts to non-target native plant species, and the success of the treatments.

Activity Fuel Disposal

Prescribed pile burning following mechanical treatments could impact the vegetation under the piles and in a small zone around each pile. Impacts to vegetation around the pile would depend on the environmental conditions present at the time of burning, such as soil and duff moisture, plant vigor, phenological state (e.g., dormant; flowering; releasing seed) at time of burning, and fire severity. Prescribed pile burn areas should re-vegetate with a vegetation composition likely composed of species from the surrounding area. Prescribed pile burn areas that do not re-vegetate naturally, perhaps due to localized, more severe fire effects, would be vulnerable to weed invasion or expansion. However, prescribed pile burn areas that do not have greater than 50% native plant cover should be reseeded and restored immediately after treatments to reduce potential adverse impacts.

Cultural Treatments

Targeted grazing would only be used where noxious weeds compose more than 50% of total cover and where herbicide treatments or other treatments are a concern. Targeted grazing could cause direct impacts to native vegetation from grazing or trampling. The extent of impacts would depend on the animal species used, the plant species' tolerance to grazing, management of the grazing system (e.g., timing, intensity, duration), and existing site conditions and disturbances. Additionally, targeted grazing treatments could spread noxious weed species by transporting seeds or plant parts on livestock's fur or in their dung. These impacts would be reduced by implementing mitigation measures, such as quarantining grazing animals after treatments and collecting and burning their dung, to reduce the spread of noxious weeds to other areas.

Biological Treatments

Biological controls are not expected to have adverse impacts on native vegetation as controls would be used to ensure insects and pathogens used in treatments are specific to the target vegetation and do not harm non-target vegetation. The BIA would conduct site-based testing near treatment areas as recommended by APHIS to determine feasibility and specificity of using the biological agent. Over time, the species composition of the plant community would change as treated weeds die and native vegetation is restored.

4.4.2 Wildlife

No Action

There would be no direct impacts to wildlife species under the No Action Alternative. Weeds would likely continue to expand along riparian areas in the planning area. The continued expansion of noxious weeds could lead to long-term wildlife habitat degradation. Noxious weeds would be expected to continue to out-compete native vegetation in riparian areas, altering the species composition and diversity of native plant communities, reducing quality and quantity of habitat and forage for wildlife species, increasing the potential for soil erosion and adverse impacts on water quality, and degrading wetland and riparian functions and values. In addition, the expansion of noxious weeds could increase wildfire risks in the planning area, which could remove large tracts of lands used for foraging, security, cover, or nesting, thus resulting in degradation of wildlife habitat quality. An intense wildfire could also alter the current vegetation structure or species composition, which could change the wildlife communities present within the burned areas.

Proposed Action

Common to All Treatment Methods

In general, noxious weed treatments would temporarily displace individual wildlife species within and near the treatment areas due to human and equipment presence and noise. Displacement would be expected to last until the treatments were completed as treatments are site-specific and small in size and surrounding native vegetation would provide suitable habitat. Noxious weed treatments would occur outside critical use periods for wildlife species (e.g., avian nesting periods). Removal of vegetation along the streams could reduce vegetation cover along banks, which could increase water temperature and sedimentation, decrease water storage capacity, and reduce shelter. However, over time, removal of noxious weeds would have beneficial, long-term impacts to wildlife habitats by restoring native plant communities, including forage plants, thinning vegetation, and reducing hazardous fuel loads. A combination of noxious weed treatments would need to be repeated for most noxious weed species to reach the desired control objective. The combination of methods used would vary based on specific site conditions. The annual impact on wildlife species would be expected to be minimal on a population level for most species with the proposed treatment site sizes (up to 50 acres treated annually and 345 acres total; 0.3% and 0.2% of watershed, respectively) compared to habitat available for wildlife species in the Bá'azh chíní Canyon HUC 10 Watershed (148,383 acres).

Manual Treatment

Human presence and noise from manual treatments could temporarily displace mobile wildlife species (e.g., deer) from the treatment areas and cause stress to wildlife species that are less mobile (e.g., rodents, lizards). These effects would be short-term and are not likely to adversely affect the

long-term health and habitat used by wildlife in the treatment areas. Manual treatments would be most effective in sensitive areas, such as wetland and riparian habitat, as it has more control over vegetation impacts than other methods.

Mechanical Treatment

Noise associated to human presence and equipment may alter wildlife use of habitat or temporarily displace wildlife species during treatments. These impacts would be the same as described for manual treatments. Mechanical treatments would temporarily reduce vegetation cover in treatment sites, with impacts lasting until re-vegetation of native forbs and grasses occurred. Loss of non-target plants used by migratory birds could also occur. The extent of impacts would depend on the amount and type of vegetation removed. Heavy equipment used for mechanical treatments could also injure or kill ground dwelling or burrowing wildlife. As stated above, all treatments would occur outside the avian breeding season and during wildlife sensitive periods to avoid and reduce potential impacts.

Chemical/Herbicides

Wildlife species may be harmed directly through contamination of food sources, water sources, habitat alteration, or direct contact. Aerial applications of herbicides have the greatest potential to impact wildlife species because this method can cover the largest treatment areas. Hover impacts would be minimized implementing timing restrictions. These timing restrictions would exclude treatments during critical wildlife breeding or staging periods, including those for big game such as deer. The mitigation measures (see Chapter 5) and conservation measures (Appendix B) would be implemented to reduce potential adverse impacts.

Herbicide treatments could have adverse health impacts on individual wildlife species including death, damage to vital organs, change in body weight, decrease in healthy offspring, and increased susceptibility to predation. The extent of impacts to wildlife would vary by the effectiveness of herbicide treatments in controlling target noxious weeds and promoting the growth of native vegetation, as well as by the extent and method of treatment (e.g., aerial vs. ground) and chemical used (e.g., toxic vs. non-toxic; selective vs. non-selective), the physical features of the terrain (e.g., soil type, slope), and weather conditions (e.g., wind speed) at the time of application. The BIA would mainly use imazapyr, metsulfuron-methyl, 2,4-D, and triclopyr for treatments (BIA 2022a). All proposed herbicides have been analyzed in detailed environmental risk assessments prepared by the BLM (2007, 2016), USFS (2005, 2006), SERA (2000-2016), and BIA Navajo Region Agency (2022). Only aquatic approved herbicides (e.g., certain formulations of 2,4-D, glyphosate, imazapyr, triclopyr) and herbicides that are non-toxic to fish and aquatic amphibians (White 2007) would be used in the proposed treatment sites along the streams.

No aquatic weed treatments are proposed, therefore no direct impacts are anticipated to aquatic amphibians or fish. Additionally, only herbicides that are non-toxic to fish species and aquatic amphibians (White 2007) would be used within riparian zones. An indirect impact from over spraying would be unlikely with implementation of buffers (see Mitigation Measures, Chapter 5). Only aquatic formulations of 2,4-D, glyphosate, triclopyr, and imazapyr would be used exclusively within 25 feet of the daily high-water mark. Herbicides that are on-toxic to aquatic amphibians and fish include aminopyralid, chlorsulfuron methyl, clopyralid, imazapic, and thifensulfuron-methyl (White 2007). These herbicides have shown no risk to fish even if there is an accidental direct spray or spill to the aquatic habitat (BLM 2007). Non-aquatic and moderate to high aquatic toxicity herbicides (White 2007) require a 300 feet (90 m) buffer from the daily high-water mark. Only

aquatic approved herbicides would be used for aerial applications by either fixed wing or rotary aircraft in riparian areas. Implementing mitigation measures (i.e., buffers and using only aquatic approved herbicides) and following procedures to prevent spills and direct spraying into streams, would minimize herbicide exposure to aquatic habitats and species. Over time, riparian vegetation would increase in density and abundance, erosion potential would be reduced, and prey for fish and aquatic amphibians could increase from increased food source for invertebrates.

Overall herbicide treatments and their impacts would be temporary only impacting wildlife in the short-term minimizing chronic exposure impacts. The long-term beneficial impacts on wildlife communities include improvements to habitat, native forage and cover, and overall ecosystem health. All herbicide applications would adhere to the buffer requirements and mitigation measures listed for special status species and riparian and wetland areas. Overall, the impacts to wildlife form herbicide treatments would be minimal.

Activity Fuel Disposal

Prescribed burning of piles is likely to create a temporary disturbance to any terrestrial wildlife individual that may be present but should only last until prescribed pile burns are completed as they are site-specific and small in size. Wildlife species with larger home ranges such as deer should not be impacted compared to passerine bird species and lizards. Prescribed pile burning could directly impact reptiles that are using them. Piles could be lit on one side to allow reptiles within the pile time to escape. Prescribed pile burns would occur outside critical use periods for wildlife species (e.g., avian nesting periods). Additionally, all prescribed pile burns would be placed at least 300 feet from streams to avoid potential impacts to stream bank vegetation and potential sediment transport to streams. Overall, prescribed burning of debris piles are small areas compared to the scale of the Bá'azh chíní Canyon HUC 10 Watershed, and would be expected to have a negligible impact on water quality, thus riparian habitats and aquatic species.

Cultural Treatments

Planting native plants using BIA and Tribal approved seed mixes in treatment areas would be expected to help stabilize soils and improve wildlife habitat. This could increase native forbs to a treatment site that was almost exclusively grasses, which increases habitat for pollinators too. Targeted grazing could impact non-targeted plants, but his method does allow for treatment of larger areas and may stimulate new growth of native plant species. If used in moderation, targeted grazing could alter the productivity and composition of plant communities to benefit wildlife habitat. For example, goats have been shown to effectively control shrubs in sensitive areas such as near streams and wetlands (BLM 2007).

Biological Treatments

Biological controls are not expected to have adverse impacts on wildlife species as controls would be used to ensure insects and pathogens used in treatments are specific to the target vegetation and do not harm non-target vegetation. Over time, the species composition of the plant community would change as treated noxious weeds die and native vegetation is restored. This would benefit species that favor native vegetation but may temporarily adversely affect species that adapted to noxious/invasive weed species (e.g., tamarisk used as a food source or nesting and foraging habitat). However, as invasive species are replaced by native species and the plant communities are reestablished, it is expected that wildlife species adapted to noxious/invasive weed species would use the restored native plant communities. Indirect impacts to wildlife from biological treatments would

be beneficial and long-term as native plant communities are restored and hazardous fuel loads are reduced, making future intense, wildfires unlikely.

4.4.3 Threatened and Endangered Species

4.4.3.1 Wildlife

No Action

There would be no direct impacts to existing special status species or their habitat conditions because no noxious weed treatments would occur within the planning area. Noxious weeds would likely continue to increase in density and abundance, which could lead to long-term degradation of riparian areas and wildlife habitat. This could result in changes to species composition, structure, and diversity of native riparian plant communities, leading to reduced quality and quantity of habitat and forage for special status species, and increasing the potential for soil erosion, and for stand replacing wildfires. In addition, long-term alterations to aquatic habitats would be expected to occur from interrupting biological, geomorphological, and hydrological processes (BIA 2022a). Some of these processes and features include the geomorphology of stream banks, channel morphology (i.e., width and depth), sediment transport, ground water recharge, aquatic and riparian food chains, and water temperature regulation. These alterations would compromise the invertebrate food base and limit species to only those able to persist in noxious weed dominated vegetation habitat.

Proposed Action

Common to All Treatment Methods

A combination of manual, mechanical, targeted herbicide, cultural, and biological treatments would be used to reduce noxious weeds, increasing the likelihood of native dominated vegetation communities, which would improve food sources for some threatened and endangered species and/or their prey. Additionally, removal of noxious weeds would be expected to have beneficial, long-term impacts by restoring native plant communities, thus improving overall habitat quality. Removal of vegetation along the streams could reduce vegetation cover along banks, which could increase water temperature and sedimentation, decrease water storage capacity, and reduce shelter Overall, noxious weed management actions under the Proposed Action Alternative would benefit threatened and endangered species by improving the health and integrity of the riparian areas and surrounding vegetation communities and increasing resiliency to wildfires from reducing hazardous fuel loads (e.g., cheatgrass, salt cedar).

The implementation of the Proposed Action could result in temporary displacement of federally and tribally listed species that are within or adjacent to treatment areas due to human presence and equipment noise. The potential disturbance would be limited for the duration of the project activities and the noxious weed treatments would not be treated all at once and would be spread across the planning area. The annual impact on special status species or their habitat would be expected to be minimal on a population level because the proposed treatments could impact up to 2% of the Bá'azh chíní Canyon HUC 10 Watershed (2,394 acres). Mitigation measures would be implemented to minimize potential adverse impacts to known threatened and endangered species and their habitat, such as avoidance buffers around nest sites and occupied habitats (see Chapter 5, Mitigation Measures and Appendix B). Noxious weed treatments would occur outside critical use periods for federal and tribally listed wildlife species (e.g., avian nesting periods).

The Proposed Action Alternative would have *no effect* to the following species because of lack of habitat or because the planning area is outside the principal range of the species, both of which make occurrence unlikely: northern saw-whet owl, golden eagle, Welsh's milkweed, ferruginous hawk, Zuni bluehead sucker, southwestern willow flycatcher, roundtail chub, bald eagle, Kanab ambersnail, band-tailed pigeon, and three-toed woodpecker.

The BE for the Bá'azh chíní Canyon Watershed Noxious Weed Management Plan (BIA WNA 2023) recommends a "***May Affect, But is Not Likely to Adversely Affect"*** determination for all federal and Tribal listed wildlife species that could be impacted by the proposed action upon following the conservation measures (Appendix B) and mitigation measures (Chapter 5) from the PFEIS-NNIWMP. Refer to the referenced BE for additional information and analysis regarding these species (Appendix F).

American dipper—The proposed action *may affect but is not likely to adversely affect* the American dipper. Conservation measures would be implemented to avoid or minimize impacts to the American dipper (see Appendix B). A qualified biologist would conduct surveys in areas of potential habitat to confirm presence. Buffers would be implemented around nest sites; thus, no direct impacts would occur. Dippers could be impacted by noxious weed treatments during non-breeding season from temporary displacement near treatment areas. American dippers could be impacted from herbicide drift, but only aquatic approved herbicides that are practically non-toxic to small birds and their aquatic prey (White 2007) would be used in riparian areas.

Mexican spotted owl—A *may affect but is not likely to adversely affect* determination is recommended for Mexican spotted owls because noxious weed treatments would be implemented in riparian areas in canyons that could have suitable owl habitat. Direct contact with herbicides from direct application or brushing treated vegetation would be unlikely because owls are nocturnal and herbicide treatment would be completed in the day. Additionally, the primary prey species, rodents, are also nocturnal and would not be expected to be directly sprayed, reducing the potential risk of owls ingesting herbicides from prey in treatment areas. Adverse effects to nesting Mexican spotted owls would be avoided because no noxious weed management activities would be allowed within a quarter mile of an active nest until young have fledged during breeding season (March 1 to August 31st) (see Appendix B, Conservation Measures).

Banner-tailed kangaroo rat—The proposed action *may affect but is not likely to adversely affect* the banner-tailed kangaroo rat with implementation of mitigation measures (see Chapter 5) and conservation measures, such as a 200-foot buffer around occupied habitat to avoid impacts from proposed noxious weed treatments (see Appendix B). A qualified biologist would conduct surveys in areas of potential habitat to confirm presence. Indirect impacts from noxious weed treatments would be temporary and direct impacts would be avoided with implementation of recommended buffers around occupied habitat.

Navajo Mountain vole—The proposed action *may affect but is not likely to adversely affect* Navajo Mountain voles with implementation of mitigation measures (see Chapter 5) and conservation measures (see Appendix B) to avoid direct impacts from proposed noxious weed treatments. A qualified biologist would conduct surveys in areas of potential habitat to confirm presence. Indirect impacts from noxious weed treatments would be temporary and direct impacts would be avoided with implementation of recommended 200-foot buffer around occupied habitat.

Northern leopard frog—The proposed action *may affect but is not likely to adversely affect* northern leopard frog determination is recommended because no noxious weed treatments would occur in aquatic habitats. Biological surveys are recommended if treatments occur in potential habitat. No direct impacts would occur, and indirect impacts would be avoided with implementation of recommended conservation measures (i.e., only using aquatic approved herbicides in riparian areas, buffers).

Chuckwalla—The proposed action *may affect but is not likely to adversely affect* chuckwalla with implementation of conservation measures (see Appendix B) to avoid direct impacts from proposed noxious weed treatments and best management practices for herbicide treatments. No mechanical treatments would occur in occupied habitat. Manual, cultural, or biological treatments would not be expected to impact chuckwallas. Herbicide treatments would only use aquatic approved herbicide near open water, restrict application of herbicides during adverse weather conditions, restrict on where herbicides could be mixed and stored, and follow all herbicide labels, which includes restrictions on how much herbicide used for each application method, which would limit the amount of herbicide exposure and limit the risk of drift in non-target areas.

Colorado pikeminnow—A *may affect, not likely to adversely affect* Colorado pikeminnow determination is recommended because noxious weed management activities within the riparian areas along Bá'azh chíní could temporarily result in increased sediment delivery to streams containing Colorado pikeminnow and their habitat, and lead to other adverse impacts to the aquatic environment. There would be no direct impacts to Colorado pikeminnows from noxious weed treatments since there would be no aquatic treatments. Indirect impacts include increased erosion and sedimentation from mechanical treatments using heavy machinery within riparian areas adjacent to suitable habitat, but mitigation measures to control erosion would limit impacts. Pile burning would be conducted 300 feet outside of floodplains. Additionally, impacts from herbicide treatments would be immeasurable with implementation of buffers and conservation measures. Indirect impacts from noxious weed treatment activities would be localized and temporary and would not restrict or limit fish access to water. In the long-term, riparian vegetation structure would be improved through noxious weed removal and re-establishment of native riparian species resulting in improvements to suitable habitat for Colorado pikeminnow.

Razorback Sucker—A *may affect, not likely to adversely affect* razorback sucker determination is recommended because noxious weed management activities within the riparian areas along Bá'azh chíní could temporarily result in increased sediment delivery to streams containing razorback sucker and their habitat, and lead to other adverse impacts to the aquatic environment. There would be no direct impacts to razorback suckers from noxious weed treatments since there would be no aquatic treatments. Indirect impacts include increased erosion and sedimentation from mechanical treatments using heavy machinery within riparian areas adjacent to suitable habitat, but mitigation measures to control erosion would limit impacts. Pile burning would be conducted 300 feet outside of floodplains. Additionally, impacts from herbicide treatments would be immeasurable with implementation of buffers and conservation measures. Indirect impacts from noxious weed treatment activities would be localized and temporary and would not restrict or limit fish access to water. In the long-term, riparian vegetation structure would be improved through noxious weed removal and re-establishment of native riparian species resulting in improvements to suitable habitat for razorback sucker.

4.4.3.2 Plants

No Action

There would be no direct impacts to existing federal or tribal listed plant species or their habitat conditions because no noxious weed treatments would occur within the planning area. Noxious weeds would likely continue to increase in density and abundance, which could lead to long-term degradation of habitat. This could result in changes to species composition, structure, and diversity of native riparian plant communities, leading to reduced quality and quantity of habitat for listed plant species, and increasing the potential for soil erosion, noxious weeds to outcompete or threaten listed plant species, and for stand replacing wildfires.

Proposed Action

Common to All Treatment Methods

All proposed noxious weed treatments could trample listed plant species., leading to injury or mortality of individuals. Surveys would be conducted by the NNDFW Botanist or qualified botanist during the active growing season for plant species of concern prior to treatment implementation. Plants found within the project areas should be flagged and marked. Buffers around species of concern should be implemented and would depend on the techniques and methods being used (See Chapter 5, Mitigation Measures and Appendix B, Conservation Measures). Preference would be given to manual treatments around identified listed plant species.

The BE for the Bá'azh chíní Canyon Watershed Noxious Weed Management Plan (BIA WNA 2023) recommends a "***May Affect, But is Not Likely to Adversely Affect"*** determination for all federal and Tribal listed plant species that could be impacted by the proposed action upon following the conservation measures (Appendix B) and mitigation measures (Chapter 5) from the PFEIS-NNIWMP. Refer to the referenced BE for additional information and analysis regarding these species (Appendix F).

Alcove death camas—The proposed action *may affect but is not likely to adversely affect* Alcove death camas with implementation of conservation measures (See Appendix B). Biological surveys would be conducted during the flowering period from mid-July through August within suitable habitat. All identified populations would be flagged, and buffers would be established. In addition, hanging gardens are in remote and inaccessible areas where it is unlikely weed treatments would occur, and, if they do occur, herbicide drift would not reach the populations. Therefore, it is unlikely that weed treatments would have direct impacts on alcove death camas individuals and their habitat. Additionally, weed treatments are not proposed in hanging garden sites.

Cutler's milk-vetch—The proposed action *may affect but is not likely to adversely* affect Cutler's milk-vetch with implementation of conservation measures (see Appendix B) to reduce the risk of impacts from herbicide overspray, mechanical equipment, and trampling. There are no elements occurring within the project area according to NNDFW, but there is potential on the north end of Bá'azh chíní and tributaries. Biological surveys would be conducted during the flowering period from April through early June within suitable habitat. All identified populations would be flagged, and buffers would be established. Therefore, it is unlikely that weed treatments would have direct impacts on Cutler's milk vetch individuals and their habitat.

Navajo sedge—The proposed action *may affect but is not likely to adversely affect* Navajo sedge with implementation of mitigation measures, including buffers identified for each treatment, and

conservation measures (see Appendix B). Biological surveys would be conducted during the flowering period from June through September within suitable habitat. All identified populations would be flagged, and buffers would be established. In addition, hanging gardens are in remote and inaccessible areas where it is unlikely weed treatments would occur, and, if they do occur, herbicide drift would not reach the populations. Therefore, it is unlikely that weed treatments would have direct impacts on Navajo sedge individuals and their habitat. Additionally, weed treatments are not proposed in hanging garden sites.

Rydberg's thistle—The proposed action *is not likely to l ad to listing* Rydberg's thistle with implementation of conservation measures (see Appendix B). Biological surveys would be recommended in suitable habitat and identified populations would be flagged, and avoidance buffers would be established (200-foot buffer). Weed treatments are not proposed in hanging garden sites, thus, there would be no direct impacts to Rydberg's thistle. In addition, hanging gardens are in remote and inaccessible areas where it is unlikely weed treatments would occur, and, if they do occur, herbicide drift would not reach the populations.

Navajo beardtongue—The proposed action *may affect but is not likely to adversely affect* Navajo beardtongue with implementation of conservation measures (see Appendix B). Biological surveys would be conducted during the flowering period from early July to early August within suitable habitat. All identified populations would be flagged, and a 1-mile buffer would be established for mechanical, herbicide, cultural, and prescribed pile burns.

Alcove bog-orchid—The proposed action *may affect but is not likely to adversely affect* Alcove bog-orchid with implementation of conservation measures (see Appendix B). Biological surveys would be conducted during the flowering period from July through August within suitable habitat. All identified populations would be flagged, and buffers would be established. In addition, hanging gardens are in remote and inaccessible areas where it is unlikely weed treatments would occur, and, if they do occur, herbicide drift would not reach the populations. Therefore, it is unlikely that weed treatments would have direct impacts on alcove death camas individuals and their habitat. Additionally, weed treatments are not proposed in hanging garden sites.

Cave primrose—The proposed action *is not likely to lead to listing* cave primrose with implementation of conservation measures (see Appendix B). There would be no direct impacts to cave primrose because proposed noxious weed treatments would not occur in hanging gardens. Biological surveys would be conducted during the flowering period from March through April within suitable habitat. All identified populations would be flagged, and buffers would be established. In addition, hanging gardens with cave primrose are in remote and inaccessible areas where it is unlikely weed treatments would occur, and, if they do occur, herbicide drift would not reach the populations. Therefore, it is unlikely that weed treatments would have direct impacts on cave primrose individuals and their habitat.

Parish's alkali grass—The proposed action *is not likely to lead to listing* Parish's alkali grass with implementation of conservation measures (see Appendix B). There are no elements occurring within the project area according to NNDFW, but there is potential habitat within the project area. Biological surveys would be recommended in suitable habitat and conducted during the flowering period from mid-April through early June. All identified populations would be flagged, and buffers would be established to avoid direct impacts and to reduce indirect effects from herbicide treatments and accidental trampling.

Welsh's American-aster—The proposed action *is not likely to lead to listing* Welsh's American-aster with implementation of conservation measures (see Appendix B). Weed treatments are not proposed in hanging garden sites, thus, there would be no direct impacts to Welsh's American-aster. There are no known populations occurring within the planning area according to NNDFW, but there is potential habitat. Biological surveys would be recommended in suitable habitat and conducted during the flowering period from August through October. All identified populations would be flagged, and buffers would be established. In addition, hanging gardens are in remote and inaccessible areas where it is unlikely weed treatments would occur, and, if they do occur, herbicide drift would not reach the populations.

4.4.4 Agriculture (Livestock, crops, prime and unique farmlands)

No Action

There would be no direct impacts to agriculture resources because no noxious weed treatments would be implemented. Noxious weeds would likely continue to expand, reducing the vigor and health and the quality and quantity of native plant communities along Bá'azh chíní and its tributaries, and increasing the potential for soil erosion and adverse impacts on water quality and quantity available for agricultural resources. For example, salt cedar uses more groundwater resources than native plants, reducing the amount of available groundwater for wildlife and livestock and recharge of the watershed. In addition, noxious weeds such as Russian thistle and kochia, that are poisonous to livestock would continue to increase in abundance and density, reducing overall rangeland health.

Indirect impacts could include increased potential for intense, large wildfires due to increased noxious weed species that are more prone to frequent wildfire regimes, such as cheatgrass and Mediterranean grass. The continued increase of cheatgrass and Mediterranean grass along the streams could alter the fire regime by increasing the continuity and amount of fine fuels, which are conducive to shorter frequencies for wildfires (Brooks 2008) along riparian areas where wildfires were historically infrequent due to moist soil and wet conditions. Continued increase of salt cedar and Russian olive stand densities could also alter the fire regime to frequent and high intensity crown fires due to increased ladder fuels (Brooks 2008). Intense, large wildfires could consume large tracts of vegetation, which would reduce the available forage for livestock.

Proposed Action

Common to All Treatment Methods

Over time noxious weed treatments along the streams would improve soil stability from restoring native plant communities, which would reduce the risk of erosion to farm plots near the streams, benefitting agricultural land use permittees. Over time native plant communities would also increase in diversity and abundance, which could improve available quality and quantity of forage for livestock grazing near treated stream areas, benefiting grazing permittees. Indirect effects would occur from noxious weed treatments restoring native plant communities, increasing desired native plant species for grazing, reducing hazardous fuel loads, and reducing potential for frequent, intense wildfires. These effects would increase the quality and quantity of forage available for livestock and would improve the overall health of rangelands. Reduction of weed infestations contributing to hazardous fuel loads would reduce the potential for intense, large wildfires that could remove large tracts of vegetation used as foraging habitat by livestock or farm plots. The degree of beneficial impacts would depend on the amount of acres treated and the success of the treatments over both

the short and long term. Implementation of mitigation measures would minimize impacts to agricultural resources, such as deferring livestock grazing after weed treatments during the growing season or until seeding has established (see Chapter 5, Mitigation Measures). Grazing permittees would be contacted prior to any noxious weed treatments to remove livestock from the treatment area.

Manual Treatment

Manual treatments would have minimal effects on agricultural resources because manual treatments would target the removal of undesirable species but would not affect native species desirable to livestock or affect lands used as farm plots. Manual treatments would result in beneficial impacts to rangeland management as the quality and quantity of forage habitat increases from restoration of native plant communities.

Mechanical Treatment

Mechanical treatments that remove plants and their roots, such as grubbing, would more likely reduce the amount of forage available than treatments that cut plants at their base. Reduced forage amounts should last until re-growth of native vegetation. Equipment used to conduct mechanical treatments could compact soils, creating bare ground, or removing non-target, native plant species. Mechanical treatments could require the removal of livestock in the area until native vegetation regrows. Indirect, adverse impacts could include replacement of noxious weed species with more competitive noxious weed species. All treatments would implement mitigation measures in Chapter 5, which would reduce adverse impacts to livestock and their forage and adjacent farm plots.

Chemical/Herbicides

Direct impacts to livestock could include consumption of contaminated vegetation and temporary loss of available forage in treated areas. Livestock that primarily consumes grass have a greater risk because likelihood for herbicide residue is higher for grass than other plants (Fletcher et al. 1994, Pfleeger et al. 1996). The herbicides proposed are slightly to moderately toxic to large mammals. However, exposure to harmful doses of herbicide would be unlikely, since animals would be removed from the treatment area prior to and during treatments, mixing and preparing herbicides away from the main project area to prevent spills, and deferring livestock to prevent animals from grazing treated forage. In addition, spot treatment applications, following application rates on the herbicide labels, would reduce potential adverse impacts of residual herbicides on suitable grasses for foraging. Implementing herbicide use strategies for treatment areas on rangelands would also reduce potential adverse impacts to livestock. The extent of adverse impacts to livestock would depend on size of the treatments on or adjacent to grazing allotments, timing of treatments, method of treatments (aerial, spot), and sensitivity to the herbicide used.

Herbicide drift to farm plots and grazing allotments near treated stream sites would be avoided by following mitigation measures, such as avoiding spraying herbicides in high wind conditions high temperature, and low humidity to prevent chemical drift to areas off site.

Adverse impacts to range operations could include a temporary closure of the treatment area, which would require alternative grazing sites for livestock normally using the treated area. Temporary closures would follow the timeframe as directed on herbicide labels. To reduce adverse impacts to livestock operations treatments could be scheduled to occur when livestock are not present, following the re-entry timeframe specified on the herbicide label.

Activity Fuel Disposal

Prescribed pile burning of vegetation should have negligible impacts to livestock and available forage due to limited size and scattered nature of the treatments. A temporary closure of the treatment area may be required, which could require alternative grazing sites for livestock normally using the treated area. Prescribed pile burn areas should re-vegetate with a vegetation composition likely composed of species from the surrounding area. Prescribed pile burn areas that do not re-vegetate naturally, perhaps due to localized, more severe fire effects, would be vulnerable to weed invasion or expansion. Treatment sites that do not have greater than 50% native plant cover should be reseeded and restored immediately after treatments to reduce potential adverse impacts.

Cultural Treatments

Noxious weed projects that restore native vegetation would benefit treated sites from restoring native plants, reducing potential erosion, and reducing potential wildfire risk. Restoring native plants would improve forage production in areas where weeds may have replaced native vegetation. Temporary impacts from native plant restoration could include increased foot traffic at planting sites, which could increase erosion, soil compaction, and sedimentation near streams. However, these impacts would be short-term and not likely to negatively impact rangelands.

Targeted livestock grazing could be used to manage thistles, cheatgrass, kochia, and salt cedar. When managed improperly, these animals could compete for the same forage resources as domestic livestock. When managed properly, it has been demonstrated that the use of targeted grazing could improve the conditions of the treated area by opening up infested sites for grass regrowth, thus providing additional forage for livestock grazing (Mosley and Roselle 2006). The implementation of mitigation measures, such as placing livestock in fenced, isolated areas for up to 24 hours after treatments to collect feces, bag it, and dispose by incinerating, would also reduce adverse impacts (see Chapter 5).

Biological Treatments

Biological control agents would not likely affect livestock or farm plots near streams as APHIS permits use of biological agents following testing to ensure that biological agents are host-specific and do not affect non-target plant species. In the long-term, biological control agents would increase the quality of forage on a treatment site. Livestock on treatment sites would only be removed when biological agents are first placed on sites and when they are collected for distribution, which would only last a few hours or days. Biological treatments would promote growth of native plants, improving overall range health and forage for livestock.

4.5 Cultural Resources

No Action

There would be no direct impacts to existing cultural resource conditions because no weed treatments would occur within the planning area. Noxious weeds would likely continue to increase in density and abundance, continuing to out compete native plant communities, and may reduce the abundance of culturally significant native plants used in spiritual ceremonies, medicinal use, or other traditional uses in the long-term. The replacement of native plant communities could also reduce quality and quantity of forage and cover available for culturally significant wildlife species. The expansion of noxious weeds could also reduce accessibility to traditional gathering sites from dense stands of noxious weed trees or brush.

The continued expansion of noxious weeds could also cause increased soil erosion. Increased soil erosion from noxious weeds could cause artifacts to become exposed, leading to looting or displacement, losing their context. In addition, the continued expansion of noxious weeds increases hazardous fuel loads within and near cultural resources. This would increase the potential for intense, large wildfires that could remove large tracts of vegetation, including culturally significant plants. Wildfires could also cause discoloration of surface artifacts, burning perishable materials, checkering or cracking of glass and ceramic artifacts, spalling of stone, and melting of metals (Ryan et al. 2012).

Proposed Action

Common to all Treatments

Ground disturbing activities from treatment methods could potentially disturb or destroy unidentified cultural resources on or near the ground surface. Impacts to cultural resources from noxious weed treatments would be negligible because cultural surveys of the treatment area would be conducted prior to treatments to prevent damage to cultural resources or culturally significant plants and gathering areas. In addition, project-specific compliance may indicate other required mitigating measures, such as incorporating BIA or Tribal archeologists during heavy equipment use in case previously unknown sites or cultural materials are discovered.

Removal of noxious weeds would reduce hazardous fuel loads within and near cultural resources, which would reduce the likelihood of future intense wildfires. Wildfires could remove large tracts of vegetation and the integrated management approach would help to ensure the long-term protection of cultural resources. Additionally, noxious weed treatments would improve the overall ecosystem health benefitting plants and animals that are culturally significant to the traditional users. The removal of noxious weeds that are used in traditional cultural practices, cheatgrass, Russian thistle, and salt cedar are well established across the planning area, and it is unlikely the treatments would remove noxious weeds that are culturally significant. Implementation of mitigation measures would minimize or avoid potential effects to cultural resources and TCPs (see Chapter 5, Mitigation Measures).

Manual Treatment

Manual treatments could disturb subsurface archeological deposits from roots being pulled from the ground. Removal of roots could displace surface artifacts to the subsurface through exposed root cavities. Indirect impacts to cultural resources could occur with removing noxious weeds and exposing cultural resources. Manual treatments could cause adverse impacts to cultural resources from disturbance to surface artifacts and shallow buried cultural deposits. However, with cultural surveys conducted prior to treatments to avoid known cultural resources and implementation of mitigation measures (i.e., 20-foot buffer around culturally significant plant species; see Chapter 5), impacts would be reduced or eliminated.

Mechanical Treatment

Mechanical treatments could result in soil displacement, impacting depositional context and integrity, or artifact damage or destruction. Treatments involving surface and shallow subsurface disturbance could introduce organic materials to lower soil layers, thus contaminating surface or shallow subsurface cultural resources containing datable organics—wood, charcoal, preserved plant material, pollen. Mechanical treatments could also displace cultural resources, horizontally or vertically, contained in the upper portions of the soils, compromising the depositional context and

integrity, or artifact damage or destruction. Loss of vegetation cover could also increase the potential for indirect effects from surface erosion and displacement of surface archaeological materials and the subsequent loss of integrity and interpretive value of these resources. However, no mechanical treatments or use of heavy mechanized equipment would occur within archeological sites or traditional cultural property boundaries (See Mitigation Measures).

Chemical/Herbicides

Herbicide treatments herbicides could impact cultural resources from chemical reaction or from the application method. Some herbicides and treatment solutions contain salts which could act as desiccants that damage old, fragile wood, such as historical Navajo structures. Application dyes in herbicides could also permanently discolor archaeological features and artifacts. In addition, some herbicides could increase the acidity of the soil and cause deterioration of buried perishable materials. Adjuvants and surfactants added to herbicides, including mineral oil, vegetable oil, and methylated seed oil, are organic substances that have some potential to leach into the subsoil and interfere with radiocarbon dating techniques (BIA 2014, Winthrop 2012).

Herbicide treatments are more likely to have adverse effects on traditional cultural practices of gathering plants for medicinal, spiritual practices, or other traditional uses. Herbicides could harm plants used by local Tribal members and could affect the health of the people who gather, handle or ingest recently treated plants, or animals contaminated by herbicides. Since traditionally gathered plants and animals may occur near vegetation treatment areas, drift from herbicide treatments may occur in areas utilized by Native Americans. There could be short-term impacts to traditional cultural uses due to loss of access during treatment. Vehicles taken off-road to apply chemicals may also cause damage to cultural sites. The impacts from use of herbicides would depend on the method of application and the herbicide used. However, pretreatment site-specific investigations, placing 200-foot buffers around TCPs and culturally significant plants, and following mitigation measures for when to conduct herbicide treatments (see Chapter 5, Mitigation Measures) would be expected to reduce the likelihood of herbicide drift to culturally significant plant areas. In addition to the mitigation measures, not exceeding the typical application rate when applying 2,4-D and triclopyr in known traditional use areas could be used to reduce or eliminate potential adverse impacts to cultural resources.

Ethnographic interviews, community engagement, and traditional plant surveys would identify traditional plant resources and gathering sites and would identify alternative locations for traditional plant gathering. Community engagement would educate traditional plant gatherers of the potential health risks from processing plant resources affected by chemical treatments (i.e., drift). As a result, some traditional plant gathering sites may become temporarily inaccessible during chemical treatment to avoid the effects of drift on gatherers. Consequently, any areas being considered for chemical weed control methods would be fully evaluated for plant gathering before proceeding with treatments.

There would be indirect, long-term benefits associated with enhancing culturally significant plant and animal habitat as well as improving vegetation cover on eroding archaeological sites. Additionally, herbicide treatments would benefit traditional gathering areas as displacement of native vegetation by weeds is controlled.

Activity Fuel Disposal

Prescribed pile burns following mechanical treatments are not expected to impact cultural resources as they would not occur on or near known cultural resources. A 300-foot buffer would be placed around all cultural resources to avoid potential impacts.

Cultural Treatments

Cultural treatments using livestock for targeted grazing could damage surface artifacts, which could lead to erosion from sediment compaction and vegetation removal (Robbins 2015). However, pretreatment site-specific investigations, developing a grazing treatment plan for review by NNHHPD, and fencing around the perimeter of the treatment area to contain livestock would avoid this possibility. Reseeding using tilling or seed injection methods or replanting poles or plant cuttings could also directly impact cultural resources. Reseeding or replanting could impact subsurface archeological deposits as discussed above under manual treatments. Additionally, targeted livestock grazing could impact culturally significant plants used for traditional uses. Livestock could impact culturally significant plants from grazing desirable species that could be collected by gathered for traditional uses. However, all treatments, including targeted grazing, require an ethnographic study of community resources to identify potential TCP resources. Implementing mitigation measures, such as pretreatment site-specific investigation and flagging a 200-foot buffer around archeological sites and TCPS, including culturally significant plant areas, by a qualified cultural specialist would avoid or reduce potential impacts and loss to local, culturally significant plant communities (see Chapter 5, Mitigation Measures).

Biological Treatments

Biological agents are not expected to affect cultural resources, as APHIS permits use of biological agents following testing to ensure that biological agents are host-specific and do not affect non-target plant species, including culturally significant native plants.

4.6 Resource Use Patterns

4.6.1 Recreation

No Action

Noxious weeds likely continue to expand along the riparian areas in the planning area. The continued expansion of noxious weeds could result in replacement of native plant communities, which could degrade hunting opportunities for big game animals due to decreased healthy native plant populations available for foraging. Indirectly, increased weed infestations could contribute to hazardous fuel loads and alter the fire regime, resulting in conditions more prone to intense, large wildfires in these areas, which could increase soil erosion and remove large tracts of vegetation, reducing habitat for big game species and hunting opportunities and culturally significant plants and their habitat.

Proposed Action

Common to All Treatment Methods

Recreation is currently not managed in the planning area, but dispersed recreational activities, hunting and plant gathering occur. Treatment methods could result in temporary closures of these areas to hunting and plant gathering from a few hours to days, depending on the treatment. These

closures would be related to health and safety concerns (e.g., smoke, herbicides) and would be based on the specific treatment methods. There could also be short-term degradation to visual aesthetics of the treatment areas as well as noise from crews and equipment. However, the noxious weed treatments would be distributed across the planning area along streams and would not occur at the same time. Over time, native plant communities would be expected to increase in density and abundance on treatment sites. Increased biodiversity and abundance could allow for more sustainable gathering of plants used in Navajo ceremonies and traditional activities. In addition, increased biodiversity would be expected to increase forage quality for big game species.

Indirect effects would occur from treatments restoring native plant communities and ecosystem processes, which would be beneficial for areas used by Tribal members for hunting and plant gathering areas. Over time, treatments would improve wildlife habitat for species sought by hunters. Reduction of weed infestations contributing to hazardous fuel loads would reduce the potential for intense, large wildfires that could remove large tracts of vegetation used by game species and traditional plant gathering areas. Impacts to recreational activities and users would be minimized with implementation of mitigation measures (see Chapter 5).

Manual Treatment

Manual treatments are expected to have temporary adverse impacts from the presence of crews and noise from hand-held tools, such as weedwhackers. These effects would be limited in extant and would only last as long as the treatments. The potential visual changes would be small in scale and would be less noticeable compared to other treatment methods. Manual treatments may not require any closures other than setbacks from areas of active weed-whacking or other methods that could represent a safety hazard in the immediate vicinity during the period of active treatment.

Mechanical Treatments

Mechanical treatments could require temporary closures of some treatment areas to recreational users. Low intensity treatments such as mowing would generally have less restricted areas to recreational users compared to mechanical treatments using grubbing or tilling. The use of heavy machinery would disturb soils and remove tracts of vegetation from the landscape, which could impact hunting opportunities in the short-term until. The degree of adverse effects from mechanical treatments to recreation depends on how much vegetation would be removed and the rate of recovery of the treated area.

Chemical/Herbicides

Direct impacts to recreational opportunities would include temporary closures to treatment areas, changes to wildlife habitat (loss of edible plants and fruits on treatment sites), temporary degradation of visual resources, and potential contamination off-site due to herbicide drift. Site closures would typically be short-term and would follow the recommendations on the herbicide label. In addition, signs stating the chemical used, the date of application, and a contact number for more information would be posted for at least 2 weeks following treatment. Herbicide treatments would temporarily reduce hunting opportunities. Health risks to recreational users are low for most of the herbicides approved for use on Tribal trust lands, including inadvertent exposure to an herbicide mist or contact with freshly sprayed vegetation. The degree of impact would depend on the application method used with spot treatments reducing potential for herbicide drift. Mitigation measures would be implemented to reduce impacts to recreation opportunities and recreational users, such as not conducting during windy events (see Chapter 5 for complete list of mitigation measures).

Activity Fuel Disposal

Prescribed pile burning following mechanical treatments could impact the vegetation under the piles and in a small zone around each pile as described in Native Vegetation (Section 4.4.1). Potential negative impacts to recreation areas include smoke impacts and removal of vegetation under the pile. The amount and duration of smoke impacts would be limited by conducting pile burns only during atmospheric conditions that are conducive to good smoke dispersion, limiting the number of piles burned at one time, and scheduling ignitions early in the day to allow for more complete combustion during daytime conditions. Implementing mitigation measures (see chapter 5) would enable managers to plan and conduct prescribed pile burns during optimal weather conditions, reducing the possibility of adverse impacts to Tribal members hunting or gathering plants in adjacent areas.

Cultural Treatments

Domestic livestock could be used to reduce noxious weed vigor by removing aboveground biomass and/or seed heads impacting the visual aesthetics. Targeted livestock treatments could also require temporary closures to the treatment areas but would be short-term and restricted to the treatment area.

Biological Treatments

Biological control agents are expected to have minimal impacts on recreation areas or recreational users as biological agents specifically target specific noxious weed species without disturbing native vegetation or the land. The presence of crews releasing the biological agents could temporarily disturb recreational users in the area. In addition, death or injury to targeted noxious weed species could degrade the visual aesthetics until the noxious weed infestation is completely removed.

4.7 Other Values

4.7.1 Public Health and Safety

No Action

Noxious weeds would likely continue to increase in density and abundance along Bá'azh chíní and its tributaries in the planning area. The current uncoordinated management of noxious weed species within the planning area could increase the non-judicious use of herbicides to control them by individuals and land use permit holders. This could lead to more herbicides being used to control large noxious weed infestations, such as Russian olive. The use of more herbicides to treat noxious weeds could result in harm to applicators due to inconsistent safety measures to protect workers during treatments and more direct exposure. For example, widespread and intensive use of glyphosate in agriculture and by the general public increases its prevalence in the environment, especially in surface water (Battaglin et al. 2014, Benbrook 2016, Medalie et al. 2020), which raises concerns about exposure rates for applicators and the general public. The NNEPA has developed standards for glyphosate to monitor its use and its potential impacts to human health and water quality.

Proposed Action

Common to All Treatment Methods

Safety training would be required for all noxious weed projects to educate workers on known health risks associated with different treatment methods, proper use of persona; protective equipment (PPE), proper equipment handling, and emergency safety protocols. These protocols include regular on-site briefings to remind participants of necessary safety information. Safety training and implementation of consistent safety measures would decrease the risk to public health and safety from injuries and harm under all treatment methods. Furthermore, implementing mitigation measures (see Chapter 5) would minimize impacts to public health and safety from integrated weed management treatments.

Manual and Mechanical Treatments

Potential health risks to workers from manual and mechanical treatments include cuts, burns, allergies, and skin irritations. The direct impacts on human health and safety would be greatest for allergy and contact dermatitis sufferers who are sensitive to noxious weeds or other terrestrial plants. Skin irritations may occur after general contact with some species, such as spotted knapweed or from specific parts of the plant itself, such as spines on thistles and awns from brome grasses. Implementation of safety measures for workers, such as wearing gloves, long-sleeved shirts, pants, and boots to protect skin from exposure to irritants and allergens would reduce injuries or irritations. In the long term, the removal of targeted noxious weed species would reduce allergens and hazardous contact with noxious weed species.

Workers could be injured by cutting blades such as those on saws, mulchers, shredders, and drills which could cause fatal injuries. Workers operating heavy machinery (e.g., tractors) could be injured or killed if operating equipment in an unsafe manner, such as on steep or uneven terrain, on unstable soils, or near water. Safety training would reduce the risk of injury by instructing workers on how to safely operate heavy machinery. Rocks and debris could also be kicked up during operating heavy machinery or equipment. Risks from debris could be minimized by avoiding treatments on steep slopes, maintaining equipment in optimal working condition, and using shields on equipment to deflect flying debris. Noise from heavy machinery or power tools could cause hearing impairment. These impacts could be reduced through use of personal protective equipment, such as ear plugs, gloves, hard hats, and boots.

Chemical/Herbicides

Health risks associated with herbicide treatments depend on the toxicity of the herbicide used, how a person is exposed to the herbicide, and the duration of their exposure. The public could be exposed to herbicide by direct contact of treated vegetation, consuming contaminated vegetation or water, or through herbicide drift. Drift occurs when herbicide is inadvertently carried to untreated sites by air movement. However, risk of drift would be reduced by prohibiting treatments during windy conditions, adjusting the droplet size of applicators, and where possible, using more direct application methods such as spot treatments or pelletized treatment. Exposure to herbicides is not expected to exceed levels determined as safe by the U.S. EPA over a 70-year lifetime of daily exposure (BIA 2022a).

All herbicide treatment areas would have individual treatment plans and would only use U.S. EPA approved herbicides. Targeted herbicide use would be implemented after signage was placed at all

entryways to the treatment area. All staff utilizing herbicide would be trained in approved procedures related to proper handling, storage, transportation, mixing, spill prevention, and application procedures. In addition, herbicide treatments would be completed by a certified pesticide applicator, personal protective equipment would be worn by all workers, and all herbicide label instructions would be followed. The temporary closure of treatment sites following herbicide label instructions would prevent individuals and livestock from coming into direct contact of treated vegetation or contaminated water and reduces the risks of long-term health issues. Herbicide treatments would also be prohibited during weather conditions that increase the chances of evaporation or sublimation of herbicide, such as windy conditions or heavy rain events.

Activity Fuel Disposal

Prescribed pile burns would follow all BIA protocols to reduce impacts to air quality from smoke, including developing a prescribed burn plan as required by the Navajo Nation Environmental Protection Agency, *Interagency Prescribed Fire Planning and Implementation Procedures Guide* (July 2017), and BIA's Wildfire Prevention 10-Year Plan for the Navajo Region. A plan for prescribed pile burns would include mitigation measures to minimize impacts on public safety when winds have the potential to carry significant smoke that could impact traffic corridors, smoke modeling, coordinating with regional fire support programs, and restricted seasons for when pile burns could occur.

Cultural Treatments

Cultural treatments would have no direct impacts to public health and safety. There is a risk of indirect impacts to water quality from grazing animals depending on the duration and intensity of grazing and the location proximity to a water body. Targeted livestock grazing occurring near streams could increase nutrient loading and fecal coliform levels from feces. The severity of such impacts would depend on the number of animals used, the intensity and duration of treatments, and distance to open water. However, targeted livestock grazing treatments would follow mitigation measures listed in Appendix B to minimize negative impacts to water quality.

Biological Treatments

Biological control agents would not likely affect public health and safety as APHIS permits use of biological agents following testing to ensure that biological agents do not pose a safety risk to the public. Minor injuries to workers could occur when trapping and transporting organisms from treatment sites (USFS 2005, BLM 2007).

4.8 Cumulative Impacts

As defined by NEPA regulations (40 CFR 1508.7), "Cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."

Past and Present Actions

Past human caused and natural events have had varying levels of impacts on the resources and values affected by the proposed noxious weed management activities. Past and present actions include agricultural developments, livestock grazing, noxious weed treatments, and infrastructural development such as roads and residential homes. The Tsegi Canyon and Nitsin Canyon Grazing Management and Restoration Plans which implements noxious weed control and native plant restoration measures to address erosion and sedimentation issues in the area. Over the long-term,

the Tsegi Canyon and Nitsin Canyon Grazing Management and Restoration Plans would improve native plant diversity, abundance, and species composition, and reductions to livestock would reduce impacts to water quality and improve habitat quality at the landscape level.

Reasonably Foreseeable Future Actions

Reasonably foreseeable actions include additional noxious weed management actions, livestock grazing, and agricultural projects. In addition, the canyons may be fenced off to livestock in the planning area to help improve riparian areas in the long-term.

Proposed Action

Under the proposed action, proposed use of manual and mechanical treatments, herbicide treatments, cultural treatments, and biological treatments, the cumulative impacts in biological, cultural resources, soils, water, and air quality, and resource use patterns have been analyzed. The proposed action would remove targeted noxious weeds in the planning area, contributing to beneficial cumulative impacts by enhancing riparian areas. Removing targeted noxious weed species in the planning area would help facilitate the establishment of native vegetation and improve the health and vigor of native plant communities. In addition, an integrated approach to treat noxious weeds would increase the desired native plant species in treated riparian areas, reduce competition for resources with noxious weeds, create a more stratified age structure and abundance of native vegetation, increase native plant diversity, and reduce hazard fuel loads. The proposed action would contribute to adverse impacts, but the annual amount treated would be up to 50 acres with a total of 345 acres in the planning area, which is small in size compared to the planning area (0.2%) . The proposed noxious weed management treatments would be distributed throughout the planning area, rather than being concentrated in one area or at one time, thus minimizing the adverse cumulative effects. Mitigation measures, conservation measures, and best management practices would be implemented under the proposed action to minimize adverse impacts. The proposed noxious weed management activities would be small in size and intensity, and when considered with other management actions would contribute negligibly to cumulative adverse impacts. This would further help to minimize potential impacts or contributions to adverse cumulative impacts. Overall, the minimal contribution of long-term adverse impacts, use of best management practices, and implementation of mitigation measures and conservation measures would result in negligible contributions to adverse cumulative impacts by the Proposed Action Alternative. Therefore, no measurable adverse cumulative impacts would be anticipated to occur as a result of implementing the Proposed Action Alternative.

Overall, the proposed action would improve long-term health of the watershed and streams by increasing water flow, native plant productivity and diversity, and enhancing wildlife habitat and rangelands. Thus, the Proposed Action Alternative would contribute to long term, beneficial cumulative impacts from improving integrity and health of native plant communities and reducing erosion and wildfire risk in treated areas and improving vegetation and wildlife habitat viability within the planning area. The noxious weed management treatments would restore vegetation communities to stable ecological conditions where noxious weeds have degraded ecological conditions and increased the potential for severe and intense wildfire risk.

5 Mitigation Measures

The FPEIS-NNIWMP includes mitigation measures designed to limit impacts to resources from weed management actions and externally proposed projects. The following mitigation measures are those from the FPEIS–NNIWMP that applies to this proposal.

General Measures

Project Planning

- Conduct surveys for cultural resources by a qualified cultural resource specialist before treatments in coordination with the NNHHPD.
- Conduct ethnographic inquiries with local community members to identify plant gathering sites and other traditional cultural properties (TCPs) that may be affected by weed treatments. If TCPs and gathering sites are identified, the project sponsor will work with the community to identify alternative sites, treatment options, or other mitigation measures.
- Complete and submit two copies of the Archaeological Inventory Report and all site forms to the NNHHPD Cultural Resource Compliance Section for review. The BIA NRO Regional Director will approve the CRCF to provide Section 106.
- Avoidance of all cultural resources is the preferred mitigation measure to avoid adverse effects, as well as identifying alternative plant gathering areas. All work must be coordinated with NNHHPD to ensure compliance with Section 106 and NHPA.
- Develop a Safety and Communications Plan that identifies specific safety measures for all treatment methods used in the project, including equipment handling, required Personal Protection Equipment (PPE), and emergency response communication protocols.
- Removal of invasive trees requires a forest product harvesting permit or contract and may require a silvicultural prescription to authorize a treatment in forest lands, including woodlands. Special provisions associated with the harvest document(s) should be reviewed and modified when appropriate to address unforeseen resource issues associated with the harvesting activities.
- All project personnel will be trained on the use of PPE, equipment handling, and safety protocols. Personnel will be required to use PPEs during herbicide and mechanical (chainsaw, pile burn) applications.

Prior to Noxious weed Treatments

- Designate staging areas for projects for cleaning and prep work before and after treatments. These sites will be used for mixing herbicides, refueling equipment and vehicles, and storage for the duration of the treatment. They will be located in upland sites at least 300 ft. away from surface water.
- Notify adjacent landowners, authorized land users, local authorities, and/or the public of treatments, treatment duration, and post-treatment measures before implementation to prevent exposure and limit re-infestations through education and outreach with the local grazing official, posting public notices, radio announcements, and/or chapter meeting

announcements. Weed treatment flyer and/or forest harvest sales permits should be posted locally before projects start.

- Clearly mark boundaries of treatment sites (such as posting visible flags or signs) before and during treatments.
- Sites will be inspected, and potential hazards will be removed to ensure safety prior to treatments.
- A qualified cultural resource specialist will identify areas with culturally important plants. Areas with culturally significant plant species will be flagged by a qualified cultural resource specialist and a 200-foot buffer will be implemented from identified populations when implementing chemical, mechanical, or cultural treatments. A 20-foot buffer will be implemented from identified populations when implementing manual treatments.
- Implement associated avoidance measures for any sensitive wildlife species identified (see Appendix B).

During Noxious Weed Treatment Implementation

- Vehicles will use only established roads for accessing project sites. Vehicles will be parked at designated parking spots near established roadways during treatments.
- Vehicles should drive at or below 25 mph to reduce dust on unpaved roads.
- On-site safety briefings will be given prior to any treatments to review required PPE, safety and emergency response measures, and what to do in the case of an injury or emergency. A Spill Contingency Plan will be available on-site prior to all treatments using herbicides.
- Inspect and clean equipment, heavy machinery, and clothing after treatments for mud, dirt, and plant parts to prevent spread to other project sites by the field crew.
- Minimize soil disturbance to the extent practical.
- No mechanical treatments or use of heavy mechanized equipment will be used in archeological sites or traditional cultural property boundaries.
- Vehicles and equipment should be turned off if periods between use are longer than 15 minutes.
- Pile burning would occur 300 feet outside of floodplains.
- If new populations of sensitive plants or animals are identified during vegetation treatments, project work shall stop, and Navajo Nation Department of Fish and Wildlife shall be notified for further consultation.

Chemical Treatments

- The on-site Pesticide Applicator will develop a Spill Contingency Plan that meets the minimum requirements specified by the BIA to eliminate contamination of water or soil resources in the case of accidental spills.

- If using herbicide, notify NNEPA Pesticide Enforcement of project, including location, herbicides used, and treatment dates. Submit a Pesticide Use Proposal (PUP) for approval.
- All herbicides must be U.S. EPA approved and mixed and applied according to label instructions.
- Treatment sites will be closed according to label specifications when limiting exposure to humans, livestock, and pets is recommended.
- All herbicides must be used according to the U.S. EPA approved label.
- Certified Pesticide Applicators must be on site to supervise projects during herbicide treatments. Pesticide Applicators must be certified by the U.S. EPA for the Navajo Nation.
- Use dye markers with herbicides to identify the physical spray location on weeds.
- An emergency spill kit must be present when herbicides are used to contain, absorb, and dispose of spill materials.
- Material Safety Data Sheets (MSDS) for herbicides and adjuvants must be accessible in the event of accidental exposure or spill.
- Avoid applying chemicals during times of high wind speeds, high temperature, and low humidity to prevent chemical drift to areas off site. Read the herbicide label for specific conditions.
- Use Water Quality Protection Zones (WQPZ) set by the NNEPA for mechanical treatments and broadcast herbicide treatments when using a vehicle in or near riparian and wetland areas. The WQPZ is at least 200 feet unless a greater buffer is needed for a listed species or if indicated on the herbicide label. Refer to the Water Quality Protection Guidelines for the Navajo Nation Forest (2000) and the Navajo Nation Aquatic Resource Protection Program Guidance (1994) on distance guidelines.
- Near riparian areas, only aquatic formulations of 2,4-D, glyphosate, triclopyr, and imazapyr will used within 25 ft of the daily high-water mark.
- Herbicides that are practically non-toxic to fish and mollusks (White 2007) require a 25-foot (7.6 m) buffer from the daily high-water mark, including: aminopyralid, chlorsulfuron methyl, clopyralid, imazapic, and thifensulfuron-methyl. They must be applied using spot treatment methods in this zone.
- Native plant communities, such as cottonwood-willow woodlands and native sagebrush, require a 300-foot buffer during aerial herbicide treatments.
- Non-aquatic approved and moderate to high aquatic toxicity herbicides (White 2007) require a 300-foot (91 m) buffer from the daily high-water mark.
- Water for mixing herbicide and cleaning herbicide equipment will be potable water obtained off-site or through a Water Use Permit. An anti-siphon and back flow preventer device are required to prevent contamination of the water source.
- Store equipment and materials away from riparian areas in safe and secure upland sites in close proximity of the project site. Herbicide containers and equipment must be stabilized with straw bales, filter cloth, or other appropriate means to prevent release into waterways or wetlands.

- Herbicides will be stored in a secondary containment storage unit with impermeable materials such as concrete or metal so leaks, and spills do not reach soils. Storage containers will be coordinated with BIA Safety Officer and Environmental Services.
- Herbicide containers and application equipment will be triple rinsed at designated washing stations to minimize chemical residues left as per the MSDS and herbicide labels. Do not pour rinse water from empty containers or sprayer cleaning onto ground or any drainage system. Dispose as hazardous waste.
- Properly dispose of pesticide waste and containers according to federal, state, and tribal regulations.

Mechanical Treatments

- If mechanical treatments increase the risk of erosion near waterways, erosion control measures will be implemented to stabilize and limit erosion.
- Establish and implement a burn plan if prescribed pile burning is used as a control method.
- Keep areas without vegetation wet to prevent fugitive dust. This can be accomplished with a sprayer mounted to a water truck.
- Use lightest/smallest off-road vehicle, utility vehicle, or tractors will be a priority for treatments. No such equipment will be used on wet soils or cryptobiotic soil crusts.
- No mechanical treatments within 200 feet of open water sources.

Cultural Treatments

- Projects using targeted grazing treatments will develop a grazing treatment plan for review by NNHHPD.
- Targeted grazing must use fencing around the perimeter of the treatment area to contain livestock.
- Use targeted grazing only in sites where weeds are palatable and non-toxic and where desired native species will not be damaged.
- After targeted grazing is implemented, livestock will be placed in a separate fenced location for 48 hours to collect animal waste. Animal waste will be burned to destroy plant parts and seeds.
- Targeted grazing will not exceed more than 10 days on a range and/or wildland project site or 365 days on a cropland site.
- Targeted grazing shall not be used in areas where weed comprise less than 50% of total vegetative cover.
- Passive restoration is preferred when native vegetation comprises >75% of the treated area. If natural re-vegetation fails, then active restoration is necessary. Active restoration includes planting of native species poles, root stocks, and seeds.
- Reseeding will be timed with precipitation events and at least 7 days after herbicide treatments are completed. Reseed disturbed areas with native vegetation to minimize opportunities for weed establishment and soil erosion.
- Only native vegetation, certified weed-free and preferably locally sourced, will be used for restoration activities.

- Livestock grazing will be deferred during the growing season or until seeding has established.

6 Consultation and Coordination

The Endangered Species Act of 1973, as amended, established federal policies and procedures for protecting federally listed threatened or endangered animal and plant species. *Section 7 of the ESA* requires agencies to work toward the conservation of listed species and to ensure that no agency action is likely to jeopardize a listed species or adversely modify critical habitat. The BIA Navajo Region consulted with the U.S. Fish and Wildlife Service (USFWS) and NNDFW as part of the FPEIS-NNIWMP, pursuant to Section 7 of the ESA, and prepared a programmatic biological assessment (PBA; BIA 2022b) to evaluate likely impacts to federally and tribally listed or proposed threatened or endangered species as a result of noxious weed treatments.

A BE has been prepared for the Bá'azh chíní Canyon Watershed Project area, which analyzed the impacts to federal and tribal listed threatened, endangered, or candidate species from implementing a noxious weeds management plan for the planning area. This BE was prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act, as amended (16 U.S.C. 1536 (c)). The BE will be submitted to the NNDFW for review and a biological resource clearance form determination. This follows the procedures outlined in the FPEIS-NNIWMP; site-specific projects that tier off the PBA must obtain a biological resource clearance form from NNDFW before a project can start.

Section 106 of the National Historic Preservation Act, as amended in 1992 (16 USC 470 *et seq.*) and in accordance with policy and guidance described in BIA Indian Affairs Manual: Part 59, Chapter 8––Protection of Historical and Archeological Resources requires the consideration of impacts on historic properties that are listed, or eligible to be listed, in the National Register of Historic Places. Noxious weed management activities will comply with the American Indian Religious Freedom Act, NRHP, and other legislation pertaining to cultural resources. The BIA WNA staff will consult with the Navajo Nation THPO prior to any planned noxious weed management activities to avoid known archaeological resources. The BIA Navajo Regional Archeologist will consult with the Utah and Arizona SHPO, as needed, prior to project implementation to ensure compliance with the National Historic Preservation Act of 1966 as amended.

This EA will also be available to interested parties and coordinating agencies for review and comment.

6.1 List of Contributors

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APPENDIX A. NAVAJO NATION NOXIOUS WEEDS LIST

Source: FPEIS-NNIWMP, Pages 94–95

CATEGORY A - HIGH		
COMMON NAME	SCIENTIFIC NAME	MANAGEMENT GOAL
African rue	*Peganum harmala*	Prevention
Blue mustard	*Chorispora tenella* (Pall.) DC.	Eradicate
Bull thistle	*Cirsium vulgare*	Eradicate
Canada thistle	*Cirsium arvense*	Eradicate
Common Mediterranean grass	*Schismus barbatus*	Eradicate
Dalmatian toadflax	*Linaria dalmatica*	Eradicate
Fountaingrass	*Pennisetum setaceum*	Prevention
Leafy spurge	*Euphorbia esula*	Prevention
Musk thistle	*Carduus nutans*	Eradicate
Perennial pepperweed	*Lepidum latifolium*	Eradicate
Ravenna grass	*Saccharum ravennae*	Eradicate
Sahara mustard	*Brassica tournefortii*	Eradicate
Scotch thistle	*Onopordum acanthium*	Eradicate
Spotted knapweed	*Centaurea maculosa, C. stoebe*	Eradicate
Squarrose knapweed	*Centaurea virgata*	Prevention
Sulphur cinquefoil	*Potentilla rect L.*	Eradicate
Tall whitetop	*Cardaria draba*	Eradicate
Tamarisk, Saltcedar	*Tamarix* spp., including hybrids	Eradicate
Tree of Heaven	*Ailantus altissima*	Eradicate
Uruguayan pampas grass	*Cortaderia sellonana*	Eradicate
Yellow nutsedge	*Cyperus esculentus*	Eradicate
Yellow starthistle	*Centaurea solstitialis*	Eradicate
CATEGORY B - MEDIUM		
COMMON NAME	SCIENTIFIC NAME	MANAGEMENT GOAL
Camelthorn	*Alhagi camelorum*	Contain & Long term eradicate
Diffuse knapweed	*Centaurea diffusa*	Contain & Long term eradicate
Halogeton	*Halogeton glomeratus*	Contain & Long term eradicate
Johnsongrass	*Sorghum halepense*	Contain & Long term eradicate
Russian knapweed	*Acroptilon repens*	Contain & Long term eradicate
Russian olive	*Elaeagnus angustifolia*	Contain & Long term eradicate
Siberian elm	*Ulmus pumila*	Contain & Long term eradicate
Tamarisk, Saltcedar	*Tamarix ramosissima*	Contain & Long term eradicate
CATEGORY C - LOW		
COMMON NAME	SCIENTIFIC NAME	MANAGEMENT GOAL
Bald brome	*Bromus racemosus*	Local Contain & Monitor
California burclover	*Medicago polymorpha*	Local Contain & Monitor
Cheatgrass	*Bromus tectorum*	Local Contain & Monitor
Field bindweed	*Convolvulus arvensis*	Local Contain & Monitor
Field brome	*Bromus arvensis*	Local Contain & Monitor
Horehound	*Marrubium vulgare*	Local Contain & Monitor
Jointed goatgrass	*Aegilops cylindrica*	Local Contain & Monitor
Kochia	*Bassia scoparia, K. scoparia*	Local Contain & Monitor
Puncturevine	*Tribulus terrestris*	Local Contain & Monitor
Red brome	*Bromus rubens*	Local Contain & Monitor
Rescuegrass	*Bromus catharticus*	Local Contain & Monitor
Ripgut brome	*Bromus diandrus*	Local Contain & Monitor
Russian thistle	*Salsola collina, S. paulsenii, S. tragus*	Local Contain & Monitor
Smooth brome	*Bromus inermis*	Local Contain & Monitor
Spreading wallflower	*Erysimum repandum*	Local Contain & Monitor

APPENDIX B. CONSERVATION MEASURES

The FPEIS-NNIWMP includes conservation measures designed to limit impacts to resources from weed management actions and externally proposed projects. The following conservation measures from the FPEIS-NNIWMP planning document that applies to this proposal are listed below. Conservation measures for G4 species are recommended but not required (NNDFW 2020).

Species Conservation Measures

The Navajo Natural Heritage and Historic Program (NNHHP) encourages treatment of noxious weeds within sensitive species populations as a tool to improve habitat for NESL species, with proper consultation with NNHP and USFWS, as applicable. If the goal of the weed treatment project is to improve habitat for threatened and sensitive species, the conservation measures below can be modified for individual species through consultation with NNHP and USFWS on a project-specific basis. Additionally, buffers for mechanical, cultural, manual (low impact), and non-aerial herbicide use treatments can be modified on a project-by-project basis with approval from NNHP but will require the presence of a qualified biologist on-site during all stages of project implementation. Flagging and fencing around listed plant species will also be required.

Federally Listed Species

General Project BMPs

1. Submit a Biological Consultant Data Request Form to the NNHP NNDFW to initiate the BRCF process prior to project implementation for background information on species habitat and occupancy (the form and instructions can be accessed here: https://www.nndfw.org/nnhp/drs.htm). A brief report should be submitted with the BRCF request that includes the following: a. Description and map of the project location and treatment activities proposed.

b. Consideration of the intersection of the project site with potential habitat of potential and known species listed in the Data Response.

c. Description of survey timing and methodology (including buffers) and species-specific surveys performed.

d. Conservation measures that will be applied for the project, if applicable.

2. If preliminary analysis based on maps, aerial photos, and other knowledge of the project site indicates that potential habitat for listed species is present, a qualified biologist will conduct a habitat assessment and a qualified Biologist may be required on site during all stages of project implementation as determined by the BRCF process.

3. If suitable habitat is present, the project will apply the conservation measures, including buffers established for that species or a qualified biologist will conduct additional surveys for species' presence.

4. Qualified biologists should obtain federally listed species permits from USFWS and be on the permitted consultants list for NNDFW prior to conducting species surveys on Navajo Nation land.

5. If the species is present at the site, the species-based protection measures will be employed. If protocol surveys do not detect the species, there will be no buffers.

6. Where specified, species breeding season timing restrictions and buffers apply to all treatment methods.

7. Where two or more species' habitats overlap, the more restrictive measures will take priority.

8. Consult the Required Protection Measures for Herbicide applications for federally and Navajo Nation-listed species below for herbicide-specific mitigation and avoidance measures.

Navajo Nation Endangered Species List

General Project BMPs

1. Submit a Biological Consultant Data Request Form to the NNHP NNDFW to initiate the BRCF process prior to project implementation for background information on species habitat and occupancy (the form and instructions can be accessed here: https://www.nndfw.org/nnhp/drs.htm). A brief report should be submitted with the BRCF request that includes the following: a. Description and map of the project location and treatment activities proposed.

b. Consideration of the intersection of the project site with potential habitat of potential and known species listed in the Data Response.

c. Description of survey timing and methodology (including buffers) and species-specific surveys performed.

d. Conservation measures that will be applied for the project, if applicable.

2. Include General Project BMPs species conservation measures listed above.

3. If preliminary analysis based on maps, aerial photos, and other knowledge of the project site indicates that potential for habitat for Group 2 and 3 species is present, a qualified biologist will conduct species surveys.

4. Species surveys are preferred for Group 4 species but not required. A qualified biologist will conduct Group 4 species surveys concurrently with Group 2 and 3 species surveys.

5. Obtain Biological Investigation Permits from NNDFW prior to conducting species surveys.

Wildlife Species Conservation Measures

Birds

American Dipper (G3)

- Breeding season occurs March 1 – July 31 (Navajo Nation Endangered Species List: species accounts).
- Mechanical treatments require a 50–200-foot (ft) (15–60-meter (m)) buffer from occupied nesting habitat outside of breeding season.
- No mechanical, mechanized ground, low or high aerial chemical treatments within 1/8 mile (0.2 kilometer (km)) from an active nest during March 15–August 15.

- Spot chemical spraying or manual treatments require a buffer of 330 ft (0.1 km) from an active nest during March 15- August 15.
- Class 2 or Class 3 herbicides require a 30 ft (9 m) buffer foe spot and mechanized ground application of herbicide; 150 ft (50 m) buffer for low aerial chemical treatments; and 1/8-mile (200 m) buffer for high aerial chemical treatments near American Dipper habitat.

Mexican Spotted Owl (ESA T, G2)

- Breeding season occurs May 1 – August 1 (Navajo Nation Endangered Species List: species accounts).
- Chemical spot and manual treatments require a 330 ft (0.1 km) buffer from active nest.
- Mechanical, mechanized ground and low and high aerial chemical treatments require a 1/4-mile (0.4 km) buffer from suitable nesting habitat during breeding season.

Mammals

Banner-tailed kangaroo rat and Navajo Mountain Vole (G4s)

- Mechanical and target grazing treatments require a 200 ft (60 m) buffer from occupied habitats year-round.

Fish

Colorado pikeminnow (ESA E, G2)

- Weed removal projects would require restoration of native vegetation to prevent erosion. Weed removal activities in the riparian zone would be conducted in patches to prevent erosion. Patch size would be determined in consultation with NNDFW.
- Best Management Practices would be used to reduce sedimentation and chemical run-off from mechanical and chemical weed treatments along bank lines within the 100-year floodplain.
- Pile burning would be conducted 300 ft (90 m) outside of the floodplain.
- Approved aquatic formulation herbicides only: 2,4-D, glyphosate, triclopyr and imazapyr would exclusively be used within 25 ft (7.6 m) of the daily high-water mark.
- Herbicides with relatively low aquatic toxicity to fish require a 25 ft (7.6 m) buffer from the daily high-water mark in the riparian zone, including: aminopyralid, chlorsulfuron methyl, clopyralid, imazapic, and thifensulfuron-methyl.

Razorback sucker (ESA E, G2)

- Weed removal projects would require restoration of native vegetation to prevent erosion. Weed removal activities in the riparian zone would be conducted in patches to prevent erosion. Patch size would be determined in consultation with NNDFW.
- Best Management Practices would be used to reduce sedimentation and chemical run-off from mechanical and chemical weed treatments along bank lines within the 100-year floodplain.
- Pile burning would be conducted 300 ft (90 m) outside of the floodplain.
- Approved aquatic formulation herbicides only: 2,4-D, glyphosate, triclopyr and imazapyr would exclusively be used within 25 ft (7.6 m) of the daily high-water mark.

- Herbicides with relatively low aquatic toxicity to fish require a 25 ft (7.6 m) buffer from the daily high-water mark in the riparian zone, including: aminopyralid, chlorsulfuron methyl, clopyralid, imazapic, and thifensulfuron-methyl.
- Non-aquatic approved and moderate to high aquatic toxicity herbicides require a 300 ft (90 m) buffer from the daily high-water mark.

Amphibians and Reptiles

Northern Leopard Frog (G2)

- Mechanized and manual treatments require a 200 ft (60 m) buffer from open water habitats.
- Prescribed fire requires a 200 ft (60 m) buffer zone from the edge of the wetland vegetation.
- No applications of herbicides will be used inside occupied or potentially occupied aquatic habitat.
- Mitigation measures will be applied in dispersal and migration corridors after rain events.
- All projects in riparian/wetland habitats near occupied habitat will require native riparian/wetland vegetation restoration following invasive species removal.
- Only herbicides labeled for aquatic use and the cut-stump method on tree species will be used in potential habitat.
- No target grazing will be used in the habitat.
- All equipment and boots will be cleaned with bleach before and after treatments within 200 ft (60 m) of occupied habitat to prevent the spread of chytrid fungus.

Chuckwalla (G4))

- No mechanical treatments (surface disturbance) within occupied habitats

Federal and Navajo Listed Plant Species Conservation Protection Measures

Alcove bog-orchid and Alcove death camas (G3)

- Mechanical, cultural, and chemical ground treatments require a 200ft (60 m) buffer from identified listed species locations.
- Aerial herbicide application requires a 1-mile (1.6 km) buffer from identified listed species locations.
- Manual treatments (low impact treatments) require a 20ft (6 m) buffer from identified listed species locations.
- When doing treatments, flagging and fencing would be placed around listed plant populations.
- Vehicles would use only established roads for accessing project sites in listed plant habitat.
- The NNDFW botanist would be notified of any positive results of rare plant surveys. BIA would also notify the NNDFW botanist as to whether they are proceeding with the proposed weed treatment near the listed plant, and if so, the buffers and other avoidance measures that would be implemented.
- The field crew administering weed treatments would be educated on the listed plants and how to avoid them.

Navajo sedge (ESA T, G3) and Cutler's milk-vetch (ESA T, G2)

- Vehicles would use only established roads for accessing project sites in listed plant habitat.
- Vehicles would be parked at previously disturbed parking areas located 20ft from suitable habitat for federally listed species when treating. Parking areas would be near established roadways.
- Mechanical, cultural, and chemical treatments require a 200-foot (ft) (60-meter (m)) buffer from identified listed species locations.
- Aerial herbicide application requires a 1-mile (1.6 km) buffer from identified listed species locations.
- Manual treatments (low impact treatments) require a 20 ft (6 m) buffer from identified listed species locations.
- When doing treatments, flagging and fencing would be placed around listed plant populations.
- The NNDFW botanist would be notified of any positive results of rare plant surveys. BIA would also notify the NNDFW botanist as to whether they are proceeding with the proposed weed treatment near the listed plant, and if so, the buffers and other avoidance measures that would be implemented.
- No pre-emergent herbicide application would be used (Navajo sedge only).
- The field crew administering weed treatments would be educated on the listed plants and how to avoid them.

Navajo Beardtongue (G3)

- Mechanical, cultural, and chemical treatments require a 1-mile (1.6 km) buffer from identified listed species locations. A burn plan must be developed for prescribed pile burns, which will include specific treatment buffers.
- Aerial herbicide application requires a 1-mile (1.6 km) buffer from identified listed species locations.
- Manual treatments (low impact treatments) require a 20 ft (6 m) buffer from identified listed species locations.
- Vehicles would use only established roads for accessing project sites in listed plant habitat.
- When doing treatments, flagging and fencing would be placed around listed plant populations.
- The NNDFW botanist would be notified of any positive results of rare plant surveys. BIA would also notify the NNDFW botanist as to whether they are proceeding with the proposed weed treatment near the listed plant, and if so, the buffers and other avoidance measures that would be implemented.
- No pre-emergent herbicide application would be used (Navajo sedge only).
- The field crew administering weed treatments would be educated on the listed plants and how to avoid them.

Welsh's American-aster, Rydberg's thistle, Cave primrose, and Parish's alkali grass (G4)

- Mechanical, cultural, and chemical ground treatments require a 200 ft (60 m) buffer from identified listed species locations.
- Aerial herbicide application requires a 1-mile (1.6 km) buffer from identified listed species locations.
- Manual treatments (low impact treatments) require a 20 ft (6 m) buffer from identified listed species locations.
- When doing treatments, flagging and fencing would be placed around identified plant populations.
- The field crew administering weed treatments would be educated on the listed plants and how to avoid them.

Migratory Birds

- Mechanical treatments within the buffer zone would be conducted outside of the breeding season (March through August).
- Non-endangered raptors—All treatments require a 490ft (0.15km) buffer from the active nest from March–August.
- Migratory birds—All treatments require a 165ft (50m) from the active nest from March–August.

APPENDIX C. HERBICIDE LIST FOR THE NAVAJO NATION

The BIA WNA would also be able to use new active ingredients that are developed in the future if: 1) they are registered by the EPA for use on one or more land types (e.g., rangeland, aquatic, etc.) managed by the BIA; 2) the BIA Navajo Nation Region determines that the benefits of use on public lands outweigh the risks to human health and the environment; and 3) they meet evaluation criteria to ensure that the decision to use the active ingredient is supported by scientific evaluation and NEPA documentation. These evaluation criteria are discussed in more detail in the FPEIS (Appendix K; BIA 2022a).

Approved Herbicides on the Navajo Nation and their recommended land uses in the Bá'azh chíní Canyon Watershed Planning Area*

Herbicide	Selectivity	Riparian	Rangeland	Agricultural Lands
2,4-D	Broadleaf Weeds	X	X	X
Aminopyralid	Broadleaf Weeds	X	X	X
Atrazine	• Broadleaf Weeds • Grasses		X	X
Chlorsulfuron	• Perennial Broadleaf Weeds • Grasses		X	X
Clopyralid	Broadleaf Weeds		X	X
Dichlobenil	• Annual and Perennial Grasses • Broadleaf Weeds • Woody Plants		X	X
Fluroxypyr	Broadleaf Weeds		X	
Fluazifop-p butyl	Annual and Perennial Grasses			X
Glyphosate	Non-selective	X	X	X
Imazapic	Broadleaf Weeds		X	X
Imazapyr	• Annual and Perennial Grasses • Broadleaf Weeds		X	
Isoxaben	• Annual and Broadleaf Weeds • Grasses • Vines			X
Metsulfuron methyl	• Annual, Biennial, Perennial and Broadleaf Weeds • Brush		X	X
Metribuzin	• Broadleaf Weeds • Grasses			X
Paraquat	• Annual Broadleaf Weeds • Grasses		X	X

Herbicide	Selectivity	Riparian	Rangeland	Agricultural Lands
Pendimethalin	• Broadleaf Weeds • Annual Grasses			X
Picloram	• Annual and Biennial Broadleaf Weeds • Brush		X	X
Prodiamine	• Broadleaf Weeds • Grasses			
Thifensulfuronmethyl	Broadleaf Weeds		X	X
Triclopyr	• Broadleaf Weeds • Woody Plants	X	X	X

*Shaded rows are herbicides that would be used for noxious weed treatments in the Bá'azh chíní Canyon Watershed Project

APPENDIX D. PROPOSED BIOLOGICAL CONTROL AGENTS

Noxious Weed	Control Agent Scientific Name	Control Agent Common Name
Bull Thistle	*Urophora stylata*	Bull thistle seed head gall fly
Canada Thistle	*Urophora cardui*	Canada thistle gall fly
Puncturevine	*Microlarinus lypriformis*	Puncturevine seed feeding weevil
Russian Kanpweed	*Subanguina picridis* *Jaapiella ivannikovi* *Urophora kasachstanica* *Urophora xanthippe*	Nematode Diptera: Cecidomyiidae Flower gall fly Flower gall fly
Russian Thistle	*Coleophora parthenica*	Russian thistle stem miner moth

APPENDIX E.NNDFW SPECIES LIST

NNHP
Navajo Natural Heritage Program

PO BOX 1480
Window Rock, AZ 86515

P 928.871.6472
F 928.871.7603

www.nndfw.org

22bric101

12-May-2022

Stephanie Lee
BRIC
8901 Adams Street - Suite B
Albuquerque, NM 87113
505-563-4702
stephanie.lee@bric-dine.com

SUBJECT: Ba eschini (Piute Creek HUC 10) Watershed Restoration Plan Project

Stephanie Lee,

NNHP has performed an analysis of your project in comparison to known biological resources of the Navajo Nation and has included the findings in this letter. The letter is composed of seven parts. The sections as they appear in the letter are:

1. **Known Species –** a list of all species within relative proximity to the project
2. **Potential Species –** a list of potential species based on project proximity to respective suitable habitat
3. **Quadrangles –** an exhaustive list of quads containing the project
4. **Project Summary –** a categorized list of biological resources within relative proximity to the project grouped by individual project site(s) or quads
5. **Conditional Criteria Notes –** additional details concerning various species, habitat, etc.
6. **Personnel Contacts –** a list of employee contacts
7. **Resources –** identifies sources for further information

Known Species lists "species of concern" known to occur within proximity to the project area. Planning for avoidance of these species is expected. If no species are displayed then based upon the records of the Navajo Nation Department of Fish and Wildlife (NNDFW) there are no "species of concern" within proximity to the project. Refer to the Navajo Endangered Species List (NESL) Species Accounts for recommended avoidance measures, biology, and distribution of NESL species on the Navajo Nation (https://www.nndfw.org/nnhp/sp_account.htm).

Potential Species lists species that are potentially within proximity to the project area and need to be evaluated for presence/absence. If no species are found within the Known or Potential Species lists, the project is not expected to affect any federally listed species, nor significantly impact any tribally listed species or other species of concern. Potential for species has been determined primarily on habitat characteristics and species range information. A thorough habitat analysis, and if necessary, species specific surveys, are required to determine the potential for each species.

Species of concern include protected, candidate, and other rare or otherwise sensitive species, including certain native species and species of economic or cultural significance. For legally protected species, the

following tribal and federal statuses are indicated: NESL, federal Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Eagle Protection Act (EPA). No legal protection is afforded species with only ESA candidate, NESL group 4 status, and species listed on the Sensitive Species List. Please be aware of these species during surveys and inform the NNDFW of observations. Reported observations of these species and documenting them in project planning and management is important for conservation and may contribute to ensuring they will not be up listed in the future.

In any and all correspondence with NNDFW or NNHP concerning this project please cite the Data Request Code associated with this document. It can be found in this report on the top right corner of the every page. Additionally please cite this code in any biological evaluation documents returned to our office.

1. Known Species *(NESL=Navajo Endangered Species List, FE=Federally Endangered, FT=Federally Threatened, FC=Federal Candidate)*

Species

ANVA = Anticlea vaginatus / Alcove Death Camas NESL G3
CASP = Carex specuicola / Navajo Sedge NESL G3 FT
CIME = Cinclus mexicanus / American Dipper NESL G3
CIRY = Cirsium rydbergii / Rydberg's Thistle NESL G4
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
MIMO = Microtus mogollonensis / Navajo Mountain Vole NESL G4
PENA = Penstemon navajoa / Navajo Beardtongue NESL G3
PLZO = Platanthera zothecina / Alcove Bog-orchid NESL G3
PRSP = Primula specuicola / Cave Primrose NESL G4
SAAT = Sauromalus ater / Chuckwalla NESL G4
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT

2. Potential Species

Species

AEAC = Aegolius acadicus / Northern Saw-whet Owl NESL G4
ANVA = Anticlea vaginatus / Alcove Death Camas NESL G3
AQCH = Aquila chrysaetos / Golden Eagle NESL G3
ASCU = Astragalus cutleri / Cutler's Milk-vetch NESL G2
ASWE = Asclepias welshii / Welsh's Milkweed NESL G3 FT
BURE = Buteo regalis / Ferruginous Hawk NESL G3
CADI = Catostomus discobolus / Zuni Bluehead Sucker NESL G2
CASP = Carex specuicola / Navajo Sedge NESL G3 FT
CIME = Cinclus mexicanus / American Dipper NESL G3
CIRY = Cirsium rydbergii / Rydberg's Thistle NESL G4
DISP = Dipodomys spectabilis / Banner-tailed Kangaroo Rat NESL G4
EMTREX = Empidonax traillii extimus / Southwestern Willow Flycatcher NESL G2 FE
GIRO = Gila robusta / Roundtail Chub NESL G2
HALE = Haliaeetus leucocephalus / Bald Eagle NESL G2
LIPI = Lithobates pipiens / Northern Leopard Frog NESL G2
MIMO = Microtus mogollonensis / Navajo Mountain Vole NESL G4
OXKA = Oxyloma kanabense / Kanab Ambersnail NESL G4 FE
PAFA = Patagioenasa fasciata / Band-tailed Pigeon NESL G4

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PENA = Penstemon navajoa / Navajo Beardtongue NESL G3
PIDO = Picoides dorsalis / Three-toed Woodpecker NESL G4
PLZO = Platanthera zothecina / Alcove Bog-orchid NESL G3
PRSP = Primula specuicola / Cave Primrose NESL G4
PTLU = Ptchocheilus lucius / Colorado Pikeminnow NESL G2
PUPA = Puccinellia parishii / Parish's Alkali Grass NESL G4
STOCLU = Strix occidentalis lucida / Mexican Spotted Owl NESL G3 FT
SYWE = Symphyotrichum welshii / Welsh's American-aster NESL G4
XYTE = Xyrauchen texanus / Razorback Sucker NESL G2 FE

3. Quadrangles (7.5 Minute)

Quadrangles

Cattle Canyon (36110-H5) / AZ, UT
Chaiyahi Flat (36110-H8) / AZ, UT
Chaiyahi Rim NE (36110-H7) / AZ, UT
Chaiyahi Rim SE (36110-G7) / AZ
Deep Canyon North (37110-B6) / UT
Deep Canyon South (37110-A6) / UT, AZ
Navajo Begay (37110-A7) / UT, AZ
No Mans Mesa South (37110-A5) / UT, AZ
Oak Springs (36110-G6) / AZ
Tall Mountain (36110-G5) / AZ
Tall Mountain NW (36110-H6) / AZ, UT

4. Project Summary *(EO1 Mile/EO 3 Miles=elements occuring within 1 & 3 miles., MSO=mexican spotted owl PACs, POTS=potential species, RCP=Biological Areas)*

SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Piute Creek HUC 10 Watershed	PLZO	CIRY, PLZO	Cattle Canyon (36110-H5) / AZ, UT	None	ANVA, AQCH, CASP, CIRY, EMTREX, PLZO, PRSP, STOCLU, SYWE	Area 1, Area 2, Area 3
Piute Creek HUC 10 Watershed	MIMO	MIMO	Chaiyahi Flat (36110-H8) / AZ, UT	None	ANVA, AQCH, ASWE, BURE, CASP, CIRY, DISP, EMTREX, LIPI, PLZO, PRSP, SYWE	Area 3
Piute Creek HUC 10 Watershed	ANVA, CASP, CIRY, MIMO, PENA, PRSP	ANVA, CASP, CIRY, LIPI, MIMO, PENA, PLZO, PRSP, SAAT	Chaiyahi Rim NE (36110-H7) / AZ, UT	None	ANVA, AQCH, ASWE, BURE, CASP, CIRY, DISP, EMTREX, MIMO, PLZO, PRSP, STOCLU, SYWE	Area 1, Area 3

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SITE	EO1MI	EO3MI	QUAD	MSO	POTS	RCP
Piute Creek HUC 10 Watershed	CASP, CIRY, PLZO, PRSP	ANVA, CASP, CIRY, LIPI, MIMO, PLZO, PRSP	Chaiyahi Rim SE (36110-G7) / AZ	None	ANVA, AQCH, ASWE, CASP, CIRY, EMTREX, LIPI, PLZO, PRSP, STOCLU, SYWE	Area 1, Area 3
Piute Creek HUC 10 Watershed	None	CIRY, PRSP	Deep Canyon North (37110-B6) / UT	None	ANVA, AQCH, ASCU, CADI, CASP, CIRY, EMTREX, GIRO, HALE, LIPI, OXKA, PLZO, PRSP, PTLU, STOCLU, XYTE	Area 1, Area 3
Piute Creek HUC 10 Watershed	MIMO	MIMO	Deep Canyon South (37110-A6) / UT, AZ	None	ANVA, AQCH, ASCU, CASP, CIRY, EMTREX, LIPI, PLZO, PRSP, STOCLU	Area 1, Area 2, Area 3
Piute Creek HUC 10 Watershed	MIMO, PENA, SAAT	CASP, MIMO, PENA, SAAT, STOCLU	Navajo Begay (37110-A7) / UT, AZ	None	AEAC, ANVA, AQCH, BURE, CASP, CIME, CIRY, DISP, EMTREX, LIPI, MIMO, PAFA, PENA, PIDO, PLZO, PRSP, STOCLU, SYWE	Area 1, Area 3, Area 5
Piute Creek HUC 10 Watershed	None	None	No Mans Mesa South (37110-A5) / UT, AZ	None	ANVA, AQCH, CASP, CIRY, EMTREX, PLZO	Area 3
Piute Creek HUC 10 Watershed	CASP, CIRY, LIPI, PLZO, PRSP	ANVA, CASP, CIME, CIRY, LIPI, PLZO, PRSP, STOCLU	Oak Springs (36110-G6) / AZ	None	ANVA, AQCH, ASWE, CASP, CIME, CIRY, EMTREX, LIPI, PLZO, PRSP, PUPA, STOCLU, SYWE	Area 1, Area 3
Piute Creek HUC 10 Watershed	CIRY, PLZO	CIME, CIRY, PLZO	Tall Mountain (36110-G5) / AZ	None	ANVA, AQCH, CASP, CIRY, EMTREX, LIPI, PLZO, PRSP, PUPA, SYWE	Area 1, Area 3
Piute Creek HUC 10 Watershed	CASP, CIRY, MIMO, PLZO	ANVA, CASP, CIRY, LIPI, MIMO, PLZO, PRSP	Tall Mountain NW (36110-H6) / AZ, UT	None	ANVA, AQCH, ASWE, BURE, CASP, CIRY, DISP, EMTREX, PLZO, PRSP, STOCLU, SYWE	Area 1, Area 2, Area 3

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5. Conditional Criteria Notes *(Recent revisions made please read thoroughly. For certain species, and/or circumstances, please read and comply)*

A. Biological Resource Land Use Clearance Policies and Procedures (RCP) - The purpose of the RCP is to assist the Navajo Nation government and chapters ensure compliance with federal and Navajo laws which protect, wildlife resources, including plants, and their habitat resulting in an expedited land use clearance process. After years of research and study, the NNDFW has identified and mapped wildlife habitat and sensitive areas that cover the entire Navajo Nation.
The following is a brief summary of six (6) wildlife areas:
1. **Highly Sensitive Area** – recommended no development with few exceptions.
2. **Moderately Sensitive Area** – moderate restrictions on development to avoid sensitive species/habitats.
3. **Less Sensitive Area** – fewest restrictions on development.
4. **Community Development Area** – areas in and around towns with few or no restrictions on development.
5. **Biological Preserve** – no development unless compatible with the purpose of this area.
6. **Recreation Area** – no development unless compatible with the purpose of this area.
None - outside the boundaries of the Navajo Nation
This is not intended to be a full description of the RCP please refer to the our website for additional information at https://www.nndfw.org/clup.htm.

B. Raptors – If raptors are known to occur within 1 mile of project location: Contact the NNHP zoologist at 871-7070 regarding your evaluation of potential impacts and mitigation.
Golden and Bald Eagles- If Golden or Bald Eagle are known to occur within 1 mile of the project, decision makers need to ensure that they are not in violation of the *Golden and Bald Eagle Nest Protection Regulations* found at https://www.nndfw.org/nnhp/docs_reps/gben.pdf.
Ferruginous Hawks – Refer to *Navajo Nation Department of Fish and Wildlife's Ferruginous Hawk Management Guidelines for Nest Protection* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on avoiding impacts to Ferruginous Hawks within 1 mile of project location.
Mexican Spotted Owl - Please refer to the *Navajo Nation Mexican Spotted Owl Management Plan* (https://www.nndfw.org/nnhp/docs_reps.htm) for relevant information on proper project planning near/within spotted owl protected activity centers and habitat.

C. Surveys – Biological surveys need to be conducted during the appropriate season to ensure they are complete and accurate please refer to NN Species Accounts https://www.nndfw.org/nnhp/sp_account.htm. Surveyors on the Navajo Nation must be permitted by the Director, NNDFW. Contact Jeff Cole at (928) 871-6450 for permitting procedures. Questions pertaining to surveys should be directed to the NNDFW the NNHP Zoologist for animals, and the NNHP Botanist for plants. Questions regarding biological evaluation should be directed to Jeff Cole at 871-6450.

D. Oil/Gas Lease Sales – Any settling or evaporation pits that could hold contaminants should be lined and covered. Covering pits, with a net or other material, will deter waterfowl and other migratory bird use. Lining pits will protect ground water quality.

E. Power line Projects – These projects need to ensure that they do not violate the regulations set forth in the *Navajo Nation Raptor Electrocution Prevention Regulations* found at https://www.nndfw.org/nnhp/docs_reps/repr.pdf.

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F. Guy Wires – Does the project design include guy wires for structural support? If so, and if bird species may occur in relatively high concentrations in the project area, then guy wires should be equipped with highly visual markers to reduce the potential mortality due to bird-guy wire collisions. Examples of visual markers include aviation balls and bird flight diverters. Birds can be expected to occur in relatively high concentrations along migration routes (e.g., rivers, ridges or other distinctive linear topographic features) or where important habitat for breeding, feeding, roosting, etc. occurs. The U.S. Fish and Wildlife Service recommends marking guy wires with at least one marker per 100 meters of wire.

G. San Juan River – On 21 March 1994 (Federal Register, Vol. 59, No. 54), the U.S. Fish and Wildlife Service designated portions of the San Juan River (SJR) as critical habitat for Ptychocheilus lucius (Colorado pikeminnow) and Xyrauchen texanus (Razorback sucker). Colorado pikeminnow critical habitat includes the SJR and its 100-year floodplain from the State Route 371 Bridge in T29N, R13W, sec. 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian) up to the full pool elevation. Razorback sucker critical habitat includes the SJR and its 100-year floodplain from the Hogback Diversion in T29N, R16W, sec. 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T41S, R11E, sec. 26 (Salt Lake Meridian). All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of critical habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

H. Little Colorado River - On 21 March 1994 (Federal Register, Vol. 59, No. 54) the U.S. Fish and Wildlife Service designated Critical Habitat along portions of the Colorado and Little Colorado Rivers (LCR) for Gila cypha (humpback chub). Within or adjacent to the Navajo Nation this critical habitat includes the LCR and its 100-year floodplain from river mile 8 in T32N R6E, sec. 12 (Salt and Gila River Meridian) to its confluence with the Colorado River in T32N R5E sec. 1 (S&GRM) and the Colorado River and 100-year floodplain from Nautuloid Canyon (River Mile 34) T36N R5E sec. 35 (S&GRM) to its confluence with the LCR. All actions carried out, funded or authorized by a federal agency which may alter the constituent elements of Critical Habitat must undergo section 7 consultation under the Endangered Species Act of 1973, as amended. Constituent elements are those physical and biological attributes essential to a species conservation and include, but are not limited to, water, physical habitat, and biological environment as required for each particular life stage of a species.

I. Wetlands – In Arizona and New Mexico, potential impacts to wetlands should also be evaluated. The U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps should be examined to determine whether areas classified as wetlands are located close enough to the project site(s) to be impacted. In cases where the maps are inconclusive (e.g., due to their small scale), field surveys must be completed. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. NWI maps are available for examination at the Navajo Natural Heritage Program (NNHP) office, or may be purchased through the U.S. Geological Survey (order forms are available through the NNHP). The NNHP has complete coverage of the Navajo Nation, excluding Utah, at 1:100,000 scale; and coverage at 1:24,000 scale in the southwestern portion of the Navajo Nation. In Utah, the U.S. Fish & Wildlife Service's National Wetlands Inventory maps are not yet available for the Utah portion of the Navajo Nation, therefore, field surveys should be completed to determine whether wetlands are located close enough to the project site(s) to be impacted. For field surveys, wetlands identification and delineation methodology contained in the "Corps of Engineers Wetlands Delineation Manual" (Technical Report Y-87-1) should be used. When wetlands are present, potential impacts must be addressed in an environmental assessment and the Army Corps of Engineers, Phoenix office, must be contacted. For more information contact the Navajo Environmental Protection

Agency's Water Quality Program.

J. Life Length of Data Request – The information in this report was identified by the NNHP and NNDFW's biologists and computerized database, and is based on data available at the time of this response. If project planning takes more than two (02) years from the date of this response, verification of the information provided herein is necessary. It should not be regarded as the final statement on the occurrence of any species, nor should it substitute for on-site surveys. Also, because the NNDFW information is continually updated, any given information response is only wholly appropriate for its respective request.

K. Ground Water Pumping - Projects involving the ground water pumping for mining operations, agricultural projects or commercial wells (including municipal wells) will have to provide an analysis on the effects to surface water and address potential impacts on all aquatic and/or wetlands species listed below. NESL Species potentially impacted by ground water pumping: Carex specuicola (Navajo Sedge), Cirsium rydbergii (Rydberg's Thistle), Primula specuicola (Cave Primrose), Platanthera zothecina (Alcove Bog Orchid), Puccinellia parishii (Parish Alkali Grass), Zigadenus vaginatus (Alcove Death Camas), Perityle specuicola (Alcove Rock Daisy), Symphyotrichum welshii (Welsh's American-aster), Coccyzus americanus (Yellow-billed Cuckoo), Empidonax traillii extimus (Southwestern Willow Flycatcher), Rana pipiens (Northern Leopard Frog), Gila cypha (Humpback Chub), Gila robusta (Roundtail Chub), Ptychocheilus lucius (Colorado Pikeminnow), Xyrauchen texanus (Razorback Sucker), Cinclus mexicanus (American Dipper), Speyeria nokomis (Western Seep Fritillary), Aechmophorus clarkia (Clark's Grebe), Ceryle alcyon (Belted Kingfisher), Dendroica petechia (Yellow Warbler), Porzana carolina (Sora), Catostomus discobolus (Bluehead Sucker), Cottus bairdi (Mottled Sculpin), Oxyloma kanabense (Kanab Ambersnail)

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Date: 2022.05.12 09:33:56 -07'00'

Dexter D Prall, GIS Supervisor - Natural Heritage Program
Navajo Nation Department of Fish and Wildlife

7. Resources

Navajo Endangered Species List:
https://www.nndfw.org/nnhp/endangered.htm

Species Accounts:
https://www.nndfw.org/nnhp/sp_account.htm

Biological Investigation Permit Application
https://www.nndfw.org/nnhp/study_permit.htm

Navajo Nation Sensitive Species List
https://www.nndfw.org/nnhp/trackinglist.htm

Various Species Management and/or Document and Reports
https://www.nndfw.org/nnhp/docs_reps.htm

Consultant List
https://www.nndfw.org/bi_consult_list_2014.pdf

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APPENDIX F. BIOLOGICAL EVALUATION