

Navajo Nation Integrated Weed Management Plan

FINAL

August 2022

FOR MANAGEMENT OF LANDS ON:
THE NAVAJO NATION

UNITED STATE DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS NAVAJO REGION



THIS PAGE INTENTIONALLY LEFT BLANK

NAVAJO NATION INTEGRATED WEED MANAGEMENT PLAN

August 2022

U.S. Department of the Interior
Bureau of Indian Affairs
Navajo Region

Prepared by:
EnviroPlan Partners, LLC
Flagstaff, AZ
Denver, CO

and

Fred Phillips Consulting
Flagstaff, AZ 86001

Cover photo by Renee Benally, Bureau of Indian Affairs Western Navajo Agency Natural Resource Specialist, of a halogeton sample collected along Highway 163.

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

1.0	Introduction	1
1.1	Background	2
1.2	Project Goals	3
2.0	Project Area.....	3
3.0	Priority Weed Species.....	7
4.0	Implementation Strategy	10
5.0	Approach for Prioritizing Actions and Sites	11
5.1	Site Approach.....	12
5.2	Species Approach.....	13
5.2.1	Risk Assessment.....	13
5.2.2	Pre-Field Review	14
5.2.3	Field Reconnaissance	16
6.0	Weed Inventory and Mapping.....	17
6.1	Field Mapping.....	18
6.1.1	GPS Units.....	19
6.1.2	Smart Phone Mapping Apps	19
6.1.3	GIS Remote Mapping.....	19
6.2	Data Collection	20
6.2.1	Stand Exams	23
6.3	Data Processing.....	23
7.0	Permitting	24
8.0	Mitigation Measures	28
8.1	General Measures.....	28
8.2	Chemical Treatments	30
8.3	Mechanical	32
8.4	Cultural	33
9.0	Weed Management Techniques.....	33
9.1	Prevention	35
9.2	Early Detection/Rapid Response	35
9.3	Manual Control	36
9.4	Mechanical Control.....	36
9.5	Cultural Control	39

9.6	Biological Control.....	42
9.7	Chemical Control	44
9.8	Roads and Rights-of-Way Treatments	54
10.0	Native Vegetation Re-Planting.....	54
10.1	Passive Restoration	54
10.2	Active Restoration	54
10.2.1	Direct Seeding	55
10.2.2	Propagating Cuttings	55
10.2.3	Deep Pot Upland Plants.....	56
10.2.4	Containerized Plants.....	57
10.2.5	Bioengineering and Erosion Control.....	57
11.0	Project Maintenance and Monitoring.....	59
11.1	Project Monitoring	59
11.1.1	Treatment Effectiveness Monitoring.....	60
11.1.2	Photo Monitoring	60
11.1.3	Adaptive Management	60
11.2	Project Maintenance.....	61
12.0	Demonstration Projects	62
13.0	References	64
Appendix A. Acronyms		
Appendix B. Priority Weed Area Maps		
Appendix C. Weed Project Checklist		
Appendix D. Noxious Weed Mapping Protocol		
Appendix E. Best Management Option for Control by Noxious Weed Species		
Appendix F. Mitigation and Species Conservation Measures		
Appendix G. Navajo Nation Historic Preservation Department Permit Process		
Appendix H. Sample Monitoring Datasheets		
Appendix I. Federal, State and Navajo Contact Information		
Appendix J. Funding Sources		
Appendix K. Project Planning Forms (BIA only)		
Appendix L. Noxious Weed Information		

List of Figures

Figure 2-1. Project area of the Navajo Nation divided by BIA Navajo Regional Agencies.	4
Figure 5-1. Flow chart for prioritizing noxious weeds identified at a project area.....	15
Figure 6-1. A field infested with musk thistle on the Navajo Nation. Photo courtesy of R. Benally.	17
Figure 9-1. Examples of mechanical treatments. <i>Left:</i> Tractors grubbing root systems for large tamarisk stands. <i>Right:</i> A site cleared of invasive tamarisk using mechanical treatments. Photos courtesy of Fred Phillips Consulting, LLC.	37
Figure 9-2. A Bobcat with a brush hog mower attachment removing noxious weeds. Photo courtesy of Fred Phillips Consulting, LLC.	38
Figure 10-1. Harvested willow poles are planted along a bankline to provide additional erosion protection. <i>Left:</i> Work crews prep the bundles of willow poles after they have soaked in the Colorado River. <i>Right:</i> the same location one year after planting. Photos courtesy of Fred Phillips Consulting.	57
Figure 10-2. Bundles of fast-growing plants planted along the streambank can provide erosion control when steep banks cannot be re-graded. <i>Left:</i> grass bundles installed along a steep bank with willow bundles planted in between to stabilize and capture soils on the bankline. <i>Right:</i> The same bankline one year later. Photos courtesy of Fred Phillips Consulting.	58

List of Tables

Table 3-1. Noxious weeds of concern and proposed management strategy goals.	9
Table 5-1. Criteria for site prioritization.	12
Table 9-1. Targeted grazing by weed species, livestock class, grazing objective, plant growth stage, and potential effectiveness (Daines 2006). Only the weed species listed in the table were reduced by targeted grazing treatments. Weeds not listed are not recommended for target grazing.....	40
Table 9-2. Target noxious weeds and proposed biological control agents.	43
Table 9-3. Herbicides approved for use on the Navajo Nation based on priority treatment areas. * Indicates a Restricted Use Pesticide.	47
Table 9-4. Herbicides and recommended application concentrations per acre for priority weed species. Rates listed are general according to label instructions, the USFS Field Guide for Managing Weed Species in the Southwest; Montana, Utah and Wyoming Cooperative Extension Service Weed Management Handbook; and Lake Mead Exotic Plant Management Plan. Herbicides should be applied according to the label instructions by certified pesticide applicators. *Indicates a restricted use pesticide.	50
Table 12-1. Demonstration Projects identified by the five BIA Navajo Region Agencies including Western, Shiprock, Chinle, Eastern (Crownpoint), Navajo Partitioned Land, and Fort Defiance Agencies. The table outlines the weed species mapped at the site, habitat and land use, proposed methods, and funding years for project implementation.	63

THIS PAGE INTENTIONALLY LEFT BLANK

1.0 Introduction

Controlling noxious/invasive weeds, or more appropriately, undesirable non-native vegetation, has long been a serious concern for land users. According to the Federal Noxious Weed Act of 1974 (P.L. 93-629), noxious or invasive weed species are plants “classified as undesirable, noxious, harmful, exotic, injurious, or poisonous” and does “not include plants indigenous to an area where control measures are to be taken.” Noxious weeds have little value and often have negative impacts on desired native plants and wildlife. Noxious weeds occupy space across the landscape, absorb sunlight, and utilize soil moisture that would otherwise be available for native plants. Many noxious weeds can directly change a site, making it difficult to re-establish desired native plants. In addition, noxious weeds can harm livestock, wildlife, and humans; thereby, resulting in economic, cultural, and social impacts.

On the Navajo Nation, the number and cover of noxious weed species has increased in recent years. Noxious plants were introduced through various activities, including:

- Road construction & maintenance,
- Use of hay and feed with weeds,
- Transportation of weed seeds by livestock and wildlife to remote locations,
- Infrastructure development (i.e., waterline, gas lines, powerlines, and fiber optics),
- Flowing streams, wildlife and the wind which contribute to seed dispersal, and
- A lack of grazing limits, which can put additional pressure on native vegetation, allowing noxious weeds to outcompete native plants.

Disturbed habitats facilitate the establishment of noxious weeds. Disturbance can introduce weeds along roads and rights-of-way from vehicles that carry seeds and plant materials, construction material, or garbage. These linear corridors provide a thoroughfare for rapid weed expansion to adjacent wild, agricultural or range lands. Rights-of-way also provide access points for weeds to spread to riparian corridors from runoff or road crossings.

The expansion of noxious weeds on the Navajo Nation contributes to the decline of forage production, native grassland community quality, wildlife habitat quality, and overall ecological health of the region. Noxious weeds impact every habitat on the Navajo Nation, which affects the economic, historic, and cultural livelihood of the Navajo people. Control of these weeds will improve rangeland and agricultural land quality by improving growth of native forbs and grasses that benefit subsistence ranching and farming, increase native plant diversity in riparian corridors, protect water resources and water quality, prevent the spread of additional weeds to unaffected land and property, and maintain and improve wildlife habitat.

1.1 Background

The Bureau of Indian Affairs (BIA) Noxious Weed program was initiated in December 1988 in response to Congressional directives to improve management on Indian lands. A task force and 10-Year Management Plan were developed and included in the BIA Range and Agriculture Handbook. The Acting Deputy Commissioner of Indian Affairs issued an Interim Policy in 1991 for the Noxious Weed Control Program. This policy directed on-the-ground work and allocated funds directly for weed control projects. Program standards and oversight are provided by BIA Branch of Agriculture and Rangeland Development based on input from BIA Regional Noxious Weed Coordinators.

The BIA Navajo Region has initiated various projects to control specific target noxious weeds on the Navajo Nation using various methods. The target noxious weeds treated to date on the Navajo Nation include:

- Tamarisk (*Tamarix* spp.)
- Russian olive (*Elaeagnus angustifolia*)
- Russian knapweed (*Acroptilon repens*)
- Camelthorn (*Alhagi camelorum*)
- Halogeton (*Halogeton glomeratus*)
- Musk thistle (*Carduus nutans*)

While these efforts support the goals of the Noxious Weed Control Program, the Navajo Regional Office (NRO) determined the need for an integrated and coordinated management plan which used methodical, science-based strategies to actively monitor and control noxious weeds. In conjunction with developing a weed management plan, NRO determined that compliance with the National Environmental Policy Act (NEPA) was necessary to facilitate discussions with the public regarding potential impacts of a weed management plan. By completing one wholesale environmental compliance effort for integrated weed control, the BIA can streamline planning and compliance processes and encourage large-scale cooperative projects.

To address the need for a more balanced approach to weed management, NRO initiated development of a weed management plan. This Navajo Nation Integrated Weed Management Plan (NNIWMP) identifies weed species of concern; details weed removal strategies; and consolidates the best management practices available for weed control. Best management practices that were limited in the past are now an integral component of the Region's weed management efforts, such as early detection and eradication, prevention, and education. This plan will encompass a 10-year period but will be reviewed after five years. After 10 years, the BIA may opt to keep the NNIWMP in place or update the plan based on updated data and project planning needs. The NNIWMP, however, will remain in place if no plans are developed to replace it. Repeated treatments will be necessary until the desired control objective is reached for most species as seeds can be viable for 10 or more years.

1.2 Project Goals

1. Develop the best control techniques described for the target weed species in a planned, coordinated, and economically feasible program to limit the impact and spread of noxious weeds.
2. Use adaptive management strategies to incorporate successful projects from completed weed projects when developing new initiatives.
3. Identify and prevent the expansion of existing target weed species, and quickly prevent the spread of new high priority weed species.
4. Coordinate weed removal efforts with adjacent landowners, land managers, and/or federal agencies to prevent the further spread of weeds.
5. Provide and promote economic opportunities for the Navajo people to improve rangeland and farmland productivity and to remove noxious weeds.
6. Develop a public education program focused on weed identification, prevention, and removal techniques for local communities and non-profit organizations.

2.0 Project Area

The Navajo Nation covers approximately 16.3 million acres across northeastern Arizona, southeastern Utah, and northwestern New Mexico and (**Figure 2-1**). The BIA Navajo Region is divided into five BIA agencies including (acres indicate total size of areas managed by each agency):

- Western Navajo Agency (Tuba City, Arizona, 5.2 million acres)
- Eastern Navajo Agency (Crownpoint, New Mexico, 2.3 million acres)
- Fort Defiance Agency (3.3 million acres)
- Shiprock / Northern Navajo Agency (2.7 million acres)
- Chinle / Central Navajo Agency (1.4 million acres)

The Navajo Partitioned Lands (Pinon, Arizona, 910,000 acres) and the New Lands Area (310,000 acres) contain an additional 1.2 million acres. At the date of this writing, New Lands is managed by the Office of Hopi and Navajo Indian Relocation but may come under the BIA in the foreseeable future. Thus, the New Lands Area is included in the project area. Additionally, there are approximately a million acres of land that may be in transition to allotment or trust lands on the Navajo Nation as part of land buy backs. For this document, the project area refers to the entire Navajo Nation as defined above with project sites referring to individual weed project locations.

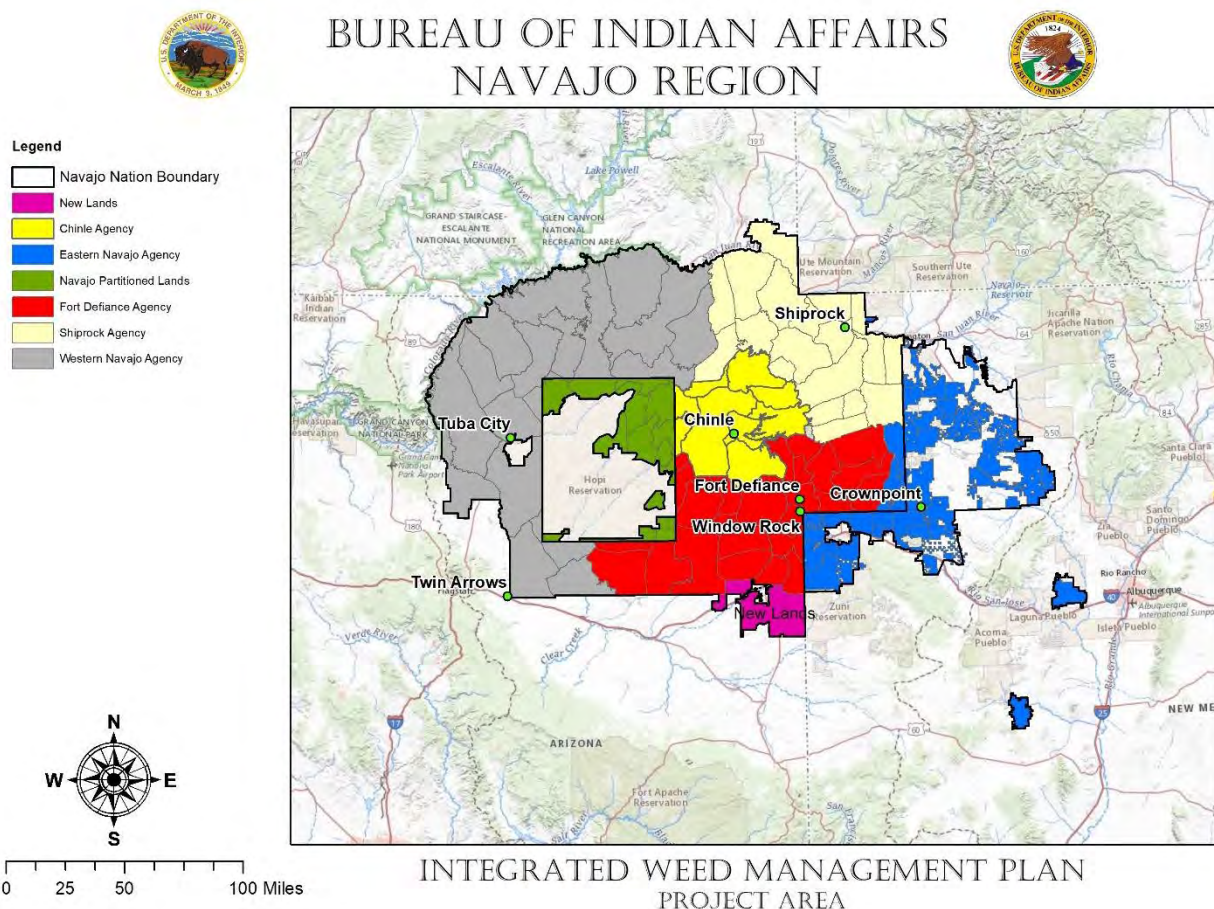


Figure 2-1. Project area of the Navajo Nation divided by BIA Navajo Regional Agencies.

This plan addresses lands under the direct administration of the NRO, which includes all Navajo Indian Allotments and Navajo trust land. Priority areas were identified to direct weed treatments where noxious weeds cause significant issues for land users and land managers (Appendix B). These areas were selected based on general land use types where a majority of weed management projects have been planned or coordinated. Priority areas include:

- Navajo Nation, BIA, federal, state, and county roads
- Riparian areas
- Navajo Nation-designated Community Development Areas
- Rights-of-way
- Designated rangeland
- Designated farmlands
- Navajo Agricultural Products Industry (NAPI) lands

All weed treatment projects shall be conducted in close coordination with local communities, Chapter Houses, and the Navajo Nation.

Roads are a primary contributor of noxious weed populations on the Navajo Nation and are a priority area for weed treatment. In 2018, the Navajo Nation DOT assumed full responsibility for the administration and management of the Tribal Transportation Program (TTP), including the BIA Navajo Region Branch of Transportation (NRBOT) Force Account Program. There are numerous paved and unpaved public roads managed under the TTP. For roads managed by state transportation agencies, vegetation is treated approximately 300 ft from the center of the road for interstates and between 50-100 ft from the center of the road or to the right-of-way fence on state highways. Agencies responsible for management of public roads include Navajo Nation Department of Transportation (Navajo DOT, 5,174 miles); Bureau of Indian Affairs Branch of Transportation (6,086 miles); County Roads (1,512 miles); and state and federal routes managed by Arizona Department of Transportation (ADOT), Utah Department of Transportation (UDOT) and New Mexico Department of Transportation (NMDOT). Treatments may also occur along tribal forest roads, which will require coordination with Navajo Forestry Department and the BIA Branch of Forestry.

Riparian areas are distinct ecosystems surrounding perennial and intermittent surface water bodies, such as lakes, rivers, and streams. These areas are hotspots of biodiversity in the region and cover approximately 1.3 million acres on the Navajo Nation. Water bodies are classified based on the major watershed basin they are located in. Five sub-regional watershed basins occur on the Navajo Nation and include the Rio Grande (710,367 acres), Upper Colorado (980,449 acres), San Juan (8.54 million acres), Lower Colorado (723,528 acres), and Little Colorado (6.67 million acres). These major watersheds are divided into 32 drainage basins on the Navajo Nation. Noxious weeds have been identified in all drainage basins on the Navajo Nation. Riparian habitats in these watersheds have been most impacted by noxious trees, such as Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix spp.*). Weed populations in these habitats often serve as seed sources to downstream habitats and degrade valuable habitat for wildlife populations, including federally and tribally listed species.

Community Development Areas (CDAs) are defined by the Navajo Nation Department of Fish and Wildlife as “areas in and around towns with few or no restrictions on development.” Planning for these areas is done through the Navajo Nation Department of Community Development with local Navajo Chapters. These areas are deemed unsupportive for Navajo species of concern with few restrictions on development. CDAs can be hotspots for weeds as construction, road work, and development activities spread seeds and plant parts to neighboring communities and natural areas.

Rights-of-way (ROWs) occur along all utility transmission lines, homesite leases, and roads on the Navajo Nation. Utility ROWs on the Navajo Nation are Indian Trust Land and maintained by utility companies who manage the lines. These include transmission lines for electricity, water, sewage, internet, phone, and natural gas. Most lines are managed by the NTUA, who provide utility service to residents on the Navajo Nation. BIA Realty currently estimates over 14,000

acres of approved rights-of-way across the Navajo Nation.¹ In addition to NTUA and a few local service providers, Arizona Public Service, Public Service Company of New Mexico, and the Salt River Project also maintain transmission lines on the Navajo Nation but may not provide direct service to trust lands. Federal law requires grantees to control and prevent weeds as part of their right-of-way (25 CFR §169.5). Land disturbance from installation or repair of utility lines can encourage the growth and introduction of many of noxious weed species.

Designated rangeland are areas managed for livestock grazing. These areas are administered by the Navajo Nation either through the Department of Agriculture (NNDA) or the BIA. There are currently around 11,000 active grazing permits on the Navajo Nation. All range permits and range units are managed by the BIA, while NNDA manages enforcement and oversight. These lands encompass roughly 2.6 million acres. The highly disturbed nature of designated rangelands has promoted the growth of many noxious weeds.

Designated farmlands are set aside either through land lease agreements or permits by the Navajo Nation (3 N.N.C. 1) and the BIA (25 CFR § 162 and 167). Designated farmlands comprise approximately 57,900 acres of the Navajo Nation under an estimated 5,000 customary land use permits. Farmlands are categorized as either dryland farms or irrigated farms. Irrigated farms are located near open water used to irrigate fields. Dryland farms are located further away from open water and receive water through irrigation, pumping, and seasonal precipitation.

Commercial farmlands cover areas managed by the Navajo Agricultural Products, Inc. (NAPI) and the Navajo Indian Irrigation Project (NIIP), which provide irrigation and agricultural products for the Navajo Nation. The BIA is responsible for NAPI and NIIP project oversight and ensures they remain in compliance with environmental concerns. The Navajo Nation is responsible for overall management and operations. NAPI lands comprise approximately 110,000 acres along the border between Shiprock / Northern Navajo Agency and Eastern Navajo Agency south of Farmington, New Mexico. In 2019, 66,490 acres were in active production, and 7,000 acres were inactive or fallow. The remaining 36,510 acres are inactive due to delays in the construction of the NIIP irrigation delivery system to the site.

Although the BIA will focus on weed treatments in these priority areas, weed treatments may occur in non-priority areas based on ecological and economic impacts and need. If a site matches the site prioritization criteria outlined in Section 5.0, and serious concern exists for the ecological and economic impacts of existing weed populations, efforts should be made to treat and manage weeds in those areas.

Weed inventory and mapping will be conducted concurrently as part of this plan to identify weed populations in the project area and to prioritize control efforts. Recent efforts in the past 5 years

¹ Based on BIA TAMS data compiled on January 15, 2021 recently transferred and requires additional clean up and categorization to determine road vs. right of way data. Estimate is likely higher due to undigitized records.

have documented over 70,000 acres of noxious weeds. All areas with identified weed infestations should be ranked and prioritized based on criteria outlined in Section 4.0.

3.0 Priority Weed Species

Forty-five noxious weed species are prioritized for control in this plan. The priority weed species were identified through previous weed mapping efforts by the BIA and the Southwest Exotic Plant Information Clearinghouse (SWEPIC) managed by the U.S. Geological Survey (USGS) Colorado Plateau Research Station (**Table 3-1**). These weeds were selected and ranked based on variety of factors, such as weed occurrence data and priority status in nearby states. The BIA also proposes implementing a weed mapping program as part of the Plan to assess and monitor weeds cover and impacts on the Navajo Nation. Weed inventory and mapping is discussed further in Section 6.0. Information, including photos, names, and management concerns for each species can be found in Appendix L of the PEIS associated with this plan.

These 45 weed species were categorizing into Category A, B, or C with help from the San Francisco Peaks Weed Management Area Working Group (**Table 3-1**, Morse, et al. 2004). Category A noxious weeds are not currently present or have limited distribution on the Navajo Nation but may occur in neighboring areas. The management goal for Category A weeds is to prevent new infestations and eradicate existing ones. For Category A species, the BIA will emphasize eradication, prevention, education, awareness, identification, monitoring, and treatment. Category B noxious weeds are limited in range across the Navajo Nation and the management goal is to contain existing infestations and stop further spread. For Category B species, the BIA will emphasize immediate control, prevention of seed spread, and eradication. Category C noxious weeds are widespread and well established on the Navajo Nation, and the management goal is to locally contain infestations and monitor populations. Management of Category C species is determined at the local level and is based on the feasibility of control and level of infestation. For Category C species, the BIA will emphasize management, education, awareness, and identification/monitoring.

Under this plan:

- **Prevention** means minimizing introductions of a weed species in the project area and is usually combined with eradication to allow the elimination of small populations as they arise.
- **Eradication** means to eliminate a species from the project area.
- **Contain** means preventing seed production in a target patch and reducing the area covered by a species.

Long-term eradication means an attempt to eliminate a species from the project area over several years. The “contain” and “long-term eradication” strategies are combined as

different sized populations may be found in different areas. Some populations may be controlled in a manner to eventually achieve eradication within the project area.

- **Local contain** means local weed management teams will identify the species to contain in localized sites and implement monitoring.
- **Monitoring** means making observations to detect changes in a population using qualitative or quantitative techniques. Monitoring can help prioritize noxious weed removal activities by identifying increases in existing populations, presence of new infestations, and invasion from new noxious weed species.
 - Qualitative techniques involve monitoring methods that do not include measurements or statistics (i.e. photo monitoring and general ocular observations).
 - Quantitative techniques involve using a systematic empirical investigation of plant community characteristics via statistical, mathematical, or computational methods.

Table 3-1. Noxious weeds of concern and proposed management strategy goals.

CATEGORY A - HIGH		
COMMON NAME	SPECIES	MANAGEMENT GOAL
African rue	Peganum harmala	Prevent
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	Prevent
Leafy spurge	Euphorbia esula	Prevent
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	Prevent
Sulphur cinquefoil	Potentilla rect L.	Eradicate
Tall Whitetop	Cardaria draba	Eradicate
Tamarisk (other species)	Tamarix spp., including hybrids	Eradicate
Tree of Heaven	Ailantus altissima	Prevent
Uruguyan pampas grass	Cortaderia sellonana	Eradicate
Yellow nutsedge	Cyperus esculentus	Eradicate
Yellow starthistle	Centaurea solstitialis	Eradicate
CATEGORY B - MEDIUM		
COMMON NAME	SPECIES	MANAGEMENT GOAL
Camelthorn	Alhagi camelorum	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	SPECIES	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	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 kali, S. collina, S. paulsenii, S. tragus	Local Contain & Monitor
Smooth brome	Bromus inermis	Local Contain & Monitor
Spreading wallflower	Erysimum repandum	Local Contain & Monitor

4.0 Implementation Strategy

The BIA proposes completing up to 50,000 acres of weed treatments across the Navajo Nation annually. Noxious weed treatments will be prioritized for the priority areas described above including roads; riparian areas; Navajo Nation Designated Community Development Areas; utility rights-of-way; designated rangeland; designated farmlands; and Navajo Agricultural Products Industry (NAPI) lands. BIA has identified priority Demonstration Projects in these areas (see Section 12.0) based on completed weed mapping efforts and on-going projects, which will be initiated upon approval of this plan. To assist BIA in selecting and ranking new noxious weed projects, the following implementation prioritization strategy was developed. Since funding is limited, the number of projects and acres treated per year will likely vary.

The tasks outlined below provide the essential steps for implementing successful weed removal projects. For the long-term sustainability of weed removal efforts, a Weed-Free Policy should be developed and enforced by the Navajo Nation and BIA to prevent the further spread of noxious weeds. The Weed-Free Policy should require use of certified-weed free hay, seed, ballast, and road material on the Navajo Nation to prevent further spread and establishment of noxious weed species. A checklist is provided in Appendix C, which outlines all steps necessary for weed projects.

Task 1. Initiate demonstration projects near communities. These projects are shovel ready projects that will provide public outreach and educational opportunities, obtain public support for the broader goals of the Plan, and engage the local community in weed removal efforts. The demonstration projects provide information about the distribution of noxious weeds, effective removal methods, project costs, and effective monitoring and maintenance. Proposed demonstration projects are listed in Section 12.0 Demonstration Projects.

Task 2. Meet with local communities and nearby federal agencies. Engagement with the public should determine potential concerns or issues that may affect local communities, such as public health concerns, treatment preferences, or treatment conflicts. Meeting with local residents, community leaders, and agencies will determine the scope of the weed treatment project, identify concerns and challenges, and inform each project's goals and objectives. These concerns can include but are not limited to identifying culturally important plants and/or collection sites, health concerns, and access issues.

Task 3. Map and inventory noxious weeds. A regular workshop will be conducted with the BIA Weed Coordinators to establish a standardized approach to consolidate and coordinate mapping efforts. Mapping provides information on the species present, the size of the infestation, and location.

Task 4. Apply the site and species approaches. Actions are prioritized using the site and species approaches to select the best sites to initiate weed management (see Section 5.0). This applies to all new weed management projects.

Task 5. Develop a site-specific plan to implement weed removal efforts for projects. The plan will provide information on weed species present; a map of the treatment area; the removal efforts selected, including detailed information on equipment; native plant restoration; and proposed project costs. If the treatment is located within forestlands a silvicultural prescription may be required.

Task 6. Obtain required permits, clearances, and funding. Acquire permits and support from the tribe and BIA, develop landowner access agreements, obtain funding, and build capacity. Required permits and clearances may include but are not limited to: Forest product harvest permit or contract, burn permit, consent of the majority Indian interest of the beneficial Indian owner(s), Biological Resource Compliance Form from NNDFW, the Cultural Resource Compliance Form from Navajo Nation Historic Preservation Department (NNHPD), and a tribal resolution from the local Chapter House(s) and/or Grazing Committee(s) affected by the project. Finally, all projects should complete a project-specific EA based on the analysis provided in the Programmatic EIS prepared for this plan. See Appendix C for more details on these processes.

This plan can be incorporated into other Navajo nation land management projects or plans by citing either the BIA NEPA reference number or by an in-text citation (i.e., BIA 2022). By incorporating this plan, it is agreed that the subsequent plans or projects will abide by the methods, planning requirements, and mitigation measures outlined in this document.

5.0 Approach for Prioritizing Actions and Sites

To successfully work toward the Plan's goals, an organized approach is essential to prioritize weed removal actions and sites. While the Navajo Nation is a large land base, focused weed removal efforts in targeted areas will help prevent the spread of noxious weeds. A two-pronged approach was developed to prioritize noxious weed removal actions: Site Approach (**Table 5-1**) and Species Approach (**Figure 5-1**).

The Site and Species Approaches are tools used to first prioritize sites and then prioritize the species for removal within a given site. In some cases, all noxious weeds occurring at a site could be removed. This should be determined on a case-by-case basis.

There are five fundamental requirements that dictate the feasibility of a successful weed removal project at any given site. The characteristics listed below must be met for weed removal to proceed:

1. Funding is available to complete the project, including for monitoring and maintenance.
2. The land user/manager is interested and willing. The land user(s)/manager(s) should agree to the removal project and cooperate with weed removal activities, goals, monitoring, and long-term maintenance.

3. Permits are obtained. Noxious weed removal work cannot start without all required permits and environmental clearances. Any projects implemented under this plan will require compliance with the National Environmental Policy Act (NEPA), Section 106 of the National Historic Preservation Act (NHPA), and Section 7 of the Endangered Species Act (ESA) coverage. Additional permits and clearance may be necessary to comply with Navajo Nation regulations as managed by the Navajo Nation Environmental Protection Agency (NNEPA), Navajo Forestry Department, and the U.S. Army Corps of Engineers, as well as coordination with local communities, Navajo Nation Programs, and neighboring land management agencies. Permits and additional compliance are explained further in Section 7.0 Permitting.
4. There is capacity to conduct work at project sites. A trained work force and a logistic plan are necessary to implement a successful and timely noxious weed removal project.
5. The site is accessible. Site accessibility will affect the cost of the noxious weed removal efforts. Difficulty employing certain removal techniques, monitoring, and long-term maintenance should be considered based on the accessibility of the site.

5.1 Site Approach

The site prioritization criteria listed in **Table 5-1** is used to select sites where weed treatments will be most effective at preventing the spread of noxious weed infestations.

Table 5-1. Criteria for site prioritization.

Criteria	Criteria Objective
A. Sites upwind of prevailing wind direction or higher in elevation	Prevent seed or vegetative source from infesting sites downwind of the prevailing wind direction.
B. Sites upstream in the watershed	Prevent seed or vegetative source from infesting downstream sites.
C. Sites with high economic value	Removal efforts can be focused in areas of economic value (i.e. range and farmland) if noxious weed species compromise their functionality.
D. Sites with potential for high mobility (i.e. roads, rights-of-way)	Prevent the spread of noxious weeds along roads or other developed linear corridors that have high mobility potential.
E. Presence of Category A species	These species occupy minimal habitat and are feasible to remove. These species should be prevented from further spread.
F. Coordinated project efforts	Removal efforts can be focused in areas where adjacent land management agencies (e.g., Bureau of Land Management, Forest Service, Hopi Tribe, National Park Service, etc.) have similar noxious weed removal projects.

Criteria	Criteria Objective
G. Greater than 10% total canopy cover of noxious trees.	Maintain noxious trees cover below 10 percent.
H. Greater than 20% total canopy cover of herbaceous and grass invasive species	Maintain herbaceous and grass noxious weed cover below 20 percent.
I. Presence of isolated small populations of Class A or B species	Isolated populations of Class A or B weeds are feasible to remove to prevent further infestation. Priority Class A or B weeds should be identified using the Species Prioritization Flow Chart (Figure 5-1).
J. Potential for wildfire	Reduce wildfire risk for damage to property, human safety and wildlife habitat.
K. Herbaceous weed control where plants interfere with passive or active revegetation	Control noxious herbaceous species if they have the potential to serve as secondary weeds when woody noxious weed species have been removed.
L. Sites with high wildlife value	Removal efforts can be focused in areas with high wildlife value if noxious weeds are compromising their habitat.

5.2 Species Approach

The species prioritization approach is adapted from the U.S. Forest Service (USFS) Region 3 Invasive Weed Classification System and the Coconino National Forest (**Figure 5-1**). A species prioritization approach provides a plan for treating and managing different target weed species on a site based by species category, infestation size, risk, or potential of spread, and available resources.

5.2.1 Risk Assessment

An essential consideration when prioritizing species is to determine factors that may facilitate the spread of noxious weeds to other areas, such as the species' mechanism of establishment or colonization (seed, vegetatively, spread via flood events, wind, water, etc.), its location at a site, and site characteristics. Weeds classified as Category A (**Table 3-1**) are highly aggressive but may be a lower priority than a Category B species because the site factors are not conducive to spread, whereas the Category B species may have the appropriate site conditions to spread. For example, a patch of saltcedar (A) located on flat or isolated area off the river corridor may be less of a priority than camelthorn (B) located on the riverbank. While saltcedar is a highly aggressive species, the camelthorn may have a higher risk of spreading through flood events. Risk assessments should be conducted in the field by qualified professionals.

5.2.2 Pre-Field Review

The species prioritization process should begin with a review of existing weed data for each area of interest. Areas of interest include those that may serve as a noxious weed seed source to downstream or downwind areas, developed linear corridors (roads, fences, utility easements), areas with high quality range, agricultural lands, or riparian habitat (dominated by >90% native species), and areas with high fire risk. The following is a list of considerations when preparing existing data.

1. Review geographic information system (GIS) maps of all existing information for an area, weed data, hydrology, roads and travel corridors, vegetation type, and primary use of the land.
2. Check with local BIA weed coordinators, county/state weed specialist, and the Southwest Exotic Mapping Program at Northern Arizona University to determine if noxious weed species are present on or adjacent to the area. For noxious weeds along non-forest roads and highways, contact ADOT, NMDOT, and/or UDOT. For tribal forest roads contact the Navajo Forestry Department (NFD) and BIA Branch of Forestry. Develop a list of possible species present.
3. Compare the habitat requirements for noxious weeds to the project area to determine if potential habitat for noxious weeds exists.
4. Determine the accessibility of the site and complete a habitat evaluation if necessary.
5. Determine if plant gathering sites could be affected by treatments based on input from the community.

Figure 5-1. Flow Chart Species Prioritization

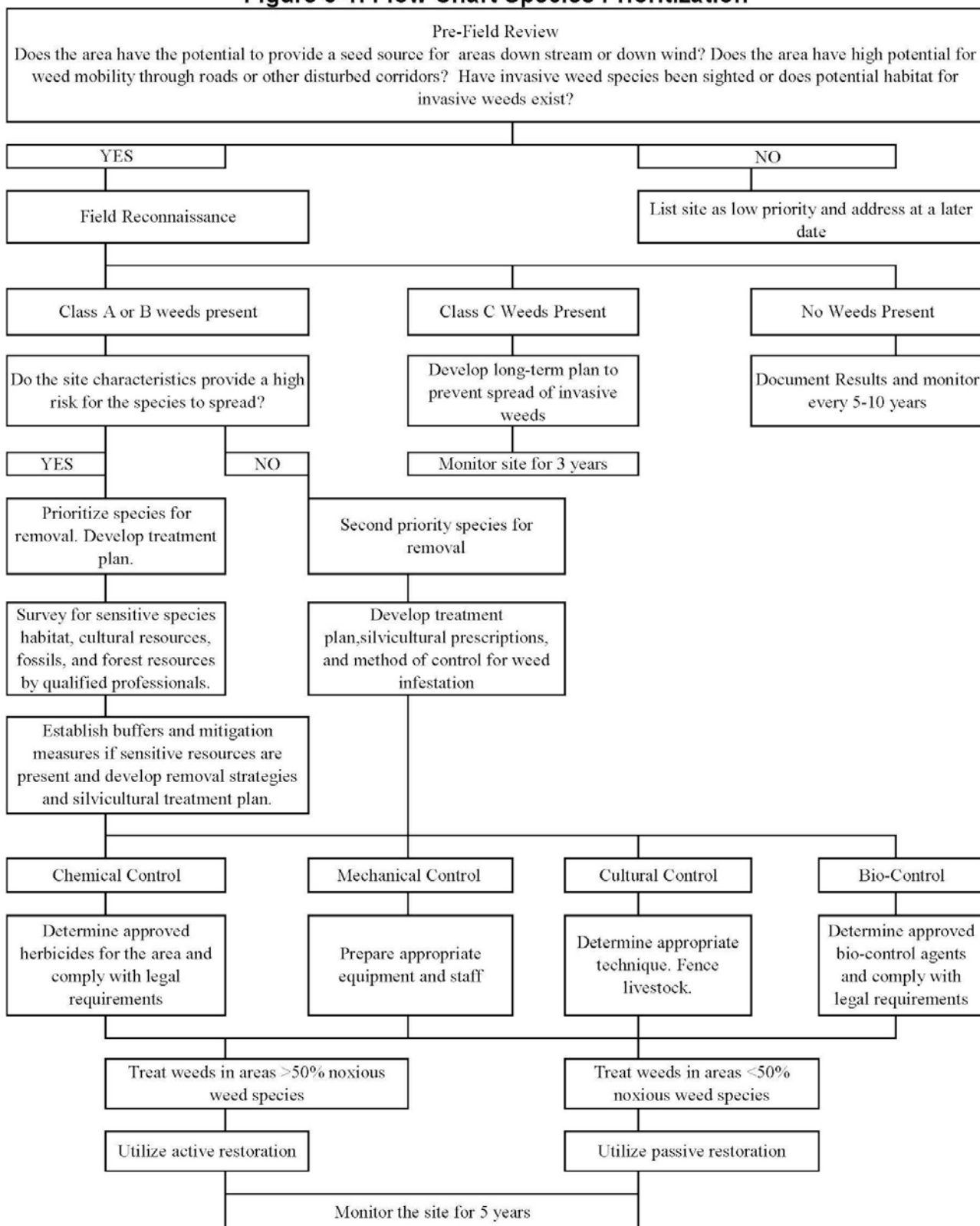


Figure 5-1. Flow chart for prioritizing noxious weeds identified at a project area.

6. Conduct a field reconnaissance to determine the presence of noxious weeds and their habitats in the area are indicated by the pre-field review (See 5.2.3 Field Reconnaissance).
7. Summarize results, including a list of the species considered and sources used to identify habitat in area.

5.2.3 Field Reconnaissance

Field reconnaissance should be conducted to determine the presence and distribution of noxious weed infestations and to evaluate spread risk if a weed inventory has not already been completed. If an inventory involves any of the listed invasive tree species (i.e. tamarisk, Russian olive, Siberian elm, or tree of heaven), a forest stand exam is required. Stand exams will provide an estimate on trees per acre of all trees species identified. They should also provide volume estimates for any native tree species that occur. Stand exams can evaluate the entire project area or provide an estimate based on at least 10% of the proposed project area. Consultation with BIA Forestry should be conducted to determine specific inventory requirements, especially if a silvicultural prescription is required.

A reliable sampling design should be used, such as a systematic search using transects or plots to cover as much of the area as possible. If the area is large, a sub-sample of the area using transects can be used. The surveyor should walk the distance of the transects and map all noxious weeds with a Global Positioning System (GPS) handheld unit. Infestation data should include the name of the species encountered, a unique population identifier, and the species spread risk. Surveys should be conducted during the growing season for proper plant identification. When conducting field reconnaissance, note changes in weather conditions that may affect noxious weed growth at the site. Some noxious weeds may not be obvious or may not occur at certain times of the year (i.e. delayed monsoon season, early spring emergence). Site characteristics should also be noted, such as landform type, existing hydrology, and land use history.

The results from the field reconnaissance can be used to develop a removal strategy (e.g. silvicultural prescription) and include control methods, re-planting of native species, and monitoring. These inventories provide baseline information on the species present and size and location of the infestation.

The field reconnaissance should guide the following weed management actions based on noxious weed class and the risk of spread:

Category A or B weeds are present:

1. Develop and implement treatment measures to eliminate weeds, based on the following:
 - a. Most effective removal techniques: chemical, mechanical, and biological control (Appendix E).
 - b. Approved herbicides for the area.

- c. Legal requirements for herbicides.
 - d. Active restoration in areas with >50% noxious weeds.
 - e. Obtain applicable permits and coverage based on federal, tribal, and state requirements (Appendix C).
 - f. Develop fire and safety plans.
8. Monitor management measures (qualitative and quantitative) for 5 years.

Category C weeds are present:

9. Develop and implement treatment measures to prevent spread or eliminate weeds.
10. Monitoring treatment area for 3 years.

No weeds are present

1. Document results.
2. Monitor every 5 – 10 years.

6.0 Weed Inventory and Mapping

Of the 17 million acres across the Navajo Nation, 3,600,015 acres (or 21% of the land area) have been inventoried for noxious weeds. Weed inventory and mapping can identify and monitor weed populations in project areas. Weeds in each project site should be mapped starting with field reconnaissance to assess the size and scale of existing infestations and to provide valuable information for developing weed control projects. After treatments, populations should be monitored annually to determine the effectiveness of weed control efforts.

Weed mapping should be conducted in priority weed areas at least every 5 - 10 years to inform project planning and to document changes to previously treated areas. Data should be no older than 5 years old when planning projects. The BIA Navajo Region plans to develop a website for the Navajo Region's Noxious Weed Program to inform the public on the location of current weed populations, planned projects, and post-project monitoring and updates. The GIS features on the site will also streamline the data collection process for future weed inventory projects and provide updates on the status of existing populations. The public can use the site for information on planned, current, and past projects, to see the extent of existing mapping efforts, or to report new weed populations as part of the BIA's early detection efforts.



Figure 6-1. A field infested with musk thistle on the Navajo Nation. Photo courtesy of R. Benally.

Weed mapping is an important tool for land managers to effectively manage weeds on the Navajo Nation. While it is impossible to map every single weed, mapping is a critical tool for identifying and monitoring problem populations. Regular weed mapping should be done in areas identified for treatment and management and should provide information on weed cover in project areas. Site-specific mapping, as described above in Field Reconnaissance, should be conducted at least every 5 to 10 years to identify new populations for treatment by weed coordinators, range managers, or members of the community. While field reconnaissance will provide initial information to develop treatment plans, weed mapping focuses on documenting the size, severity, and diversity of weeds in an area.

In addition to mapping, processing the collected data is necessary to provide agency and region-wide assessments of recurring and emerging weed issues on the Navajo Nation. There are a wide array of methods and tools used to map weeds, the following section explains the necessary information to document in a basic weed inventory protocol to assist in prioritizing weed control projects and assessing the effectiveness of control measures. A basic weed mapping protocol is provided in Appendix D.

6.1 Field Mapping

Weed mapping requires field surveys of new and established weed infestations. Field surveys should be conducted annually or semi-annually to determine the presence and distribution of weed infestations and to evaluate spread risk. A reliable sampling design should be developed, such as a systematic search using grid cells or transects to cover as much of the area as possible. If the area is large, define a sub-sample of the area to estimate the coverage and size of observed weed populations. The parameters for defining a sub-sample and its size should be documented. The surveyor should walk the area of the grid cell or the distance of the transect and map all noxious weeds observed. All documented infestations should record the geographic location of the spread, noxious weed species observed, and the size and the density of the population. Weed map data can use point, line, or polygon data depending on the techniques used and the size of infestations. However, it is preferred to document infestations as polygons to make it easier to estimate acres and to assist in project planning. However, if infestations are documented using point or line data, it is recommended that acreage and coverage estimates be included to estimate the overall size of the population.

When conducting field mapping, surveyors should be briefed on the following:

- The size of the property being surveyed including property boundaries or areas to avoid (i.e. private property).
- How to clean off equipment and clothing after a survey is done to avoid inadvertently spreading weeds to other mapping locations.
- How to identify and avoid sensitive plant species (i.e. federally and tribally listed species).
- How to identify priority weed species.

- The best routes for accessing mapping locations and where to park to avoid damage to sensitive areas.

6.1.1 GPS Units

Global Positioning System (GPS) units are commonly used to collect geographic data. GPS units provide real-time data collection and navigation, allowing users to systematically collect data as they survey a project area. GPS units can provide the most accurate geographic location data that can be used to create detailed maps and a variety of spatial analyses. Using GPS units requires training on how to set them up and use them accurately and efficiently. For surveying, it is important that users know how to set up the projection system, navigate to specific locations, and input relevant information and unique identifiers for individual data points or populations.

Some GPS units may save geographic data in different file formats, which may make it difficult to use with GIS mapping software or between different GPS units. The State of Minnesota Department of Natural Resources has developed open-source software called DNRGPS that converts several popular GPS file formats compatible with different GPS models and GIS software (Available online here: <http://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html>).

GPS units can be limited by satellite reception. While widespread use of GPS units has increased their accuracy, it may be hard to get accurate location data in some locations, such as slot canyons or under dense canopy cover, where features can interfere with the unit's reception. It may be necessary to note data points where accuracy is limited or questionable.

6.1.2 Smart Phone Mapping Apps

An array of GPS apps allows surveyors to use their personal phones as GPS devices. These apps use the phone's GPS technology to provide real-time location information and allow data collection. Smart phone apps may reduce the costs for survey equipment and can allow volunteer groups to assist with weed mapping. Apps such as Esri Field Maps, iNaturalist, LandPKS, Fulcrum, and MapIt allow users to collect field data and create custom reports for mapping projects. Esri applications allow easy integration with ArcGIS Online to update data in real-time, reducing the time needed to process and convert data. This method, however, depends on whether field surveyors have access to smart phones. In some instances, the GPS signal on the smart phone may not provide the level of accuracy needed to document individual weed populations and a signal booster or GPS antenna may be needed.

6.1.3 GIS Remote Mapping

GIS, or a Geographic Information System, is a powerful tool for creating geographic data for mapping and project planning. GIS software can compile and analyze data collected in the field. GIS software can identify potential populations through remote sensing or by documenting visible problem areas on aerial imagery. This method works well for noxious weed tree species, such as tamarisk or Russian olive, which can grow in dense stands and have distinctive foliage. For example, dense stands of tamarisk can be delineated when using high resolution aerial

imagery based on differences in infrared signals. Remote sensing is recommended where field mapping may not be feasible, such as in canyons or rivers, but may be expensive due to the costs for obtaining high resolution multi-spectral images needed for such analysis. While currently in development, remote sensing for smaller, less dense weed species such as thistles, grasses, or other herbaceous or annual weeds is limited due to their visual similarities to other native populations and the size of individual plants. However, new methods and imagery technology may provide some guidance on how to use remote sensing for large-scale weed mapping projects.

6.2 Data Collection

Whether in digital or paper form, the information below represents the basic required information collected during all weed mapping surveys and will allow the BIA to share weed data with other agencies and weed management groups. This list can be updated as weed mapping efforts develop and evolve. A sample data sheet is provided in Appendix D.

- Agency - As weed mapping is done, field surveys should identify the BIA Agency collecting the data and the weed coordinator managing the mapping effort.
- Date - Mapping surveys should document the month, day, and year the survey was conducted. This information can determine if certain weeds may have been missed due to the timing of the survey. For example, species that emerge in the fall may not be documented if surveys are conducted in the spring.
- Surveyor Information - Record the names and contact information of individuals conducting the survey. Follow-up may be needed to clarify recorded data or fill in missing information.
- Unique ID Code - Each infestation or area should have a unique identifier. It can be a unique combination of letters and numbers that correspond to specific geographic features, agency, date, or sequential numbers. However, they should be unique to each infestation to avoid confusion. The identifiers can be used to track projects over time.
- Information Source - Information source documents how the BIA became aware of the infestation. It can identify previous survey dates, weed coordinators, specific land users, other federal, state, or tribal agencies, community groups, or other BIA Navajo Regional agencies. During the first years implementing the Integrated Weed Management Plan, knowledge of who identified each weed infestation may be incomplete but collecting this information over time can identify community members who can assist with weed management.
- Location Data - All weed inventories should identify where infestations are located. Location information includes the geographic coordinates used to pinpoint the exact location of the infestation. Location data should be recorded for

each infestation during the survey. An infestation represents a distinct population of noxious weeds in a given area. While infestations of solitary plants may be collected, mapping efforts should focus on sites where infestations represent sizeable clusters of noxious weeds. Often this information is automatically collected with the data points.

All GIS data should comply with the Navajo Region's GIS Strategic Plan. They should also meet the FGDC metadata standards. Metadata should include descriptions of the data, an agency point of contact, and when data was collected.

If using GPS, **the geographic projection system on the unit should be set to either NAD1983 UTM Zone 12N (Arizona) or 13N (New Mexico)**, depending on where the survey is conducted. If this projection is not available on the device, coordinates can be recorded in Latitude and Longitude (Degrees, Minutes, Seconds, or Decimal Degrees), which can be converted into UTM coordinates later. To convert coordinates, the following website provides some limited coordinate conversion tools:

<https://www.earthpoint.us/Convert.aspx>

Other location data may include the USGS quad map identifier (if used), state, county, watershed HUC codes, and range, township, and section information. However, such data is not required for basic weed mapping inventories.

- Size of the Survey Area. While weed mapping may focus on a specific area, such as a Land Management District or Range Unit, it is important to document the actual size of the area surveyed, especially if surveys do not cover the entire area. Defining the size of the survey area will allow the BIA to estimate weed cover.
- Weed Species- Weed species should be identified using the U.S. Department of Agriculture (USDA) PLANTS database symbol (<http://plants.usda.gov>). Individuals conducting field surveys should be trained to identify priority weed species and local vegetation. This training should teach field surveyors to identify sensitive species to avoid collection or damage. If a species is not easily identifiable in the field, a sample may be collected for identification later. A collected plant specimen should include the entire plant, if possible, including flower, roots, stems, and leaves. Collected samples should note the date, location, the unique ID code for the population, and any other pertinent information about where the sample was taken. A data point should be recorded on the GPS unit to denote where the plant was collected.

USDA PLANTS database symbols for the target weed species are provided in Appendix D. The table and symbols should be updated annually so the proper codes are used in the field to identify problem weeds.

- Native Species (for forest land projects) – Projects requiring a silvicultural permit should include an inventory of native tree species at the project site. Consult with

a professional forester to determine the level of detail needed to develop weed treatments in forestlands. The distribution of a timber and woodland tree species will determine the appropriate silvicultural system needed to ecologically restore an area or accomplish specific project goals and objectives in line with the current forest management plan. Baseline data collected during a forest inventory include but is not limited to species, diameter at breast height/diameter at root collar, percent canopy cover, height, and basal area, and understory species occupancy.

- Size and Extent- The size of the infestations should be documented in either square feet (for small sites) or an estimated acreage (for large sites). Size estimates for each documented infestation are used to assess the severity and spread of identified weed species. Polygon data is the most accurate way to document the size of the infestation. If point data is collected, surveyors should record a rough estimate of the population's size (e.g. >0.1 acres, 5-10 ft², etc.). If line data is collected, surveyors should set a buffer distance for the width of the infestation.

Size and extent should record the size of the infestation for **each species identified** at a recorded site. The size estimate should be an estimate for each weed population found in an area, not an estimate of the size of individual plants. This information can determine which control method to use, how to set up post-treatment monitoring, and how to assess the overall cover of priority weed species on the Navajo Nation.

- Vegetation Cover- Vegetation cover is an estimated percentage of the ground covered by the specified species. Cover is a measure of how densely the plants grow in an area. Some weeds may grow in a large area, but they may be widely spaced, allowing other vegetation to grow in the same area. Other weeds, such as tamarisk, can grow in dense stands or patches, which crowd out other plant species. Cover is best estimated by looking at how much foliage or canopy crown covers the view of the ground. For more detailed information on how to estimate vegetation cover refer to Elzinga et al. 1998 (<https://digitalcommons.unl.edu/usblmpub/17/>; pp. 178-186).

- Other Information

Additional information to record:

- Nearby water sources or barriers that may limit the size of the infestation
- Locations of wells or wellheads at the site.
- Travel routes to project sites and roads within the site
- Other dominant vegetation
- If unique, sensitive, or protected plants were present
- Problems encountered while collecting the data
- Other sources that may document the infestation (e.g. maps, notes, etc.)
- Photos of infestations along with photo file information

6.2.1 Stand Exams

If the project treats a noxious tree species (i.e. Russian olive, tamarisk, tree of heaven, or Siberian elm), then a stand exam is required to estimate and evaluate stand dynamics of the site. This should include an inventory of all the tree species at the site, including native trees, and an estimate of trees per acre. The stand exam information is used to estimate volume for a harvest document through either the Navajo Nation Forestry Department (if on tribal land) or BIA Forestry (if on allotted land). Stand exams are done by establishing plots within the proposed treatment so that the size and number of plots equates to at least 10% of the total stand area. The stand exam will be used to develop silvicultural prescriptions if the removal project takes place on a Navajo Nation forestland (i.e. timberland or woodland). Stand exams should be updated for each permit to detail the number of trees removed with each phase of treatment.

For any stand exam, a survey plan should be developed before field data collection starts. Project sites should follow the Navajo Forestry Compartment Exam Handbook, especially for establishing the exam layout. See the Navajo Forestry Compartment Exam Handbook (2012) for more details on exam design and terms.

In the field, the following are parameters should be collected for stand exams.

- Plot number – Create a unique identifier for each plot.
- Plot size – Record the size of the plots to ensure proper sampling design.
- Location Information – Provide the tract number, Township, Section, and Range information, if available, or latitude and longitude for the center of each plot.
- Tree species – use scientific name or USDA PLANTS code.
- Native Tree Species – Seedlings, saplings, and trees with a DBH/DRC greater than 6” should be inventoried by species per the Navajo Forestry Department Compartment Exam Handbook (2012).

6.3 Data Processing

Once data is collected in the field, it will be compiled and analyzed using GIS software. The software can organize inventory data and use it to assess weed cover and treatment effectiveness. The BIA uses ArcGIS Online to display, collect, and manage weed mapping data for the Noxious Weed Program. The data is managed by each BIA Agency weed coordinator, including management and development of relevant metadata.

Spatial data in the form of vector data should be used to assess and summarize mapping efforts. All field surveys are compiled into a central geodatabase to provide a comprehensive view of all documented weed infestations. Spatial data should include attributes that describe when individual populations were first documents, when they were last updated, if they are part of a specific weed management project, and if they represent an expansion or reduction of weed coverage from previous years (if applicable).

Weed data should be assessed at the agency and regional level on an annual basis. Analyses should look at the size and extent of infestations for all priority species, the effectiveness of treatment methods to reduce the size and cover of target species, and locations where weed projects can make the best use of limited funds. Implementation of a basic weed mapping program will aid planning and long-term management of priority weed species on the Navajo Nation.

7.0 Permitting

The PEIS, Biological Assessment (BA), and Biological Opinion (BO) associated with this plan will provide federal coverage to implement weed management activities on the Navajo Nation. However, some permitting is needed on a project-by-project basis. Prior to implementing a project, the following agencies should be contacted to ensure project compliance and to obtain necessary permits and approvals. Additional information on how to apply or fulfill additional permitting and compliance requirements are outlined in the Weed Project Checklist (Appendix C). Contact information for the agencies is available in Appendix I.

Navajo Nation Department of Fish and Wildlife (NNDFW)

Project sponsors conducting weed projects under this plan shall complete and submit a Data Request Form for the project area to NNDFW Natural Heritage Program, including weed treatment methods proposed and maps of the project area. NNDFW will determine if habitat for Federal or Navajo Listed Endangered, Threatened, or Proposed species or migratory birds exists through the Biological Resource Compliance Form (BRCF). If habitat exists a qualified biologist will conduct species specific surveys during the appropriate season to determine if the species is present or have a qualified biologist on site during construction to identify species locations. To conduct species surveys on the Navajo Nation, a biological research permit must be acquired from the NNDFW. If species are detected on the site, the agency shall implement the species conservation measures outlined in the BA, BO, and PEIS (see Appendix F). Any positive results from the habitat evaluation and species surveys (i.e., occurrences of listed species) should be reported to the NNDFW. If any projects affect wetland or riparian habitats, NNDFW will require a review and approval of the project.

Navajo Nation Historic Preservation Department (NNHPD)

Cultural surveys for individual weed projects will be conducted using the standard Section 106 process established between BIA and NNHPD (see Appendix G). The project sponsor, primarily BIA, will be responsible for obtaining all necessary cultural resource clearances for individual projects. Cultural surveys should be conducted by a qualified cultural resource specialist with an NNHPD approved permit. Prior to conducting surveys, the consultant shall obtain a Class B project-specific permit from NNHPD at least 10 days prior to the start of field work. Surveys will include records searches, ethnographic interviews, and field surveys for cultural resources,

including traditional cultural properties (TCPs), for all projects. After a survey is complete the consultant must complete an Archeological Inventory Report based on the NNHPD standards (Appendix G). NNHPD will recommend specific cultural resource mitigations to the BIA NRO Regional Director through a Cultural Resource Compliance Form (CRCF) and as part of the NEPA decision document to avoid adverse effects to historic properties or TCPs. Upon approval by the BIA NRO Regional Director, the project sponsor will distribute the CRCF to all project partners for their records, excluding the cultural resource consultant and the SHPO, who will receive their approved CRCF forms from NNHPD.

Navajo Nation Environmental Protection Agency (NNEPA)

Projects must comply with the Navajo Nation Clean Water Act, Navajo Nation Safe Drinking Water Act, Navajo Clean Air Act, Navajo Environmental Policy Act, and the Navajo Nation Pesticide Act. The following reports may be required to comply with the Navajo Nation EPA:

- Any project using herbicide must submit a Pesticide Use Permit (PUP) for the Navajo Nation EPA Pesticide Program. A weed treatment flyer should be posted to the nearby Chapter House and to the project site to notify the public about the project.
- Due to the size of the Navajo Nation, projects using herbicides near open water must submit an electronic Notice of Intent (eNOI) to the U.S. Environmental Protection Agency (U.S. EPA). Each BIA Navajo Agency will serve as the Decision-Maker and Operator for the eNOI on the U.S. EPA's Region 9 Pesticide General Permit (PGP). The eNOI will provide the U.S. EPA with the project details (herbicides proposed, size of area, weeds managed, potential endangered species and watershed impacted, etc.). Copies of the Notice of Intent must be sent to the NNEPA Surface & Ground Water Protection Department and the NNEPA Pesticide Enforcement and Development Program. Information on the Pesticide General Permit requirements and eNOI submission requirements can be found in Appendix C.
 - Any projects using restricted use pesticides must have certified pesticide applicators who are certified through NNEPA. Project records must record where, when, amount applied, and for whom herbicide was applied. These records will be subject to review by NNEPA to ensure compliance with the Navajo Nation Pesticide Act.
 - Any projects that implement prescribed burns must be planned in coordination with NNEPA and BIA Branch of Fire Management to address air quality concerns when developing the project Burn Plan. An air quality report may be necessary to document the effects of burning on regional air quality for specific communities on the Navajo Nation.
 - Any actions that require a federal permit, license or approval to discharge into federal waters will require a Section 401 permit from the NNEPA Water Quality

Program (not including herbicides which are covered under the PGP). These include projects that excavate or place materials in some waterways and wetlands (i.e. weed removal in a stream or wetland); consultation with the U.S. Army Corps will help determine which wetlands and waterways are subject to this requirement. If necessary, an application for the Section 401 permit should be done at the same time as the Section 404 permit (see below) since these permits are done in conjunction with each other for all projects in riparian or wetland areas.

- If any projects are proposed in wetland or riparian areas, a wetland delineation is required. NNEPA must review and approve all projects that may impact federal or tribal waters along with the NNDFW.
- Projects must survey for wellheads and coordinate activities with NNEPA Public Water Systems Supervision Program (PWSSP) to incorporate wellhead protection measures.

United States Army Corps of Engineers (Corps)

The Corps regulates activities on federal waters and is charged with protecting harbors and navigation channels from destruction and encroachment, and with restoring and maintaining environmental quality. Pursuant to Section 404 of the Clean Water Act, projects along riparian and wetland areas that impact jurisdictional waters require Corps permits. The Corps has an obligation to ensure that permitted projects comply with NEPA, ESA, and NHPA. Weed projects that require mechanized removal of vegetation along riparian corridors or wetlands will require a Section 404 permit. The application for the permit should be submitted to the representative State Corps office (i.e., Arizona, New Mexico, or Utah).

Navajo Nation Forestry Department

The Navajo Nation Forestry Department should issue a forest harvest permit (Appendix K) for any projects that remove noxious trees. Forest permits require a stand exam (Section 6.2.1 Stand Exams) to evaluate current stand composition and an estimate on the number of trees removed. A stand exam will be used to estimate how much volume will be removed during the project. If the project takes place in a Navajo Nation forestland (e.g., riparian woodland, ponderosa pine timberland, etc.), a silvicultural prescription prepared and/or reviewed by a certified silviculturist is required. The prescription should outline the following information:

- Project Location and Property Identification (same as BIA Form 5-5331)
- Name of certified silviculturist
- Date of Preparation
- Stand exam methods
- Woodland type or stand designation number

- Silvicultural system applied
- Cutting method or treatment
- Stand description and forest history
- Management constraints from each project's BRCF, CRCF, and EA.
- Landowner goals and objectives
- Map of the project area
- Detailed description of the prescribed treatment (as outlined in the treatment plan)
- Monitoring needs
- Signature of the certifying silviculturist

This applies to all woodland management areas, which include riparian habitats and commercial forests as described in 53 IAM Handbooks (i.e. where native species are present). Additional planning may be needed to ensure that forest management BMPs and permit special provisions for weed removal projects are followed and existing 638 contracts are enforced. BIA Branch of Forestry can help develop the treatment plans to ensure they include the prescription and permit requirements.

BIA Branch of Forestry

Projects planned and proposed on allotted lands that remove noxious trees should be developed in consultation with the BIA Navajo Region Branch of Forestry. Noxious tree treatments within allotment lands require consent of the majority Indian interest of the beneficial Indian owner(s), documented by their signature(s) on a Power of Attorney for the Sale of Allotment Timber, contract or permit. Stand exams should also be completed to document the estimated number of trees being removed. If the projects take place in timberlands and woodlands, a silvicultural prescription is required with the same elements as above (a certified silviculturist is not required, however). Refer to 25 CFR Part 163, IAM Part 53 Chapter 3 – Harvest of Forest Products, IAM Part 53 Chapter 9 – Silviculture, and other IAM's and handbooks for forestland management activities on Indian lands for additional guidance.

BIA Branch of Fire Management

Projects that used prescribed or pile burning to remove invasive weeds should be developed in consultation with the BIA Navajo Region Branch of Fire Management. The Branch of Fire Management will assist in developing the required burn plans, including required fire modeling and smoke management mitigations. The Branch can ensure that all fires and burn plans align with the BIA's Wildlife Prevention Plan for the Navajo Region. They can also assist with public notifications and additional coordination with Navajo Nation Programs, local fire departments, tribal forestry programs, and other local fire management programs.

8.0 Mitigation Measures

The following measures are required when implementing weed management projects. These measures should be printed and checked off when implementing projects.

8.1 General Measures

Project Planning

- Complete all necessary permits and authorizations prior to implementing a project (see Section 7.0 and Appendix C).
- If treatments are planned for allotment lands, the project sponsor must obtain consent from the Indian owner(s) as the law requires.
- Noxious tree treatments require consent of the majority Indian interest of the beneficial Indian owner(s), documented by their signature(s) on a Power of Attorney for the Sale of Allotment Timber, contract, or permit.
- Surveys and clearance for paleontological resources are required before any surface disturbing activities, mechanical treatments, or chemical treatments in coordination with the Navajo Nation Minerals Department.
- Conduct surveys for cultural resources by a qualified cultural resource specialist before treatments in coordination with the Navajo Nation Historic Preservation Department (NNHPD).
- 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 NNHPD 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 NNHPD to ensure compliance with Section 106 and NHPA.
- Complete and submit a Data Request Form for the project area to NNDFW (<https://www.nndfw.org/nnhp/drs2012.pdf>) and obtain a Biological Resource Compliance Form (BRCF).
- If potential habitat for endangered or threatened species is present, conduct a habitat assessment by a qualified biologist. If potential habitat is found, protection measures, including species buffers will be applied to the habitat or additional surveys for species presence will be conducted by a qualified biologist. If the species is present at the site,

species protection measures will be employed, NNDFW will be notified, and a biological monitor will be present during all phases of project implementation (Appendix F).

- 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 noxious trees requires a forest product harvesting permit or contract and may require a silvicultural prescription to authorize a treatment in forestlands, 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 Personal Protection Equipment (PPE), equipment handling, and safety protocols. Personnel will be required to use PPEs during herbicide and mechanical (chainsaw, control burn, etc.) applications.

Prior to Project Implementation

- Designate staging areas and/or equipment wash stations for cleaning and prep work before and after treatments. These sites will be used to mix herbicides, refuel equipment and vehicles, and store materials for the duration of the treatment. Equipment wash stations may be temporary and will have a filter system, for example at least 6 inches of large cinder or gravel spread over an area 10 feet x 30 feet. Filter cloth may be used for temporary stations. The area will be a perched drainage to allow excess moisture to drain after being filtered and will be located at least 300 feet away from surface water, natural drainages or wellheads.
- 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 permit should be posted locally before projects start.
- To reduce the risk of weed spread, access routes will avoid heavy infestation areas. Access routes will be closed when the project is completed.
- Clearly mark boundaries of treatment sites (such as posting visible flags or signs) before and during treatments.
- Sites will be inspected, and potential hazards removed, to ensure safety prior to treatments.

During Project Implementation

- Vehicles will use only established roads for accessing project sites. Vehicles will be parked at designated parking spots near established roadways during treatments.

- If camping, project personnel will use designated and established campsites with approval from NNHPD or a qualified archeologist.
- 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.
- 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.
- If potential habitat for an endangered or threatened species is present, a qualified biological monitor will be on site during all phases of project implementation.
- Vehicles and equipment should be turned off if periods between use are longer than 15 minutes.

Post Project Implementation

- Post-treatment monitoring will evaluate treatment effectiveness, potential re-infestations or new introductions, and impacts to resources (Section 11.0)
- Limit the number of people and trips to sensitive areas for follow-up treatments and/or monitoring.

8.2 Chemical Treatments

Project Planning

- 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.
- If wellheads or source water areas are identified within the project area, notify NNEPA Public Water System Safety Program to determine protection zones for herbicide applications and alternative treatment methods to be used in the protection area.
- For aerial herbicide treatments, native vegetation communities in or near treatment sites should be documented with GPS, especially cottonwood-willow woodlands and native sagebrush communities.

Prior to Project Implementation

- 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.

During Project Implementation

- All herbicides will 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.
- When herbicides are used, an emergency spill kit must be available 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. Wells and wellheads will also require a 100-foot buffer based on the NNEPA PWSSP's Source Water-Wellhead Protection Guidance.
- *Near riparian areas*, only aquatic formulations of 2,4-D, glyphosate, triclopyr, and imazapyr will be used within 25 ft of the daily high-water mark. They must be applied using spot treatment methods in this zone.
- 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.
- Aerial herbicide treatments should use GPS monitoring to track their position, provide a record of where herbicide was applied, and ensure all applicable avoidance buffers are enforced.

- 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.
- Only aquatic approved herbicides will be used for aerial applications by either fixed wing or rotary aircraft applications.
- Water for mixing herbicide and cleaning herbicide equipment will be potable water obtained off-site or through a Water Use Permit. For remote sites, there is a possibility of a Water Use Permit with the local water code. 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.

Post Project Implementation

- 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.

8.3 Mechanical

Prior to Project Implementation

- 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 burning is used as a control method.
- Prescribed burning will not be conducted during migratory bird breeding season.

During Project Implementation

- 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.

8.4 Cultural

During Project Implementation

- Projects using targeted grazing treatments will develop a grazing treatment plan for review by NNHP.
- 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 will 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.

Post Project Implementation

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

9.0 Weed Management Techniques

An integrated weed management approach uses a combination of treatment methods to control aggressive and adaptable weed species. No single control method or any 1-year treatment program will achieve effective control of any weed-infested area. The fast growth, extensive root system and high reproductive capacity of weeds requires long-term cooperative and integrated management programs and planning to contain and reduce weed populations on the Navajo Nation. Weed removal efforts should coordinate resources with adjacent agencies (e.g., NTUA, ADOT, BLM) who conduct weed treatments to maximize cost effectiveness of weed treatments.

Additionally, use of multiple, appropriately timed methods will increase the effectiveness of weed management projects while reducing the risk of harmful impacts. Mechanical and/or manual treatments followed by a chemical treatment is more effective than implementing each treatment by itself. Chemical treatments followed by seeding or planting native understory species, such as grasses, will help restore native plant diversity. Prior to noxious weed seed set, hand pulling is effective for small infestations followed with a mechanical or chemical treatment to ensure no target weeds germinate that year. Appropriate timing of weed control techniques is the most important factor to improve effectiveness. Most annual and biennial plants should be treated early in the season before the plants bolt and flowering occurs. In contrast, many perennials are effectively treated with systemic herbicides in the fall when plants actively transport nutrients to their root system. The methods described below are recommendations for treating noxious weeds based on techniques used in areas outside the Navajo Nation. Appendix E outlines the best option for control for each priority weed species.

Biological control agents will not eliminate an infestation; however, they will enhance control and reduce the rate of expansion of large existing infestations. Biological control is most effective on large populations where other control methods are limited due to the size and scale of the infestation. The use of herbicides in combination with biological control is successful on large populations of several weed species. A more detailed discussion of the proposed weed treatments for the Navajo Nation is discussed below. Comprehensive weed management methods for each target weed species can be found in USDA Forest Service Southwest Region Weed Field Guides (<https://www.fs.usda.gov/detail/r3/forest-grasslandhealth/invasivespecies/?cid=stelprd3813522>) and in the University of California, Davis Cooperative Extension and Agricultural Experiment Station (https://wric.ucdavis.edu/information/info_spec_weed.htm)

Treatment method selection should consider several factors. Local community engagement should identify public health concerns, economic impacts, cultural resources (such as plant collection areas), and community-based goals for removing the infestations. Impacts to natural resources such as sensitive plant and animal populations, soil erosion, and water quality, should also be evaluated. Projects should determine, based on the size, density, and the specific weed species, a reasonable level of treatment needed to reduce the population while minimizing impacts. For example, widespread but patchy clusters of yellow starthistle may be controlled with less intense treatments such as biological control or targeted grazing while dense isolated populations of Canada thistle may require more intensive mechanical removal followed by chemical treatments. Treatments should also prioritize the least harmful methods by selecting non-herbicide techniques where feasible and using the least toxic herbicide available for treating the targeted weed species (Appendix E) paired with other control methods to reduce the amount of herbicide needed to effectively reduce and minimize regrowth. These considerations ensure that projects address a wide array of concerns while maintaining treatment effectiveness through a multi-faceted and integrated management approach.

9.1 Prevention

Prevention is the most effective and least expensive method of control. Establishing a “weed-free” policy to include, but not limited to hay, grain, seed, and ballast, is crucial to reduce weed expansion and to prevent new weed introductions. A “weed-free” policy will require action by the Navajo Nation Tribal Council. Maintenance of a vigorous, competitive native plant community will also reduce noxious weed establishment.

Cleaning tires, boots, hooves, and equipment when leaving infested areas will prevent weed introductions and limit the spread of existing infestations. Extensive disturbance gives noxious weeds an advantage over native plants as most weeds are well adapted to disturbed areas. Revegetating large, disturbed sites with vigorous, hardy, native grass and perennial plants will prevent establishment of new noxious weed populations.

9.2 Early Detection/Rapid Response

The key to preventing new noxious weed introductions involves early detection and rapid response. The longer a species goes undetected during the early, non-invasive stage, the less opportunity there is to intervene. Once weeds are established, control or eradication methods become more expensive and limited in their effectiveness. Education programs on how to recognize noxious weeds may help community members detect infestations when they are still small. Community members can also use the BIA’s planned weed program website to report new populations and assist with early detection efforts. Repeated surveys can detect new weed infestations in high priority areas, such as wildlife habitat, areas for collecting traditional plants, or riparian areas. After detecting a new noxious weed on the Navajo Nation, a treatment plan should be developed based on the growth characteristics of each species, size of the infestation, and the personnel and equipment capacity of the BIA. Early detection and rapid response is most successful when new infestations are less than 1 acre in size. Early detection and rapid response to new noxious weed infestations is a high priority.

Since roads and rights-of-way corridors are primary vectors for introducing and spreading weeds, early detection and rapid response in these areas is important. Surveys along roads and rights-of-way and adjacent land can identify new weed populations with the potential to spread. Once these populations are identified, early treatment to maintain linear corridors will prevent or reduce the potential for large scale infestations on adjacent lands.

Early detection and rapid response techniques will follow those established by the U.S. Forest Service in 2005 and the Arizona Invasive Species Advisory Council in the Arizona Invasive Species Management Plan in 2008. Scattered plants and spot infestations around the perimeter of the infestation should be treated first to contain the spread of the infestation. To limit seed dispersal, treatment of infestations along roads should be done at the same time as treatment around the infestation perimeter. Treatments should then move inward toward the core of the infestation. Treatments should be repeated until the seed bank is depleted. Treatments along

linear corridors (roads and rights-of way) will be treated in a linear fashion in right-of-way easements. Linear corridors serve as both the core and/or the perimeter of the infestation and weed removal activities on adjacent infested areas should be done at the same time.

9.3 Manual Control



Photo courtesy of Fred Phillips Consulting.

Manual control techniques include the use of hand tools to cut, clear, or prune herbaceous or woody species. A maximum of 30 people (typically between 7-20 people) will conduct manual treatments. Manual treatments involve cutting undesirable plants above ground level; pulling, grubbing, or digging out root systems to prevent sprouting and regrowth; and

removing competing plants around desired species. Manual control is conducted with hand tools, including handsaws, loppers, axes, shovels, rakes, machetes, grubbing hoes, mattocks (combination of cutting edge and grubbing hoe), Pulaskis (combination of axe and grubbing hoe), brush hooks, weed whackers, and hand clippers. Manual treatments, such as hand pulling and hoeing, are most effective where weeds are limited and soils allow for complete removal of the plant material, including the root system (Rees et al. 1996).

Annual and biennial plants with shallow root systems that do not re-sprout and plants growing in sandy or gravelly soils will be hand pulled. Vegetation removed manually will be bagged and sent to a certified incinerator to prevent reinfestation from seeds or other plant materials. Repeated treatments will be necessary as seeds remain in the ground for multiple years. Manual techniques are most effective for small areas (<1 acre), areas where burning or herbicide treatments are not appropriate, areas that may be inaccessible to ground vehicles, and in areas where species of concern exist. For the most effective control, manual techniques will be used in combination with chemical techniques.

9.4 Mechanical Control

Mechanical control involves the use of power tools and heavy machinery to remove noxious weeds. The techniques described are adapted from the Bureau of Land Management (BLM)'s Vegetation Treatments for 17 Western States (BLM 2007). These techniques are utilized when clearing large areas where weeds are widespread and provide dense coverage, often limiting the growth of native vegetation to very confined areas (**Figure 9-1**). Mechanical equipment should be cleaned before treatments and before leaving the treatment area in designated facilities or equipment wash stations (see 8.0 Mitigation Measures for specifications).



Figure 9-1. Examples of mechanical treatments. *Left.* Tractors grubbing root systems for large tamarisk stands. *Right.* A site cleared of invasive tamarisk using mechanical treatments. Photos courtesy of Fred Phillips Consulting, LLC.

- **Grubbing** - Grubbing removes a plant by digging out its root system. If a species has a shallow root system, a shovel or mower is used to remove the plant. Noxious weeds with deep root systems require the use of a crawler-type tractor and a brush or root rake attachment. Brush is uprooted and roots are combed from the soil by placing the base of the blade below the soil surface. Grubbing disturbs perennial grasses, so grubbed areas will be reseeded to prevent extensive runoff and erosion, if possible. This removal technique requires a maximum of 5 people to drive the heavy machinery and prepare the site. Grubbing will not be used in areas with active prairie dog colonies or in habitats with other burrowing animals.
- **Tillage** - Tilling involves the use of angled disks (disk tilling) or pointed metal-toothed implements (chisel plowing) to uproot, chop, and mulch vegetation. Tilling is done with either a brushland plow, a single axle with an arrangement of angle disks that covers about 10-foot swaths, or an offset disk plow, which consists of multiple rows of disk sets at different angles to each other. These plows are pulled by a crawler-type tractor or a large rubber tire tractor. This technique is best used where complete removal of vegetation or thinning is desired and is followed with seeding. Tilling leaves mulched vegetation near the soil surface, which encourages the growth of newly planted native seeds. This method is also used for removal of sagebrush and similar shrubs and works best on areas with smooth terrain, and deep, rock-free soils. Chisel plowing is used to break up compact soils. This removal technique requires a maximum of 5 people to drive the heavy machinery and prepare the site. Tillage will not be used in areas with active prairie dog colonies or in habitats with other burrowing animals.
- **Mowing** - Mowing tools, such as rotary mowers or straight-edged cutter bar mowers are used to cut herbaceous and woody vegetation, and is most effective on annual and biennial plants, above the ground surface. Power tools such as chainsaws and power

brush saws are used for thick-stemmed plants. Mowing is done along highway ROWs to reduce fire hazards, improve visibility, prevent snow buildup, and/or improve the appearance of an area. Weeds are rarely killed by mowing, and an area often needs to be mowed repeatedly for treatments to be effective (Colorado Natural Area Programs 2000). The use of a “wet blade,” in which an herbicide flows along the mower blade and is applied directly to the cut surface of the plant, has greatly improved the control of some species. Chipping equipment is used to cut and chip vegetation. This removal technique requires a maximum of 2 - 5 people to operate the chainsaws, power brush saws or Bobcat and to prepare the site. Heavy machinery (Bobcats) with a mowing attachment may require off-road use and have medium ground disturbance (**Figure 9-2**).



Figure 9-2. A Bobcat with a brush hog mower attachment removing noxious weeds. Photo courtesy of Fred Phillips Consulting, LLC.

- **Prescribed Fire** - The use of controlled burns, or prescribed fire, to treat noxious weeds is the intentional application of fire under specified conditions. Controlled burns can provide many benefits to an area by controlling vegetation, enhancing growth, reproduction, and vigor of desired vegetation, reducing fuel loads, and maintaining some vegetation communities. Pile burning is an effective method to reduce fuel loads after mechanical treatments. A Burn Plan must be developed for each project prior to implementing this technique. The Burn Plan may include but will not be limited to 1) project objectives; 2) prescription; 3) scheduling; 4) pre-burn considerations and weather; 5) site assessment and topography considerations; 6) organization and equipment; 7) communication; 8) public and personnel safety and medical information 9) smoke management plan; 10) ignition and holding plans; 11) contingency plan; 12) mop up plan, and 13) restoration plan. Prescribed fire will be followed by habitat restoration.

Prescribed fires will be used in areas where there is no threat to human life or property to maintain ecosystems that are functioning within a normal fire regime. Prescribed fires are evaluated for potential risks and implemented with adequate fire management personnel and equipment. Prescribed fires will follow the guidelines outlined in the BIA NRO Programmatic Pile Burn Agreement with the Navajo Nation and all permits and authorizations will be obtained prior to implementing this technique. Prescribed fires minimize soil disturbance and will not be conducted during the migratory bird breeding season.



Photo courtesy of Fred Phillips Consult LLC

- **Heavy Machinery-** Heavy machinery includes large chipping equipment or masticators, roller chopping tools, feller-bunchers, bulldozers, and extracting equipment and requires special training for operation. Bulldozers or extracting equipment is used to uproot dense woody vegetation or tree species. Large chippers, or “tub-grinders” and masticators, are used to chip the limbs, bark, and trunks of trees to generate mulch or biomass. Feller-bunchers are used to cut trees at the base, pick them up, and move them into a pile or onto the bed of a truck (Bonneville Power Administration [BPA] 2000). Rolling chopping tools are heavy bladed drums that cut and crush vegetation up to 5 inches in diameter with a rolling action. The drums are pulled by crawler-type tractors, farm tractors, or a special type of self-propelled vehicle designed for forest or range improvement projects. Blading uses a crawler-type tractor with a blade shear attachment to cut small brush at ground level and scrape topsoil with the brush to pile into windrows. Blading is only employed in areas where the degradation of the soil is acceptable, such as along ROWs or in borrow ditches. Heavy machinery highly disturbs soils. This technique requires a maximum of 5 people to operate the heavy machinery and prepare the site.

9.5 Cultural Control

Cultural treatments include targeted grazing, replanting native species (see Chapter 10), cultivation and crop rotation, using weed-free hay, and mulching around desired vegetation to limit competition with undesired plants. Targeted grazing uses specific livestock species at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals (Daines 2006). Targeted grazing can be used around Community Development Areas, in agricultural fields, in riparian habitats, and in Highly Sensitive and Moderately Sensitive RCP Areas. However, it may not be used where sensitive species do occur because of the high degree of ground disturbance. All targeted grazing treatments conducted outside of Community Development Areas require a grazing treatment plan that must be reviewed by the Navajo Nation

Heritage Program (NNHP). Targeted grazing alone will not eradicate a weed population and must be used in combination with other methods as a long-term land management strategy (Daines 2006). Targeted grazing should aim to reduce growth and vigor of established weed populations, increasing the effectiveness of more direct removal and control methods. To successfully implement target grazing at a local level, public outreach and education, workshops, and training on identification, reporting, and monitoring weeds is necessary.

The key to success with targeted grazing is selecting the most appropriate animal to browse or graze the target weed species (**Table 9-1**, Daines 2006). Additionally, weeds must be consumed at the most appropriate life stage to be palatable to livestock and livestock should be specifically trained to consume weed species. Livestock will avoid plants that are novel, low in nutrients, or high in toxins (Daines 2006). Timing and intensity of targeted grazing should be designed to maximize damage to the target weed while minimizing impacts to native vegetation. Targeted grazing requires containing livestock in an isolated area with fencing for up to 24 hours after grazing treatments to isolate and collect defecated seed. Feces will be collected, bagged, and destroyed by incineration. A robust monitoring program is also required to understand the effectiveness of the targeted grazing treatment and should include the following metrics: livestock type, performance, and/or weight gain, consumption of vegetation (utilization and residue), and changes in vegetation structure (biomass, canopy cover or basal area, and plant density) (see 1.1.1. Treatment Effectiveness Monitoring). Targeted grazing has limited effects on field brome, common Mediterranean grass, camelthorn, several annual brome grasses, and jointed goatgrass and is not recommended to control these species. The Society for Range Management maintains a website with research, management recommendations, and training on updated information (<https://targetedgrazing.org/>).

Table 9-1. Targeted grazing by weed species, livestock class, grazing objective, plant growth stage, and potential effectiveness (Daines 2006). Only the weed species listed in the table were reduced by targeted grazing treatments. Weeds not listed are not recommended for target grazing.

Target Weed	Livestock Class	Grazing Objective	Growth Stage for Treatment	Potential Effectiveness
Bull Thistle (<i>Cirsium vulgare</i>)	Sheep, Goats, and Cattle	Prevent seed production, reduce plant size and vigor	Graze heavily during rosette to bolting stage. Repeat grazing at approximately 2-week intervals. May need to graze once a season if in early flowering stage. 3 consecutive years needed.	Cattle will not graze beyond late bud stage. Grazing works best when combined with a fall herbicide treatment. Grazing reduced plant size, density, and reproductive efficiency.
Canada Thistle (<i>Cirsium arvense</i>)	Sheep, Goats, and Cattle	Begin grazing when rosettes are green and begin to sprout. Remove animals when grazing shifts to desirable species and re-graze new sprouts	Graze during seedling to late vegetative stage with regular removal of top growth throughout the season. Graze to prevent flowering. Repeat at least 3 years.	Goats will graze all stages. Sheep and cattle prefer when young before spines develop. Most effective with repeated treatments for multiple seasons to prevent seed production and prevent root reserves. Best results when combined with herbicide treatments.

Target Weed	Livestock Class	Grazing Objective	Growth Stage for Treatment	Potential Effectiveness
Cheatgrass (<i>Bromus tectorum</i>)	Sheep, Goats, and Cattle	Intense flash grazing to remove biomass, decrease plant density, and suppress flowering.	Graze when green, as early as possible, without harming desirable perennial plants. Repeat to prevent seed production. Minimum of 2 treatments per year for 2 or more years to suppress populations.	Heavy repeated grazing for 2 or more years will reduce plant density, size and seed production. Grazing must be closely monitored to avoid damage to desirable perennial plant species. Can be used in conjunction with mechanical, herbicides, and controlled burn.
Diffuse knapweed (<i>Centaurea diffusa</i>)	Sheep, Goats, Cattle	Graze heavily at least twice each year for three or more years.	Sheep - rosette or bolted stage. Goats - all growth stages Cattle - before bolting stage	Reduce plant vigor, size, and flower production. Remove livestock for about 2 weeks and re-graze to prevent seed head formation. Grazing most effective when combined with herbicide treatments.
Leafy Spurge (<i>Euphorbia esula</i>)	Sheep and Goats	Remove 95% of top growth; graze regrowth after 1 st treatment; prevent flowering and seed production	Graze in vegetative to flowering stage. Sheep - prefer young plants Goats - eat all growth stages	Effective at reducing biomass on an annual basis when grazed moderate to heavy from vegetative to flowering growth stages. Grazing effectiveness can be low 1 st year. Suppression of high-density infestations will occur after 4 or more consecutive years of grazing. Used in combination with herbicides and biological control may be an effective strategy for long-term management.
Musk Thistle (<i>Carduus nutans</i>)	Sheep, Goats, Cattle	Prevent seed production, reduce plant size and vigor.	Graze heavily during the rosette to bolting stage. Repeat grazing at two-week intervals to prevent flowering and seed production. May need to graze once a season if in early flowering stage and site conditions limit regrowth. Graze at least 3 consecutive years.	Grazing reduces plant size, density, and reproductive efficiency. Cattle will not graze beyond early bud stage. Works best when combined with fall herbicide treatment.
Perennial Pepperweed (<i>Lepidium latifolium</i>)	Sheep and Goats	Remove 85% of top growth with repeated grazing (every 3-4 weeks)	Graze until early flowering stage, with preference for early vegetative stages. Repeat grazing for several years is necessary.	Repeat, intensive grazing can reduce biomass, density, and height in single season, but root system replenishes infestation. Grazing must be continued for several years. Can be combined with herbicide spraying.

Target Weed	Livestock Class	Grazing Objective	Growth Stage for Treatment	Potential Effectiveness
Russian Knapweed (<i>Acroptilon repens</i>)	Sheep (particularly dry ewes) and goats	Removal of 80% biomass	Early vegetative to flowering. Graze at least 3 times per season, allowing 8-10 in. of regrowth between treatments. 3 or more years necessary.	Graze repeatedly multiple times each season for several years. May result in reduced biomass and density of plants but may return to pre-grazing density when grazing ceases. Long-term management requires integrated program with herbicides and competitive planting.
Saltcedar (<i>Tamarix ramosissima</i>) Russian olive (<i>Elaeagnus angustifolia</i>)	Goats	Severe defoliation to deplete root reserves and prevent establishment of new plants	Prefer young shoots but will browse 4-year-old shoots. Repeated browsing is needed to limit resprouting and remove new seedlings.	Browsing is effective to reduce size and density of trees and eliminate from specific sites. Goats must consume most or all resprouts and seedlings for at least 3-5 years. Maintain native perennial grass understory to prevent seedling establishment for long-term management.
Scotch Thistle (<i>Onopordum acanthium</i>)	Sheep, Goats, Cattle	Prevention of flowering and reduction of stem density.	Graze at the rosette to bolting stage. Heavy to severe utilization, using short-duration, high-intensity grazing provides the best results when repeated for several years to deplete seedbank.	Grazing is effective at suppressing flowering and reducing stem density 30 to 50%. Several years may be needed to reduce populations. Native perennial grass competition is essential. Effective when used in combination with follow-up herbicide treatment.
Spotted Knapweed (<i>Centaurea maculosa</i>)	Sheep and Goats	Graze to prevent seed production and reduce biomass.	Graze heavily during the rosette or bolting stage. Two grazing periods per year during rosette to bolting and bud stages provide best control.	Grazing can reduce plant vigor, density, size, flower stems, and seed production. Sheep digestive systems may suffer if diets are composed of >70% knapweed. Most effective when combined with herbicide treatments.
Tall Whitetop (<i>Cardaria draba</i>)	Sheep and Goats	Prevent flowering and maintain removal of 85% of top growth during growing season.	Graze before flowering. Repeat at least 2 times a year for at least 3 years.	Repeated grazing may reduce plant vigor and flower production.
Yellow Starthistle (<i>Centaurea solstitialis</i>)	Sheep, Goats, and Cattle	Graze heavily at least twice a year to prevent flowering and for several years to deplete seedbank and reduce plant density.	Sheep and goats will graze at all growth stages. Cattle will graze in the rosette to bolting stage. 2-3 treatments are needed if grazed in rosette or bolting stage, goats grazing during or after flowering may require 1 year.	Goats are most effective. Grazing reduces plant vigor and plant size and suppresses flower production. Graze twice a year over several years to prevent flower and seed production.

9.6 Biological Control

Biological control agents are U.S. Department of Agriculture (USDA)-approved insects and pathogens that undergo rigorous testing prior to availability for release. Initial testing occurs in quarantined laboratories to determine their effectiveness in controlling the target organism and

host specificity. Testing includes potential effects on economic crops, rare plants, and similar species found in North America. An agent is approved for release only after it is determined that it is unlikely to feed or cause injury to any native or agricultural species. It generally takes between 15-20 years for an agent to be cleared for release. Prior to the release of a new agent, an environmental analysis is prepared by USDA APHIS (Agricultural Plant Health Inspection Service). The analysis assumes that agents will spread throughout North America following release. The BIA is using only those biological agents approved by APHIS as listed in **Table 9-2**.

The BIA will not consider the release of the tamarisk leaf beetle (*Diorhabda carniulata*). This species was released near Moab, Utah in 2004 along the Colorado River with the expectation that it could not migrate below the 38° N latitude. However, the beetles moved and infiltrated sites south of the 38° N latitude, migrating down the Colorado River past Lake Mead. This unexpected migration decimated the nesting habitat of the endangered Southwestern Willow Flycatcher, which has affected the reproductive success of this species. The leaf beetle occurs in riparian areas across the Navajo Nation. The BIA NRO monitors the leaf beetle to document its extent and impact on the Navajo Nation.

Table 9-2. Target noxious weeds and proposed biological control agents.

Target Weed Common Name	Proposed Control Agents by Scientific Name	Proposed Control Agents by Common Name
Dalmatian toadflax	<i>Brachypterolus pulicarius</i> <i>Calophasia lunula</i> <i>Eteobalea intermediella</i> <i>Eteobalea serratella</i> <i>Mecinus janthinus</i> <i>Gymnetron antirrhini</i> <i>Gymnetron linariae</i>	Flower feeding beetle Toadflax moth Root-boring moth Root-boring moth Stem-mining weevil Seed capsule weevil Root-galling weevil
Diffuse knapweed	<i>Bangasternus fausti</i> <i>Bangasternus orientalis</i> <i>Cyphocleonus achates</i> <i>Larinus minutus</i>	Seed head feeding weevil Seed head feeding weevil Root feeding weevil Seed head feeding weevil
Field bindweed	<i>Aceria malherbae</i> <i>Tyta luctuosa</i>	Bindweed gall mite Bindweed moth
Leafy spurge	<i>Aphthona abdominalis</i> <i>Aphthona cyparissiae</i> <i>Aphthona czwalinae</i> <i>Aphthona flava</i> <i>Aphthona lacertosa</i> <i>Aphthona nigriscutis</i>	Minute flea beetle Brown dot flea beetle Black flea beetle Copper flea beetle Brown-legged flea beetle Black dot flea beetle
Puncturevine	<i>Microlarinus lypriformis</i>	Puncturevine seed feeding weevil
Russian knapweed	<i>Subanguina picridis</i> <i>Jaapiella ivannikovi</i> <i>Urophora kasachstanica</i> <i>Urophora xanthippe</i>	Nematode Diptera: Cecidomyiidae Flower gall fly Flower gall fly
Spotted knapweed	<i>Bangasternus fausti</i> <i>Bangasternus orientalis</i> <i>Cyphocleonus achates</i> <i>Larinus minutus</i> <i>Larinus obtusus</i>	Seed head feeding weevil Seed head feeding weevil Root feeding weevil Seed head feeding weevil Seed head feeding weevil

Target Weed Common Name	Proposed Control Agents by Scientific Name	Proposed Control Agents by Common Name
Yellow starthistle	<i>Eustenopus villosus</i> <i>Bangasternus orientalis</i> <i>Chaetorellia australis</i> <i>Urophora sirunaseva</i>	Starthistle hairy weevil Starthistle bud weevil Starthistle peacock fly Starthistle gall fly

The BIA and Cooperating Agencies will consult with Navajo Nation Department of Fish and Wildlife (NNDFW) on a project-by-project basis to approve the use of biological control agents. Also, prior to the release of any biological control agent, the BIA will obtain a permit from APHIS. The Coconino, Kaibab, and Prescott National Forests and the City of Flagstaff have conducted biological control treatments near the Navajo Nation for Dalmatian toadflax, diffuse and spotted knapweed, yellow starthistle, and leafy spurge (Dewey Murray, personal communication 2013). The greatest success has occurred with biological controls released to control diffuse knapweed.

9.7 Chemical Control

Chemical methods include the use of herbicides to control noxious weeds. Herbicides are categorized as selective or non-selective. Selective herbicides kill only a specific type of plant. For example, a selective herbicide for broad-leaved plants will not affect grasses. Non-selective herbicides will kill all vegetation that it contacts. Therefore, it is important not to spray desirable vegetation when using non-selective herbicides. The herbicides for use on the Navajo Nation are listed in

Table 9-3.



Photo courtesy of Fred Phillips Consulting.

There are several herbicide application methods. The method chosen for a particular project site may depend on the size of the infestation, the species present, accessibility to the site, topography, resources and equipment available, and finances. All herbicides will be used according to their labels and a Navajo Nation Certified Pesticide Applicator must be on site. Water for mixing herbicide and cleaning herbicide equipment will 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. Up to 30 people are needed to implement chemical treatments. Some herbicide application methods are described below.

- Cut Stump** - This method uses both chemical and mechanical/manual techniques and is effective on tree species that sparsely populate an area or in areas where heavy machinery is not an option. The plant is cut as close to the ground as possible using a chainsaw or loppers. The cut stump is then immediately (within 15 minutes) sprayed or painted with a systemic herbicide to prevent vigorous re-

sprouting. It is important to cover the entire cut stump with herbicide. For the most effective and safe treatment, skilled sawyers are recommended.

- **Basal Bark** - Basal bark spraying is most effective on dormant and leafless woody plants with less than a 6-inch stem diameter. This method involves spraying the bottom 12-18 inches of a stem with herbicide. Care is taken to apply herbicide around the entire stem. The herbicide is 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 involves making spaced cuts around the entire tree trunk with an ax, machete, or hatchet. It is important that the cut penetrates to the cambium layer. Herbicide is then applied to the cuts using a spray bottle or similar tool.
- **Foliar spray** – Foliar sprays are most effective when plants are in full leaf. Foliar spray is applied using a backpack sprayer, spray bottle, a boom or boomless sprayer mounted on an ATV or truck, fixed-wing airplane or helicopter to distribute over a large area.
- **Pelletized Treatment**- Herbicides made into small pellets can be buried around the plant's base.
- **Pre-Emergent Treatment**- This treatment method involves applying herbicide to the soil before the target noxious weed species germinates or emerges.

Herbicide applications require certain precautions and protocols. U.S. Environmental Protection Agency (U.S. EPA) categorizes pesticides as either "unclassified" or "restricted use." A pesticide, or some of its uses, can be classified as restricted if it causes harm to humans (pesticide handlers or other persons) or to the environment. Herbicide applications will comply with the Navajo Nation Pesticide Act as enforced by the Navajo Nation Environmental Protection Agency, which includes annual reporting on projects that use herbicide treatments and proper disposal of unused herbicide. Herbicides must be applied by applicators with a state applicators license and a U.S. EPA Certified Pesticide applicator card for the Navajo Nation. The U.S. EPA Certified Pesticide applicator card can be obtained through the U.S. EPA Region 9 Pacific Southwest Office.

Near riparian areas, only aquatic formulations of 2,4-D, glyphosate, triclopyr, and imazapyr can be 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 ft (7.6 m) buffer from the daily high-water mark, including: aminopyralid, chlorsulfuron, clopyralid, imazapic, and thifensulfuron-methyl. Imazapic and imazapyr have no risk to aquatic invertebrates and fish even if there is an accidental direct spray or spill to the aquatic habitat (BLM 2007). Non-aquatic approved and moderate to high aquatic toxicity herbicides (White 2007) require a 300 ft (91 m) buffer from the

daily high-water mark. Only aquatic herbicides will be used for aerial applications by either fixed wing or rotary aircraft within riparian areas.

When applying herbicides, weather conditions such as wind speed, wind direction, inversions, humidity, and precipitation should be taken into consideration. Herbicides should always be used as directed on their labels. Caution is required to prevent overspray on non-target species. Extreme caution is used when mixing herbicides. Dermal exposure to a small amount of a concentrated herbicide is equivalent to the exposure received after a full day of working in a treated field. Herbicides are applied using the proper equipment and applicators are required to use personal protective equipment. Application rates for each herbicide are in **Table 9-4**.

Use of herbicides can include concerns about human health, ecological risks, and potential impacts to native plants and animals. Projects using herbicides should always be paired with other treatment methods to (1) improve their effectiveness and (2) reduce the potential for harmful impacts. If more than one herbicide can be used for a project, treatments should prioritize the herbicide with the lowest toxicity. Herbicides are listed by toxicity in Appendix E.

Table 9-3. Herbicides approved for use on the Navajo Nation based on priority treatment areas. * Indicates a Restricted Use Pesticide.

Herbicide	Herbicide Characteristics and Target Vegetation	Riparian	Rangeland	Agricultural Lands	Right-of-Ways	Roadsides	Residence/Communities
2,4-D	Selective herbicide used to control broadleaf weeds by interfering with plant metabolism. It is moderately to highly mobile in the soil, which restricts its use in and around high ground water tables or open water. Key species include biennial thistles, Canada thistle, diffuse knapweed, leafy spurge, blue mustard, perennial pepperweed, Russian knapweed, squarrose knapweed, sulfur cinquefoil, Dalmatian toadflax, whitetop, halogeton, puncturevine, spreading wallflower, horehound, California burclover, Russian thistle, and yellow starthistles.	X	X	X	X	X	X
Aminopyralid	Selective herbicide used for broadleaf weed control. It is relatively immobile in the soil and remains in upper 12" of soil profile. Target weeds include yellow starthistle, squarrose knapweed, bull thistle, Canada thistle, musk thistle, scotch thistle, spotted knapweed, whitetop, sulfur cinquefoil, diffuse knapweed, Russian knapweed, and Russian olive.	X	X	X	X	X	X
Atrazine*	Selective herbicide that controls pre- and post- emergence broadleaf and grassy weeds. It is mostly absorbed through the roots inhibiting photosynthesis. Atrazine degrades in soil primarily by action of microbes. It is common chemical contaminant in ground and surface water. Key species include red brome and kochia.		X	X			
Chlorsulfuron	Registered for general use to control many broadleaf weeds and some annual grasses. This herbicide inhibits enzyme activity. Chlorsulfuron tends to leach into soils with a textural range from sand to silt loam and degrades more rapidly at higher temperatures with adequate moisture contents. It is broken down to smaller compounds by soil microorganisms. Chlorsulfuron may be used to treat blue mustard, Dalmatian toadflax, perennial pepperweed, puncturevine, Russian thistle, kochia and thistles.		X	X	X	X	X
Clopyralid	Selective post-emergence herbicide controlling broadleaf species. This herbicide affects the target weed by mimicking the plant hormone auxin and causes uncontrolled plant growth and eventual death. Once applied to the ground, it rapidly disassociates, which results in having a high potential to contaminate ground or surface water. It is used to treat biennial thistles, Canada thistle, perennial pepperweed, diffuse knapweed, Russian knapweed, squarrose knapweed, and yellow starthistle.		X	X	X	X	
Dichlobenil	Selective weed control of annual grassy and broad-leaved weeds and certain perennial weeds. It is water soluble and moves slowly in the soil. Can be used to treat leafy spurge, biennial thistles, Canada thistle, perennial pepperweed, Russian knapweed, field bindweed, and kochia.			X	X	X	X
Fluroxypyr	A pyridinoy acid herbicide used to control annual and perennial broadleaf weeds and woody brush. Potential to leach to groundwater is high and potential for loss on eroded soil is low. Plants take up through leaves and roots and translocated to other plant parts. Target weeds include kochia and knapweeds.		X		X	X	

Herbicide	Herbicide Characteristics and Target Vegetation	Riparian	Rangeland	Agricultural Lands	Right-of-Ways	Roadsides	Residence/Communities
Fluazifop-P-butyl	Selective herbicide for post-emergence control of annual and perennial grass weeds. Breaks down rapidly in moist soils. It is actively taken up by plants and translocated throughout the plant where it interferes with plant cell's ability to produce energy. Target weeds include: fountaingrass, common Mediterranean grass, and red brome.			X	X	X	
Glyphosate	Broad-spectrum, nonselective herbicide used for control of annual and perennial plants including grasses, sedges, broadleaf weeds, and woody plants. Method of action is to inhibit amino acid and protein synthesis. It is moderately persistent in the soil. Glyphosate is strongly absorbed in most soils and normally does not leach out of the profile. Glyphosate is successful in controlling annual, biennial, and perennial grasses, broadleaf weeds, and woody shrubs and trees.	X	X	X	X	X	X
Imazapic	Selective herbicide for both pre- and post-emergent control of some annual and perennial grasses and broadleaf weeds. It affects plants by inhibiting the production of amino acids that ultimately reduces cell growth. It is considered moderately persistent in soils. Effective in control of biennial thistles, Canada thistle, leafy spurge, Dalmatian toadflax, perennial pepperweed, whitetop, halogeton, jointed goatgrass, red brome, and cheatgrass.		X	X	X	X	X
Imazapyr	Broad-spectrum herbicide that is applied pre- or post-emergence. Absorbed by the leaves and roots and moves rapidly through the plant. It has a strong affinity to bind to soils and rarely moves beyond the top few inches. Low potential for leaching to ground water but may reach surface water during storm events over recently treated land. Imazapyr is effective on African rue, Tree of Heaven, Fountaingrass, yellow starthistle, perennial pepperweed, whitetop, Uruguayan pampas grass, common Mediterranean grass, saltcedar, Siberian elm, camelthorn, Russian knapweed, and Russian olive.		X		X	X	
Indaziflam	Pre-emergent and broad-spectrum control of weed seedlings. It inhibits development and cellulose biosynthesis in roots. It is moderately persistent in soils and does have the potential to contaminate surface water through runoff. Target weed species include: cheatgrass, red brome, bald brome, rescuegrass, ripgut brome, smooth brome, dalmatian toadflax, Halogeton, musk thistle, Canada thistle, Russian thistle, yellow starthistle, puncturevine, jointed goatgrass, California burclover, diffuse knapweed, and kochia.		X		X	X	
Isoxaben	Used for pre-emergence control of broadleaf weeds. It is absorbed through the roots and inhibits cellulose biosynthesis in the cell walls. It is moderately persistent in soil and potential for ground and surface water contamination is low. Target weed species include: kochia, mustards, Russian thistle, and leafy spurge.			X	X	X	

Herbicide	Herbicide Characteristics and Target Vegetation	Riparian	Rangeland	Agricultural Lands	Right-of-Ways	Roadsides	Residence/Communities
Metsulfuron methyl	Control brush and certain unwanted woody plants, annual and perennial broadleaf weeds, and annual grassy plants. Affects plants by inhibiting cell division in the roots and shoots, thereby stopping growth. It dissolves easily in water and can leach through the soil to contaminate ground water but confined to soils that are either sandy or porous. It can control biennial thistles, Canada thistle, Russian knapweed, African rue, yellow starthistle, blue mustard, perennial pepperweed, halogeton, camelthorn, horehound and whitetop.		X	X	X	X	
Metribuzin	Selective herbicide that inhibits photosynthesis. It controls annual grasses and broadleaf weeds. Highly soluble in water and low tendency to adsorb to most soils. Target weeds include field brome, field sandbur, Johnson grass, puncturevine, bromes, Russian thistle, and kochia.			X			
Paraquat*	Non-selective herbicide that destroys green plant tissue on contact and by translocation within the plant. It is a "Restricted Use" herbicide. Quickly adsorbed by soil particles and is long-lived in soil. Target species include field sandbur.		X	X	X	X	X
Pendimethalin	Selective herbicide used to control most annual grasses and certain broadleaf weeds. It can be used on both pre- and post-emergence weeds. Adsorbs strongly to soil organic matter and clay and does not leach through soil to contaminate ground water. It is used to control puncturevine and kochia.			X	X	X	
Picloram*	A "Restricted Use" herbicide due to its mobility in water combined with the sensitivity of many crops that can be damaged with use. It interferes with the weed's ability to make proteins and nucleic acids. It dissolves easily in water. This herbicide controls biennial thistles, Canada thistle, knapweeds, Dalmatian toadflax, camelthorn, Russian thistle, leafy spurge, Russian knapweed, Scotch thistle, whitetop, and yellow starthistle.		X	X	X	X	
Prodiamine	A selective, pre-emergent herbicide for the control of broadleaf weeds and grasses by inhibiting plant growth. Used for control of kochia, rescuegrass, and Johnsongrass				X	X	X
Thifensulfuron methyl	This is a broad spectrum, post-emergent herbicide for control of broadleaf weeds. Absorbed through foliage of plants to inhibit growth. This herbicide controls spreading wallflower, kochia, and Russian thistle.		X	X	X	X	
Triclopyr	Works by disrupting plant growth. It is absorbed by green bark, leaves, and roots and moves to the meristem of the plant. It has a moderate to low solubility in water and normally binds to clay and organic matter, so it has a slight potential to contaminate ground water. Triclopyr is effective in treatment of yellow starthistle, squarrose knapweed, perennial pepperweed, spotted knapweed, diffuse knapweed, horehound, tamarisk, tree of Heaven, Russian olive, and Siberian elm.	X	X	X	X	X	X

THIS PAGE INTENTIONALLY LEFT BLANK

Category A - HIGH																		
Noxious Weed		2,4-D					Aminopyralid			Atrazine*	Chlorsulfuron methyl		Clopyralid		Dichlobenil		Fluroxpyr	Fluazifop-P-butyl
Common Name	Scientific Name	Various	Grazon P+D (+picloram)	Curtail: (+clopyralid)	GrazonNext (+aminopyralid)	Crossbow (+triclopyr)	Milestone	Chaparral (+metsulfuron)	Milestone + Garlon 4	Aatrex	Telar XP	Cimmaron Plus (+metasulfuron)	Transline	Reclaim	Redeem (+triclopyr)	Casoron	Vista	Fusilade 2000, Fusilade DX
African rue ¹	<i>Peganum harmala</i>																	
Blue mustard ³	<i>Chorispora tenella</i> (Pall.) DC.	½ - ¾ pt for 4 lb/gal product									0.125 oz							
Bull thistle ¹	<i>Cirsium vulgare</i>		1 - 2 pt	1 - 2 qt	2 pt		3-5 oz						0.33-1.3 pt	0.33-1.3 pt	1.5 - 2 pt	0.92 - 3.84 qt		
Camelthorn ¹	<i>Alhagi camelorum</i>												1- 1/3 pt	1- 1/3 pt				
Canada thistle ¹	<i>Cirsium arvense</i>	2 qt (based on 1 qt of 4 lb per gal)		6 pints			5-7 oz						0.67-1.3 pt	0.67-1.3 pt	2.5-4 pt	0.92 - 3.84 qt		
Common Mediterranean grass	<i>Schismus barbatus</i>																	1-1.5 pt plants;8 oz for seedlings
Dalmatian toadflax ¹	<i>Linaria dalmatica</i>										2-2.6 oz							
Fountain grass ¹	<i>Pennisetum setaceum</i>																	1-1.5 pt
Leafy spurge ¹	<i>Euphorbia esula</i>		2 qts													0.92 - 3.84 qt		
Musk thistle ¹	<i>Carduus nutans</i>		2 - 4 pt	1 - qt	1.5 - 2 pt		3-5 oz						0.33-1.3 pt	0.33-1.3 pt	1.5 - 2 pt	0.92 - 3.84 qt		
Perennial pepperweed ¹	<i>Lepidum latifolium</i>	1-2 lbs/ac									1-2 oz					0.92 - 3.84 qt		
Ravenna grass ²	<i>Saccharum ravennae</i>																	
Sahara mustard ⁴	<i>Brassica tournefortii</i>	3-6 pt					¼ to 1/3 pint	2.5-3.3 oz					2-3 qts					
Squarrose knapweed ¹	<i>Centaurea virgata</i>	1-2 qt	2-3 qt	4 pt			5-7 oz						⅔- 1 pt	⅓- 1 ⅓ pt	2 pt		8 oz	
Scotch thistle ¹	<i>Onopordum acanthium</i>		2 - 4 pt	1 - 2 qt	2 - 2.6 pt		5-7 oz						0.33-1.3 pt	0.33-1.3 pt	1.5 - 2 pt	0.92 - 3.84 qt		
Spotted knapweed ¹	<i>Centaurea maculosa</i>	1 - 2 qt	2 - 3 qt	4 pt			5-7 oz						⅔- 1 pt	⅓- 1 ⅓ pt	2 pt		8 oz	
Sulphur cinquefoil ³	<i>Potentilla rect</i> L.		2-4 pt				4-6 oz											
Tall whitetop ¹	<i>Cardaria draba</i>							2.5 - 3.33 oz			1 oz	1.25 oz						
Tamarisk, other	<i>Tamarix</i> spp., including hybrids																	
Tree-of-Heaven ¹	<i>Ailantus altissima</i>																	
Uruguayan pampas grass ⁶	<i>Cortaderia sellonana</i>																	
Yellow nutsedge ³	<i>Cyperus esculentus</i>																	
Yellow starthistle ¹	<i>Centaurea solstitialis</i>	1 qt	2 qt (1:4 mixture)	0.25 - 1 pt			3-5 oz						0.25-0.67 pt	0.25- 0.67 pt				

Category A - HIGH																			
Noxious Weed		Glyphosate		Imazapic		Imazapyr			Indaziflam		Isoxaben	Metsulfuron methyl	Metribuzin	Paraquat*	Pendimethalin	Picloram*	Prodiamine	Thifensulfuron-methyl	Triclopyr
Common Name	Scientific Name	Rodeo	Round Up	Plateau	Journey (+ Glyphosate)	Arsenal	Arsenal + Rodeo	Chopper	Rejuvra	Esplanade 200 SC	Gallery	Ally, Allie, Gropper, Escort	Sencor	Gramoxone	Pendulum	Tordon 22K	Evade	Volta	Garlon
African rue ¹	<i>Peganum harmala</i>					3 pt						3.2 - 6.4 oz							
Blue mustard ³	<i>Chorispora tenella</i> (Pall.) DC.	1.5 pt	11-12 oz									0.125 oz							
Bull thistle ¹	<i>Cirsium vulgare</i>			8-12 oz												0.5-2 pt			
Camelthorn ¹	<i>Alhagi camelorum</i>					0.75-1.5 qt						1-3 oz				2 qt			
Canada thistle ¹	<i>Cirsium arvense</i>								3.5 – 7 oz	3.5 – 7 oz						1 qt			
Common Mediterranean grass	<i>Schismus barbatus</i>	1-3 pt						2-3 pt											
Dalmatian toadflax ¹	<i>Linaria dalmatica</i>			8-12 oz + 1 qt MSO					3.5 – 7 oz	3.5 – 7 oz						1-2 qt			
Fountain grass ¹	<i>Pennisetum setaceum</i>	0.5-1 pt						2-3 pt											
Leafy spurge ¹	<i>Euphorbia esula</i>	1 qt	1 qt	8-12 oz + 1.5-2 pt MSO												1-2 qt			
Musk thistle ¹	<i>Carduus nutans</i>			8-12 oz					3.5 – 7 oz	3.5 – 7 oz						0.5-2 pt			
Perennial pepperweed ¹	<i>Lepidum latifolium</i>	3 qt	1 gal	12 oz				2-3 pt				0.75-1 oz							3 qts
Ravenna grass ²	<i>Saccharum ravennae</i>	5% soln																	
Sahara mustard ⁴	<i>Brassica tournefortii</i>											0.5-1.0 oz							3 qts
Scotch thistle ¹	<i>Onopordum acanthium</i>			8-12 oz												0.5-2 pt			
Spotted knapweed ¹	<i>Centaurea maculosa</i>															1-2 pt			
Squarrose knapweed ¹	<i>Centaurea virgata</i>															1-2 pt			
Sulphur cinquefoil ³	<i>Potentilla rect L.</i>															1 pt			
Tall whitetop ¹	<i>Cardaria draba</i>	3 qt	4 qt	12 oz				2-3 pt				0.75-1 oz							
Tamarisk, Saltcedar ¹	<i>Tamarix</i> spp., including hybrids					2 qts	1.5 qt + 1.5 qt												
Tree-of-Heaven ¹	<i>Ailantus altissima</i>	2 -5 qt				1-1.5 pt		2-3 pt											3-6 qts
Uruguayan pampas grass ⁶	<i>Cortaderia sellonana</i>	0.5-1 pt						2-3 pt											
Yellow nutsedge ³	<i>Cyperus esculentus</i>	1-5 qt																	
Yellow starthistle ¹	<i>Centaurea solstitialis</i>	4.5-7.5 pt	1.5-4 qt			1 pt			3.5 – oz	3.5 -7 oz		1 oz				1-1.5 pt			3 pts

Category B - MEDIUM																		
Noxious Weed		2,4-D					Aminopyralid			Atrazine*	Chlorsulfuron methyl		Clopyralid		Dichlobenil		Fluroxypyr	Fluazifop-P-butyl
Common Name	Scientific Name	Various	Grazon P+D (+picloram)	Curtail: (+clopyralid)	GrazonNext (+aminopyralid)	Crossbow (+triclopyr)	Milestone	Chaparral (+metsulfuron)	Milestone + Garlon 4	Aatrex	Telar XP	Cimmaron Plus (+metasulfuron)	Transline	Reclaim	Redeem (+triclopyr)	Casoron	Vista	Fusilade 2000, Fusilade DX
Diffuse knapweed ¹	<i>Centaurea diffusa</i>	1 - 2 qt	2 - 3 qt	4 pt			5-7 oz						½- 1 pt	⅓- 1 ⅓ pt	2 pt		8 oz	
Halogeton ³	<i>Halogeton glomeratus</i>	2 - 2.7 qt																
Johnsongrass ³	<i>Sorghum halepense</i>																	
Russian knapweed ¹	<i>Acroptilon repens</i>			1-2 qt			4-6 oz						1- 1 ⅓ pt	1- 1 ⅓ pt		0.92 - 3.84 qt		
Russian olive ¹	<i>Elaeagnus angustifolia</i>					2 gal			7 oz + 2 qt									
Siberian elm ¹	<i>Ulmus pumila</i>																	
Tamarisk, Saltcedar ¹	<i>Tamarix ramosissima</i>																	

Category B – MEDIUM																			
Noxious Weed		Glyphosate		Imazapic		Imazapyr			Indaziflam		Isoxaben	Metsulfuron methyl	Metribuzin	Paraquat*	Pendimethalin	Picloram*	Prodiamine	Thifensulfuron-methyl	Triclopyr
Common Name	Scientific Name	Rodeo	Round Up	Plateau	Journey (+ Glyphosate)	Arsenal	Arsenal + Rodeo	Chopper	Rejuvra	Esplanade 2000	Gallery	Ally, Allie, Gropper, Escort	Sencor	Gramoxone	Pendulum	Tordon 22K	Evade	Volta	Garlon
Diffuse knapweed ¹	<i>Centaurea diffusa</i>								3.5 – 7 oz	3.5 -7 oz						1-2 pt			
Halogeton ³	<i>Halogeton glomeratus</i>			4-12 oz					3.5 – 7 oz	3.5 – 7 oz		0.5-1 oz							
Johnsongrass ³	<i>Sorghum halepense</i>												0.5 lb				1		
Russian knapweed ¹	<i>Acroptilon repens</i>	3-7.5 pt	4-4.8 qt			2 pt										1-2 qt			
Russian olive ¹	<i>Elaeagnus angustifolia</i>	1-5 qt	1.5-3.3 qt			2.4 pt	1.5 qt + 1.5 qt												1-3 qt
Siberian elm ¹	<i>Ulmus pumila</i>	3-7.5 pt	1.5-3.3 qt			1-1.5 pt		2-3 pt											3-6 qt
Tamarisk, Saltcedar ¹	<i>Tamarix ramosissima</i>					2 qt	1.5 qt + 1.5 qt												

Category C - LOW																		
Noxious Weed		2,4-D					Aminopyralid			Atrazine*	Chlorsulfuron methyl		Clopyralid		Dichlobenil		Fluroxypyr	Fluazifop-P-butyl
Common Name	Scientific Name	Various	Grazon P+D (+picloram)	Curtail: (+clopyralid)	GrazonNext (+aminopyralid)	Crossbow (+triclopyr)	Milestone	Chaparral (+metsulfuron)	Milestone + Garlon 4	Aatrex	Telar XP	Cimmaron Plus (+metasulfuron)	Transline	Reclaim	Redeem (+triclopyr)	Casoron	Vista	Fusilade 2000, Fusilade DX
Bald brome ³	<i>Bromus racemosus</i>																	
California burclover ⁴	<i>Medicago polymorpha</i>	0.67-4 pt																
Cheatgrass ¹	<i>Bromus tectorum</i>																	
Field bindweed ³	<i>Convolvulus arvensis</i>		2-4 pt													0.92 - 3.84 qt		
Field brome	<i>Bromus arvensis</i>																	
Horehound ⁵	<i>Marrubium vulgare</i>	1-4 pt																

Category C - LOW																			
Noxious Weed		2,4-D					Aminopyralid			Atrazine*	Chlorsulfuron methyl		Clopyralid		Dichlobenil		Fluroxypyr	Fluazifop-P-butyl	
Common Name	Scientific Name	Various	Grazon P+D (+picloram)	Curtail: (+clopyralid)	GrazonNext (+aminopyralid)	Crossbow (+triclopyr)	Milestone	Chaparral (+metsulfuron)	Milestone + Garlon 4	Aatrex	Telar XP	Cimmaron Plus (+metasulfuron)	Transline	Reclaim	Redeem (+triclopyr)	Casoron	Vista	Fusilade 2000, Fusilade DX	
Jointed goatgrass ¹	<i>Aegilops cylindrica</i>																		
Kochia ³	<i>Bassia scoparia</i>									3.2-4 pt						0.92 - 3.84 qt	8 oz		
Puncturevine ³	<i>Tribulus terrestris</i>	2 qt																	
Red brome ⁴	<i>Bromus rubens</i>									1-2 pt								1-1.5 pt	
Rescuegrass ³	<i>Bromus catharticus</i>																		
Ripgut brome ³	<i>Bromus diandrus</i>																		
Russian thistle ³	<i>Salsola kali</i>	0.75-4 pt											2-4 pt	2-4 pt					
Smooth brome ³	<i>Bromus inermis</i>																		
Spreading wallflower	<i>Erysimum repandum</i>	1/4-3/8 lb																	

Category C - LOW																			
Noxious Weed		Glyphosate		Imazapic		Imazapyr			Indaziflam		Isoxaben	Metsulfuron methyl	Metribuzin	Paraquat*	Pendimethalin	Picloram*	Prodiamine	Thifensulfuron-methyl	Triclopyr
Common Name	Scientific Name	Rodeo	Round Up	Plateau	Journey (+ Glyphosate)	Arsenal	Arsenal + Rodeo	Chopper	Rejuvra	Esplanade 2000	Gallery	Ally, Allie, Gropper, Escort	Sencor	Gramoxone	Pendulum	Tordon 22K	Evade	Volta	Garlon
Bald brome ³	<i>Bromus racemosus</i>	0.5-3 qt							3.5 – 7 oz	3.5 – 7 oz			0.5-1 pt						
California burclover ⁴	<i>Medicago polymorpha</i>		24-32 oz						3.5 – 7 oz	3.5 – 7 oz									
Cheatgrass ¹	<i>Bromus tectorum</i>	0.5-1 pt		2-12 oz + 1 qt MSO	16-21 oz + 1 qt MSO				3.5 – 7 oz	3.5 – 7 oz									
Field bindweed ³	<i>Convolvulus arvensis</i>		0.25-5 qt													0.5 pt- 2 qt			
Field brome	<i>Bromus arvensis</i>	0.5-3 qt							3.5 – 7 oz	3.5 – 7 oz			0.5-1 pt						
Horehound ⁵	<i>Marrubium vulgare</i>											0.2-1 oz				2-4 pt			2.5- 3.33 pt
Jointed goatgrass ¹	<i>Aegilops cylindrica</i>	2.5-3 pt		0.063-0.188 lbs					3.5 – 7 oz	3.5 – 7 oz									
Kochia ³	<i>Bassia scoparia</i>		0.5-5 qt						3.5 – 7 oz	3.5 – 7 oz	16 oz		0.5 lb		1.8-4.8 pt		1 lb		
Puncturevine ³	<i>Tribulus terrestris</i>	0.75-4 pt							3.5 – 7 oz	3.5 – 7 oz					1.2-4.8 qt				
Red brome ⁴	<i>Bromus rubens</i>	0.5-1 pt		2-12 oz + 1 qt MSO	1½- 2 pt				3.5 – 7 oz	3.5 – 7 oz									
Rescuegrass ³	<i>Bromus catharticus</i>	0.5-3 qt							3.5 – 7 oz	3.5 – 7 oz			0.5-0.6 lb				1 lb		
Ripgut brome ³	<i>Bromus diandrus</i>	0.5-3 qt							3.5 – 7 oz	3.5 – 7 oz			0.5-1 pt						
Russian thistle ³	<i>Salsola kali</i>		8 oz- 5 qt						3.5 – 7 oz	3.5 – 7 oz	16 oz		0.25-0.75 pt			1-1.5 oz			
Smooth brome ³	<i>Bromus inermis</i>	0.5-3 qt							3.5 – 7 oz	3.5 – 7 oz			0.5-1 pt						
Spreading wallflower	<i>Erysimum repandum</i>																	0.3-0.6 oz	

MSO=Methylated seed oil

9.8 Roads and Rights-of-Way Treatments

While noxious weed treatments on roads and rights-of-way (linear corridors) use the same techniques described above, treatments occur on a regular basis and are aimed at moving quickly to disrupt traffic as little as possible. The techniques used to treat noxious weeds in linear corridors include:

- Chemical spraying using trucks or All-Terrain Vehicles (ATV) for efficient application,
- Mechanical mowing timed to occur prior to seed-head maturation,
- Boom axe or chainsaw used to cut vegetation within 15-30 ft of pavement edge,
- Cut-stump treatments,
- Pile burning of collected plan material,
- Controlled burns, and
- Maintenance of fire guards along road shoulder or fence line.

Other measures used to prevent weed introduction and retain native vegetation along linear corridors include techniques that reduce erosion and other disturbances (keeping equipment off unstable slopes), re-seeding areas with native species, use of weed free materials (straw, wattles, fill, and seed), cleaning vehicles and equipment before beginning treatment and leaving a treatment area, and coordination with landowners to treat weeds on the roads and adjacent areas.

10.0 Native Vegetation Re-Planting

It is highly recommended that native species revegetation occurs after noxious weeds are removed from areas where weeds comprised 50% or more of the vegetation community. Areas dominated by noxious weeds for long periods of time likely do not have the native seed bank necessary for passive native species recolonization. Also, revegetating with native species prevents recolonizing noxious weeds, restores native pastures, and provides habitat for wildlife. Below are recommendations for native species revegetation scenarios based on native to noxious weeds ratios prior to clearing.

10.1 Passive Restoration

Passive restoration can occur in habitats dominated by native vegetation. Noxious weeds can be removed by hand and the native seed bank and surrounding vegetation is left to recolonize cleared areas. These are areas where weeds comprise less than 50% of vegetative cover.

10.2 Active Restoration

Habitats with more than 50% noxious weeds cover prior to treatments require native species replanting after weed treatments occur. If a ground water is deep or no natural flooding occurs on a regular basis, planted vegetation will require supplemental irrigation. Below are different techniques for planting native vegetation.

10.2.1 Direct Seeding

Direct seeding offers many advantages over other techniques. When conditions are optimal, it produces large numbers of plants over an extensive area in a relatively short period. Through sheer volume, seeded plants out-compete recolonizing noxious weeds and survive harsh environmental conditions that would decimate smaller populations. Seeding is less expensive than other native planting techniques, especially for large tracts of land. Grass and herbaceous vegetation establish best from seed. Seeds from regional genetic stock have the most success germinating and surviving in the conditions found on the Navajo Nation. However, many seeds can only be obtained from commercial growers in other regions. USDA Natural Resource Conservation Service (NRCS) can provide information on the most appropriate seeds or seed mix for the desired area



Photo courtesy of Fred Phillips Consulting.

(<https://www.nrcs.usda.gov/wps/portal/nrcs/main/plantmaterials/pmc/west/azpmc/>). Additional native plant seed resources also include the NNDFW Diné Native Plants Program, NNDFW Botanist, State Cooperative Extension programs, local BIA Branch of Natural Resource Office, and the Navajo Nation Department of Agriculture Window Rock Office. Planting locally gathered seeds is successful but requires more time and effort than purchasing seed from a commercial source.

Prior to planting, some seeds with hard seed coats should be scarified mechanically or chemically. Scarification, a pre-germination process, opens the seed coat so water and gas can penetrate. When seeds naturally pass through the digestive tracts of animals, they undergo both chemical and mechanical scarification as part of the digestion process. As a substitute, seeds can be mechanically scarified by grinding them in a blender for about 10 seconds or by scraping a hole in the coat using sandpaper. Chemical scarification uses strong acids or other chemicals to partially open the seed coat; however, it is more dangerous and less effective than mechanical methods.

10.2.2 Propagating Cuttings

Vegetative propagation is more predictable and often quicker than starting with seeds. Desirable traits can be selected—for example, a superior flower color or thornless branch. However, plants propagated from the same stock over a long period may become susceptible to sudden environmental changes, insect attacks, and diseases. Harvesting cuttings from a variety of populations or from different areas ensures greater diversity and resistance to such problems. Native cottonwood and willows have high survival rates when planted as vegetative cuttings.

Cutting Guidelines. Check recommendations for individual species to identify the optimal season to harvest cuttings. In general, the best time to cut is when the plants are

dormant—usually from December to early February. Ideally, cuttings are planted within a week of harvesting, after they are submerged in water for at least 7 days. If cuttings are not planted for a few months, refrigerate them at 35°F to maintain dormancy. Try to select juvenile plants (1-2 years or younger if big enough) for cuttings, especially for woody species like cottonwood and willow. Younger plants are less likely to have growth inhibitors. If you must cut older plants, target the newest, most flexible growth near the base. When possible, prune older plants to generate new growth.

Preparing Cuttings. Before planting (either on site or in pots), re-cut and, for some species, apply rooting hormone. Make a new cut just above the original one but below a leaf node or bud, where concentrations of growth-influencing hormones or auxins are highest. This cut can be diagonal or straight. The diagonal method makes the cutting easier to plant and creates more surface area for water uptake. A straight cut lessens water loss and makes it easier to recognize the top and bottom ends. If rooting hormone is used, dip the cut end into an IBA (Indole-3-butyric acid) rooting hormone, such as Rootone, and gently tap to remove excess powder. This hormone speeds up root development. To prevent contamination, remove and apply the estimated amount of hormone for the cuttings present and discard extra after use. Cuttings from some species, like willow, are soaked for at least 7 days, but no longer than 12-14 days because the roots will begin to grow and will risk breaking off during planting. Once poles are removed from water they should not spend more than 12 hours out of water before planting.

Planting Techniques. Techniques for planting cuttings vary considerably; virtually all are effective for fast-rooting species such as cottonwood and willow. Rooting times vary by species from under a week to several months. Planting areas with a 6-inch – 4-foot depth to water table are recommended for planting cottonwood and willow tree species. Willows can be planted in clusters with 3 poles at least 7 feet in length with a minimum diameter of ½ inch. Holes are augured to a 6-inch diameter and at least 4 feet deep or just below the water table. All poles are planted at least 4 feet deep in the augured holes at the lowest water table of the year. Insert the cutting into the soil with the nodes pointing upward. The above ground portion of the pole is cut at a maximum height of 2 feet high and a minimum height of 18 inches. When planted all poles are slurred in with a water auger leaving no air gaps between pole and soil to maintain maximum soil to stem contact. Coat the tops of all poles with latex paint to seal in moisture. If planted in the ground water, planting areas should not require supplemental irrigation.

10.2.3 Deep Pot Upland Plants

Upland trees benefit from being grown in deep pots. Deep potted plants are planted in a hand augured planting holes that are 4-in wide and deep enough to reach the capillary fringe of the lowest water table of the year. One to three feet of the plant with budding sites above the ground. The plant root ball is not planted in saturated soil, but just right above the saturated soil zone.

10.2.4 Containerized Plants

Containerized plants are available all year and can establish quickly if they have well-established root systems. This method is expensive, time consuming, and difficult to transport, and is not practical for sites that are hard to access. Tree species are often planted in five-gallon containers while shrubs and forbs are planted as one-gallon containers. Herbaceous plants that naturally grow with multiple stems or rhizomatous roots are grown in flats of various sizes. If plants are not planted into the water table, drip irrigation may be necessary.

Augured or excavated 3-18-inch planting holes are dug to the lowest water table of the year. The native soil from the holes is utilized to secure the plant. When the plants are removed from the container, the root ball is pulled apart and loosened prior to planting. Once planted, a water well ring is formed on the surface soil around all tree plantings to enhance water retention. Remove noxious weeds present in the native tree containers prior to planting.

10.2.5 Bioengineering and Erosion Control



Figure 10-1. Harvested willow poles are planted along a bankline to provide additional erosion protection. *Left:* Work crews prep the bundles of willow poles after they have soaked in the Colorado River. *Right:* the same location one year after planting. Photos courtesy of Fred Phillips Consulting.

Bioengineering is implemented to prevent erosion and noxious weed recolonization along stream, wash, and riverbanks (**Figure 10-1**). This technique uses native vegetation poles, bundles, and plugs cut or harvested from local native stock. Poles are collected using the methods discussed above under Propagating Cuttings. They are planted individually or as bundles (approximately 3 poles per bundle) using a power auger or punch to create a narrow hole perpendicular to water flow that extends to the water table. Two rows of poles are planted along the bank line, one at the average low-water mark and one at the average high-water mark. When the water table is reached, a pole or bundle is immediately placed in the hole down to the water table. Soil is packed around the cutting to prevent air pockets.

Willow bundle plantings are good for areas with fluctuating water levels (**Figure 10-2**). To make bundles, 3-5 poles are tied into bundles of approximately 3 to 18 inches in diameter with the growing tips oriented up. The terminal bud is removed so the energy is re-routed to the lateral

buds for more efficient root and stem sprouting. Vertical trenches are excavated approximately on 3-foot centers with a slope of 2:1 or more to ensure adequate protections of the bank line and to encourage rapid growth. Ensure that the bottom of the trench is still under water during low flows and place bundles in them with the cut ends in the water. Bundles are secured with a wooden stake and the bundle is back filled with soil.



Figure 10-2. Bundles of fast-growing plants planted along the streambank can provide erosion control when steep banks cannot be re-graded. *Left:* grass bundles installed along a steep bank with willow bundles planted in between to stabilize and capture soils on the bankline. *Right:* The same bankline one year later. Photos courtesy of Fred Phillips Consulting.

The toe of the slope is highly erodible and is planted with fast growing native wetland vegetation plugs if perennial water is present. Wetland plugs are planted during the lowest water flow of the year to ensure that plants are submerged in the water table. A hole is dug at the toe of the slope, in the water table and the wetland plug's roots are submerged in the water.

Other erosion control techniques include the following:

- **Erosion blankets:** This technique helps hold soil and seed in place during inundation and create a microclimate conducive to germination of native grass and forb seeds. Blankets consisting of all-natural materials break down between one to 2 years after vegetation is established and are wildlife friendly. The blanket is installed over the prepared seed bed and staked into place with wooden stakes and/or metal staples by hand crews. The edges of the blanket are buried in a shallow trench.
- **Fiberschines:** This technique uses a coconut-fiber roll product to protect the streambank by stabilizing the toe of the slope and trapping sediment from the sloughing streambank. Cuttings and herbaceous riparian plants are planted into the fiberschine and behind it so that riparian vegetation stabilizes the streambank when the fiberschine decomposes.
- **Brush Layer:** This technique uses bundles of willow cuttings buried in trenches along the slope of an eroding streambank. This willow "terrace" is used to reduce

the length of the slope of the streambank. The willow cuttings will sprout and take root, thus stabilizing the streambank with a dense matrix of roots. Some toe protection such as a wattle, fiberschine, or rock may be necessary with this technique.

- **Mulch Over Reseeding:** Straw mulch consists of wheat, barley, oat or rye straw, hay, and grass cut from native grasses that are “weed free”. Straw mulch could be applied at a rate of 2 tons per acre to designated seeding areas to provide a protective environment for seed germination. Mulching will occur in the upper overbank zone and portions of the transition zone.
- **Brush revetment:** This method is used to protect and build the toe of eroding banks. This practice consists of a series of evergreen or other brushy trees tied end to end, placed along the toe of the stream bank, and anchored by bolster rock, earth anchors, or fence posts. The revetment provides temporary structural protection to the toe while vegetation becomes established by slowing velocities and diverting the current away from the bank edges. Over time, fine sediments accumulate, partially burying the degrading material. The mass of tree limbs also has the added benefit of creating aquatic habitat as the revetment material generally does not sprout. Once bank vegetation is established, T-posts are removed.

11.0 Project Maintenance and Monitoring

Monitoring and maintenance are essential to successful weed management projects. Monitoring a site after treatment can determine the effectiveness of the project. Monitoring guides adaptive management and can determine the need for alternative treatments. Maintenance, including follow-up weed treatments and native species planting, is an integral part of an integrated weed management plan. Most weed species require multiple treatments before complete eradication occurs. Often once one weed species is removed from a site, secondary weed infestations can occur. Planting native vegetation can reduce re-colonizing weed species by out-competing them. Follow-up maintenance is critical for reducing the re-colonization of primary and secondary weed species of concern. For noxious tree weed treatments in forestlands, intermediate and maintenance treatments are prescribed for a given rotation age, based on the goals and objectives of each treatment.

11.1 Project Monitoring

Establishing and implementing a monitoring program determines the success of the project activities and a long-term adaptive management strategy. Monitoring is necessary to determine the efficacy of proposed treatments on priority weed species, identify infestations of new and emerging weed species, and better understand the factors that influence weed spread within the Navajo Nation. To determine the effectiveness of treatment activities a monitoring report will be

prepared. The monitoring report will include the species controlled, method of treatment(s) used, a map of the treated area, issues encountered, and overall control achieved at the site. If using chemical treatments, the name and amount of herbicide used, dates sprayed, time of day sprayed, wind speed, and temperature at time of herbicide application is also required.

11.1. Treatment Effectiveness Monitoring

Monitoring weed spread and/or treatment effectiveness is conducted through annual weed mapping of treatment sites (see Section 6.0). During the project planning phase, the perimeter of the affected area is mapped (using methods outlined in Section 6.0) and percent cover calculated. If the treatment area is a long linear corridor (road or right-of-way) the infested areas is mapped by vehicle along the corridor. This baseline measurement is used to compare acreage of infestation against future acreage calculations following treatments to determine treatment effectiveness. Results from monitoring will be presented in annual weed monitoring reports. By tracking the size of the weed infestation, BIA can determine if treatment methods are successful, and if objectives are being met. If necessary, treatments will be adjusted through the adaptive management process to ensure that the project objectives are achieved.

If treated weed populations are large, monitoring plots located along transects may be established to sub-sample smaller areas. Plots are established by stretching a 100m tape measure across the treatment area. The start and end points of the transect are recorded with a GPS and the bearing of the transect is recorded to help relocate transects in subsequent surveys. Plots (1 x 0.5m) are established every 10 meters along the transect, and noxious weed cover is estimated using the methods outlined in Elzinga et al. 1998. Multiple transects are necessary if the treatment site is large. Data collected from the plots is measured over time and is compared year-to-year. For long linear corridors (roads and rights-of-way) vehicles will stop at established intervals to estimate vegetation cover in an established larger plot area. An example monitoring plot data sheet located in Appendix H.

11.1.2 Photo Monitoring

Photo monitoring is a qualitative way to show change over time in an area of interest. This is the most effective method for visualizing and capturing landscape conditions at a given point in time. Photo points are established immediately after treatment occurs, marked with permanent markers, and GPS coordinates are recorded. Care is taken to ensure that the photo point locations are described in detail so they can be found during follow-up visits. To relocate points and replicate photos, photos from previous sessions are taken to the field. Photos are immediately transferred to a database and labeled with a unique identifier and description so that information does not get lost with time. An example Photo Monitoring Datasheet is in Appendix H.

11.1.3 Adaptive Management

Adaptive management is a system of management practices based on clearly identified outcomes, monitoring to determine if management actions are meeting outcomes and, if not,

facilitating management changes that will best ensure that outcomes are met or to re-evaluate the outcomes. This document is a living document that will be revised through adaptive management. Weed populations are dynamic. Revisions to the plan will be done every five years with updates to the priority weed list and revised recommendations for techniques utilized in weed management projects. They decline when managed with integrated weed treatments and expand when no weed treatments occur. Currently, it is unknown how expansive weed populations are across the Navajo Nation without extensive weed mapping efforts. Even if there were extensive weed mapping efforts, weed populations continually change and expand. There are many uncertainties that can occur in a dynamic system due to weed expansion, the effectiveness of a treatment, and different management priorities. Monitoring through adaptive management will help determine if the project objectives are being met and if the treatments are staying within the environmental effects that were anticipated with this PEIS. If the parameters discussed above are not being met, the techniques, timing and frequency of treatments, etc. can be changed through adaptive management. Implementing an integrated weed management program increases the chance of overall success and decreases the risk of any large failures (Sheley and Petroff 1999, Bormann and Kiester 2004).

The BIA is required to involve the public in adaptive management by:

1. Maintaining open channels of information to the public, including transparency of the monitoring process that precedes adaptive management and the decision-making process by which it is implemented.
2. Providing post-activity opportunity for public and affected outside agency review of adaptive management practices, including practices that were exceptions to any resource management plan or that had permitting and/or other regulatory requirements not satisfied by prior coordination.

11.2 Project Maintenance

As discussed above, follow-up maintenance is required to effectively eradicate many weed species. For example, successful long-term management programs for tamarisk require more than five years of treatments using multiple control methods, including: mechanical, fire, and chemical treatments (USFS 2012). Secondary weeds (i.e., camelthorn) may colonize a treatment site once it is cleared. Planting native vegetation at treatment sites reduces re-colonizing noxious weeds. Periodic weeding using hand pulling or spraying or small mechanical tools is necessary until native vegetation matures and creates a canopy. Weed treatments should occur every other month during the growing season (April-September) to treat re-sprouting and secondary infestations. Consistent maintenance after the first treatment is the most cost-effective way to ensure eradication or control of weeds, because less time and materials are required for small, young weed. Treatment sites, especially those planted with native vegetation, should be fenced to prevent livestock from entering so native vegetation can establish and mature. Fencing will require maintenance to ensure that it is effective at preventing livestock intrusions.

12.0 Demonstration Projects

A number of demonstration projects were identified by BIA Navajo Region Agencies to initiate noxious weed treatments and serve as models for future projects (**Table 12-1**). Demonstration projects have completed weed mapping, compliance, permitting, and reporting, and departmental funding has been requested or confirmed. Monitoring and maintenance of these sites will provide valuable information that can improve and enhance weed treatment methods for future projects.

THIS PAGE INTENTIONALLY LEFT BLANK

Table 12-1. Demonstration Projects identified by the five BIA Navajo Region Agencies including Western, Shiprock, Chinle, Eastern (Crownpoint), Navajo Partitioned Land, and Fort Defiance Agencies. The table outlines the weed species mapped at the site, habitat and land use, proposed methods, and funding years for project implementation.

Agency	Project Name	Habitat Type	Methods	Weed Mapping (ac)	Species Mapped	FY
Western	Tsah Bii Kin (Tonalea Lake)	Riparian	Mechanical, Chemical	38	TAMAR	2014 - 2015
Western	Tsegi Canyon	Riparian	Mechanical, Chemical	32	ELAN	2014-2015
Western	San Juan River	Riparian	Mechanical, Chemical, Manual	1850	TAMAR, ELAN, ACRE, ALMA, SARA	2014-2015
Western	Oljato Wash and Parrish Creek (Tyende)	Riparian	Not Specified	52	Not Specified	2014-2015
Western	Nitsin Canyon (Navajo Canyon)	Riparian	Mechanical, Chemical	150	ELAN, TAMAR	2014-2015
Western	Shonto Wash – Phase 1	Riparian	Chemical, Mechanical, Biological	14	TAMAR, ELAN	2020 to 2021
Western	WNA – Phase 2	Rangeland	Mechanical, Chemical, Biological	206,389	ELAN	2014 to 2015
Fort Defiance	Kin Dah Lichi	Sagebrush, Pinon, Juniper	Mechanical, Chemical	1,516	ELAN, BRTE, COAR, SAKA, CANU, CIVU	2014 to 2015
Fort Defiance	New Lands	Stream Corridor	Mechanical, Chemical	227	PEHA, CIVU, LIDA, ONAC, ELAN, TAMAR ALMA13, ULPU, BRTE, COAR4, TRTE, MAVU, SAKA	2015 to 2016
Fort Defiance	District 14	Stream Corridor	Chemical	1,661	ELAN, TAMAR, CIVU, BRTE, COAR, CEIN, HAGL, CANU, TRTE	2016 & 2017
Fort Defiance	Commercial Forest	Forest	Chemical and Mechanical	324	BRRA, ULPU, CIVU, BRTE, SOAR, CANU, TRTE, ACRE, ELAN, SAKA, CIAR	2018-2019
Fort Defiance	District 7 (BIA 15)	Rangeland	Mechanical, Chemical, Biological	4,570	ACRE3, CEDI3, CEBI2, LIDA	2020-2021
Fort Defiance	HWY 264 and 191	Roads	Mechanical, Chemical	21,230	ACRE3, CEDI3, CEBI2, LIDA	2020-2021
Fort Defiance	Colorado Pueblo Wash	Riparian	Mechanical, Chemical	1,821	TAMAR, ELAN	2020-2021
Fort Defiance	Kinlichee	Riparian	Mechanical, Chemical	1,500	TAMAR, ELAN	2020-2021
Northern	LMD 13	Stream Corridor	Mechanical, Chemical, Biological	398,196	TAMA, ELAN, ACRE3, CANU	2020 & 2021
Eastern	Canoncito/Alamo			2,000	Not specified	2015 & 2016
Navajo Partitioned Land	Precinct 1, 2, and 3	Stream Corridor and Rangeland	Chemical and Mechanical	1,500	ACRE, BRTE, TAMA, SALSOL	2015-2016
Chinle	Many Farms Plot	Agricultural field		1,990	TAMAR, ELAN	2020-2021

THIS PAGE INTENTIONALLY LEFT BLANK

13.0 References

Arizona Invasive Species Advisory Council. 2008. Arizona Invasive Species Management Plan. 154 pp.

Bonneville Power Administration (BPA). 2000. Transmission System Vegetation Management Program Final Environmental Impact Statement. Portland, Oregon.

Bormann, B.T., and A.R. Kiester. 2004. Options in Forestry: Acting on Uncertainty. *Journal of Forestry*. 102: 22 – 27.

Colorado Natural Area Programs. 2000. Creating an Integrated Weed Management Plan: A Handbook for Owners and Managers of Lands with Natural Values. Colorado Natural Areas Program, Colorado State Parks, Colorado Department of Natural Resources; and Division of Plant Industry, Colorado Department of Agriculture. Denver, Colorado.

Daines, R. 2006. Targeted grazing: a natural approach to vegetation management and landscape enhancement. ASI, A. Peischel and D.D. Henry, Jr. American Sheep Industry Association. 201 pp.

Elzinga, C.L., D.W. Salzer, and J.W. Willoughby. 1998. Measuring and Monitoring Plant Populations. BLM/RS/ST-98/005+1730, pp 477.
(www.blm.gov/nstc/library/pdf/MeasAndMon.pdf)

McMaster, M.A., L.J. MaKarick, J. Spence, C. Deuser, and T. Dow. 2012. Beware the ravenous Ravenna: management of the highly invasive exotic Ravenna grass (*Saccharum ravennae*) in Colorado River Parks. 2011 Tamarisk Research Conference – Tamarisk Coalition. Tucson, AZ.

Montana, Utah, Wyoming Cooperative Extension Services. 2006-2007. Weed Management Handbook. pp 288.

Morse, L.E., J.M. Randall, N. Benton, R. Hiebert, and S. Lu. 2004. An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for their Impact on Biodiversity. Volume I. NatureServe, Arlington, Virginia. 42 pp.

National Park Service. 2010. Exotic Plant Management Plan -Lake Mead National Recreation Area. Clark County, Nevada. Mohave County, Arizona

Navajo Nation Forestry Department (NFD). 2012. Navajo Forestry Department Compartment Exam Handbook. Developed in 1980. Updated in 2012. 52 pp.

Rees, N.E., P.C. Quimby Jr., G.L. Piper, E.M. Coombs, C.E. Turner, N.R. Spencer, and L.V. Knutson (eds.). 1996. The Biological Control of Weeds in the West. Western Society of Weed Science. Bozeman, Montana.

Sheley, R.L., and J.K. Petroff. 1999. Biology and Management of Noxious Rangeland Weeds. Oregon State University Press. Corvallis, Oregon.

U.S. Bureau of Land Management (BLM). 2007. Final Environmental Impact Statement Vegetation Treatments on Bureau of Land Management Lands in 17 Western States. BLM Nevada State Office. Reno, NV.

U.S. Forest Service. 2021. Forest Health Staff, Newton Square, Pennsylvania. Invasive Plants website: <https://www.fs.fed.us/foresthealth/protecting-forest/invasive-species/invasive-plants.shtml>.

U.S. Forest Service. 2005. Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds. Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mojave, and Yavapai Counties, Arizona.

U.S. Geological Service Southwest Biological Science Center. 2003. USGS Weeds in the West Project: Status of Introduced Plants in Southern Arizona State Parks. Fact Sheet for: *Marrubium vulgare* L.

U.S. Forest Service. 2012. Field guide for managing weed species in the Southwest. United States Department of Agriculture. Forest Service. Southwestern Region. <http://www.fs.usda.gov/main/r3/forest-grasslandhealth/invasivespecies>.

U.S. Forest Service. 2021. Invasive Plants website. Available online at <https://www.fs.fed.us/foresthealth/protecting-forest/invasive-species/invasive-plants.shtml>.

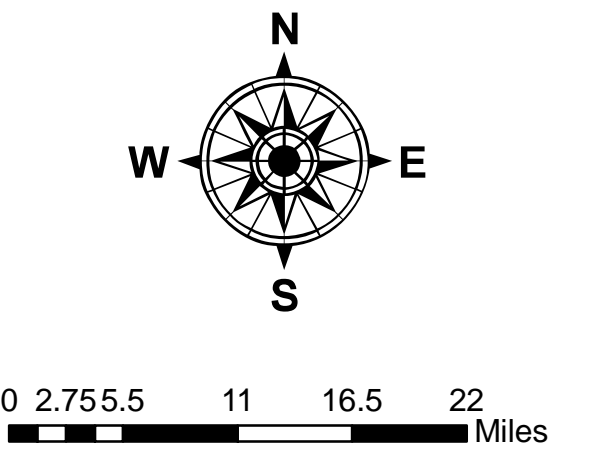
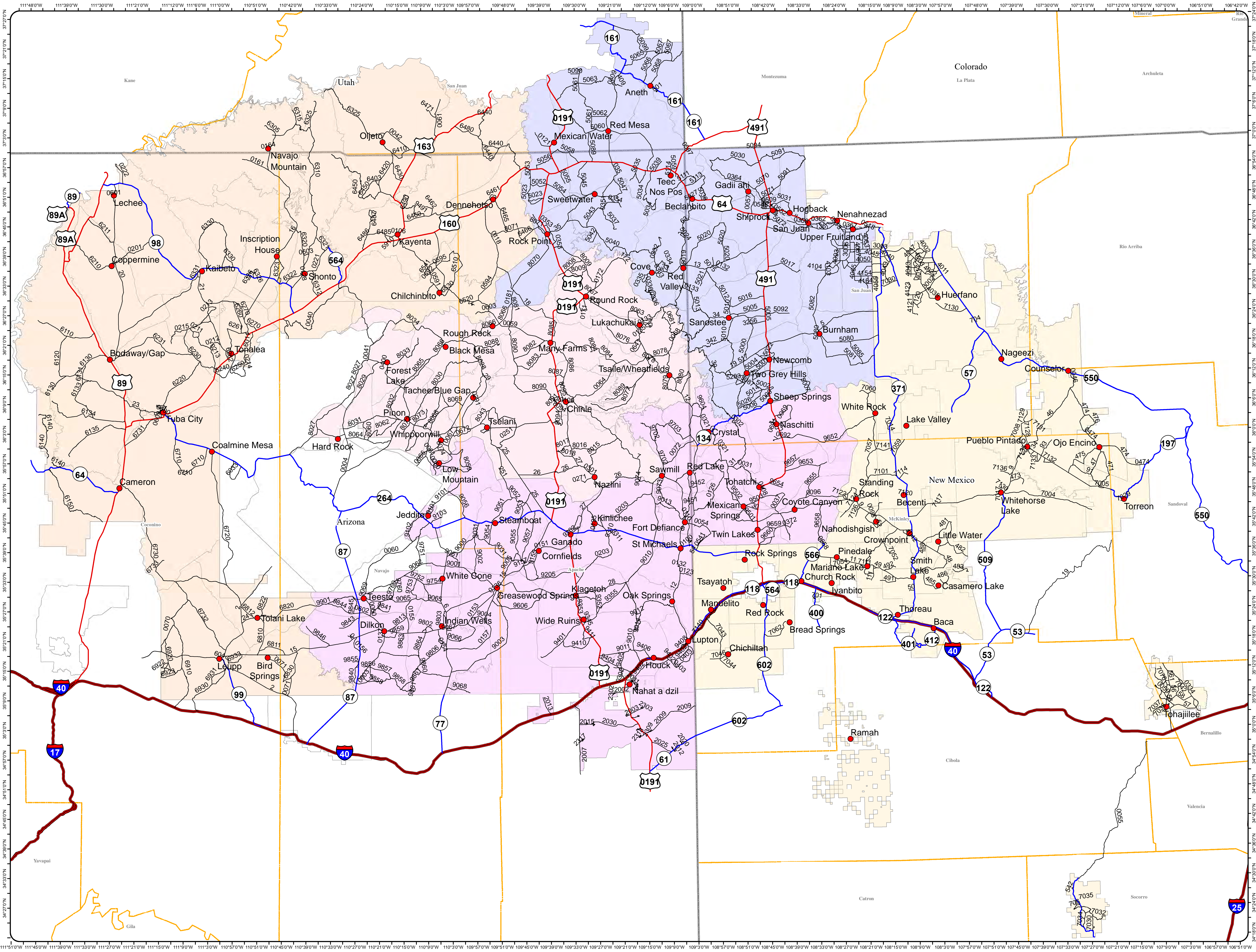
White, J.A. 2007. Recommended protection measures for pesticide applications in Region 2 of the U.S. Fish and Wildlife Service. U.S. Fish and Wildlife Service, Region 2, Environmental Contaminants Program, Austin, Texas.

Appendix A. Acronyms

Acronym	Meaning
ADOT	Arizona Department of Transportation
APE	Area of potential effect
APHIS	Animal and Plant Health Inspection Service (USDA)
BA	Biological Assessment
BE	Biological Evaluation
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
BO	Biological Opinion
BPA	Bonneville Power Administration
BRCF	Biological Resource Compliance Form
CDA	Community Development Area
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
CRCF	Cultural Resource Compliance Form
DNRGPS	Minnesota Department of Natural Resources – Global Position System
	Convertor
EIS	Environmental Impact Statement
eNOI	Electronic Notice of Intent
ESA	Endangered Species Act
ft	foot
gal	gallon
GIS	Geographic Information System
GPS	Global Positioning System
HUC	Hydrologic Unit Code
IAM	Indian Affairs Manual
lb	pound (weight)
LMD	Land Management District
m	meter
MSDS	Material Data Safety Sheet
MSO	methyalted seed oil
NAD	North American Datum
NAPI	Navajo Agricultural Products Industry
NEPA	National Environmental Policy Act
NIIP	Navajo Indian Irrigation Program (Bureau of Reclamation)
NMDOT	New Mexico Department of Transportation
Navajo DOT	Navajo Department of Transportation

NFD	Navajo Forestry Department
N.N.C.	Navajo Nation Tribal Code
NNDA	Navajo Nation Department of Agriculture
NNDFW	Navajo Nation Department of Fish and Wildlife
NNEPA	Navajo Nation Environmental Protection Agency
NNHPD	Navajo Nation Historic Preservation Department
NNIWMP	Navajo Nation Integrated Weed Management Plan
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRBOT	BIA Navajo Region Branch of Transportation
NRCS	Natural Resource Conservation Service (USDA)
NRO	Navajo Regional Office
NTUA	Navajo Tribal Utility Authority
oz	ounce
P.L.	Public Law
PPE	Personal Protection Equipment
pt	pint
PWSSP	Public Water Systems Supervision Program
qt	quart
ROW	right-of-way
SHPO	State Historic Preservation Office
SWEPIC	Southwest Exotic Plant Information Clearinghouse
TCP	traditional cultural properties
TTP	Tribal Transportation Program
UDOT	Utah Department of Transportation
USC	U.S. Code
USDA	U.S. Department of Agriculture
U.S. EPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
WQPZ	Water Quality Protection Zone

Appendix B. Priority Weed Area Maps



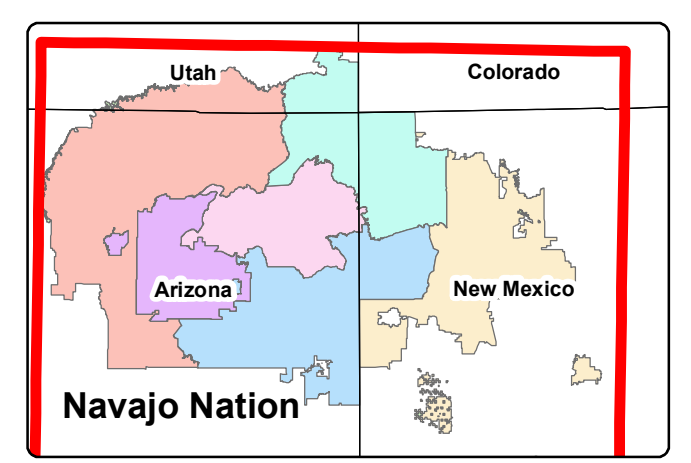
Navajo Division of
Transportation
P.O. Box 4620
Window Rock, Arizona 86515
Phone: (505) 371-8300

Map By: Raleigh Lee
Title: GIS Technician
Date: 1/26/2022

- Navajo Nation**
- NavajoNationChp_Pts
 - BIA_Rts
 - State Hwy
 - US Hwy
 - Interstate Hwy

- AGENCY**
- CHINLE
 - CRWNPT
 - FRTDEF
 - HOPI
 - SHPRCK
 - TBACTY
 - States Boundary
 - County Boundary
 - Chapter_Bndry

Note:
This map was created by the Navajo Division of Transportation (Navajo DOT) and the data represented upon this map is for estimate purposes only and not to be used for official reference or analysis. Navajo DOT is constantly updating map features and warns that some features and their locations may be incomplete and/or incorrect. The parallels and meridians, if shown, closely represent the NAD83 datum. Intuition and field verification is recommended in some areas.












BUREAU OF INDIAN AFFAIRS NAVAJO REGION

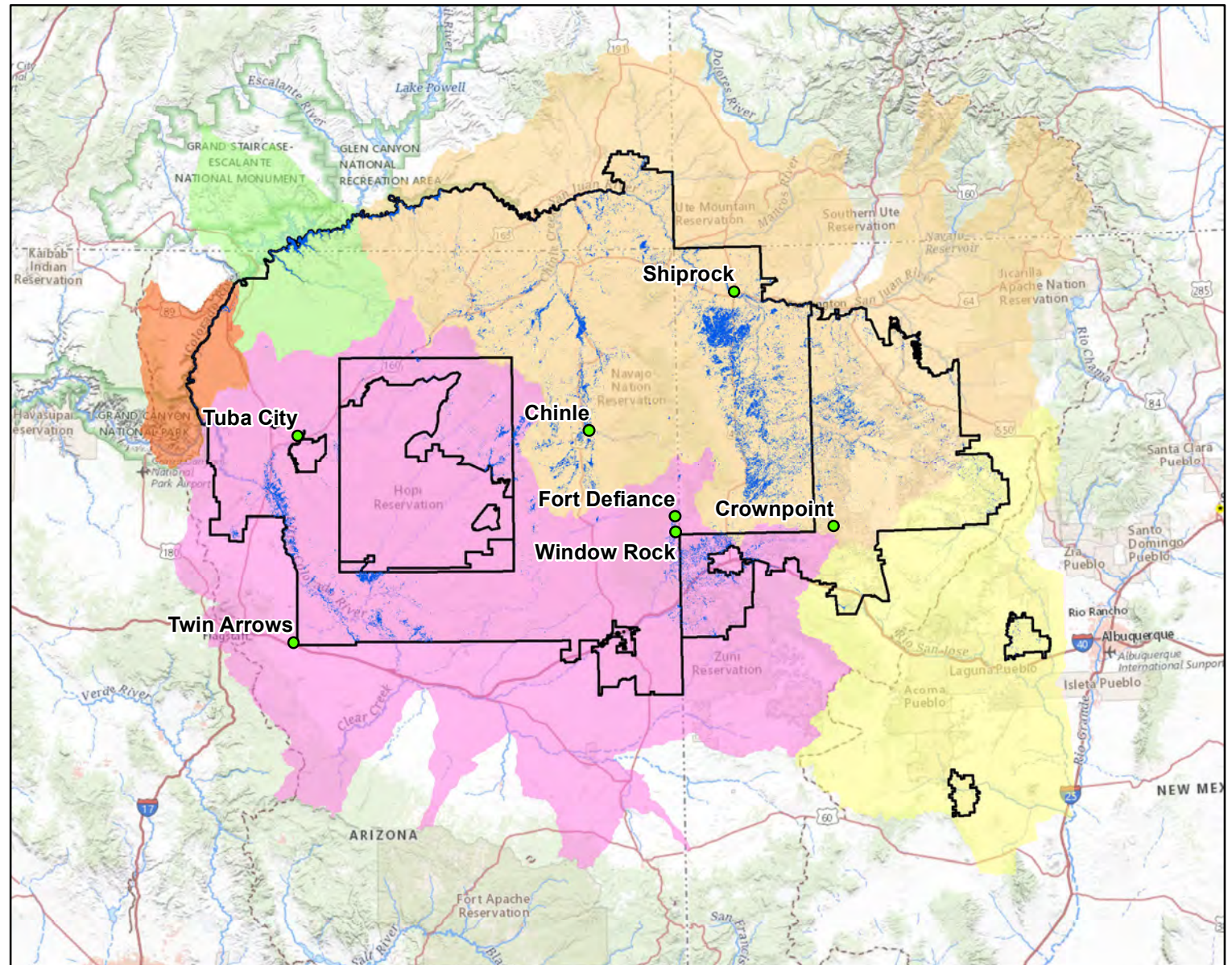


Legend

-  Riparian Habitat
-  Navajo Nation Boundary

Subregional Watersheds

-  Rio Grande
-  Upper Colorado
-  San Juan
-  Lower Colorado
-  Little Colorado



0 25 50 100 Miles

INTEGRATED WEED MANAGEMENT PLAN RIPARIAN HABITAT

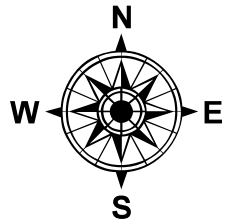
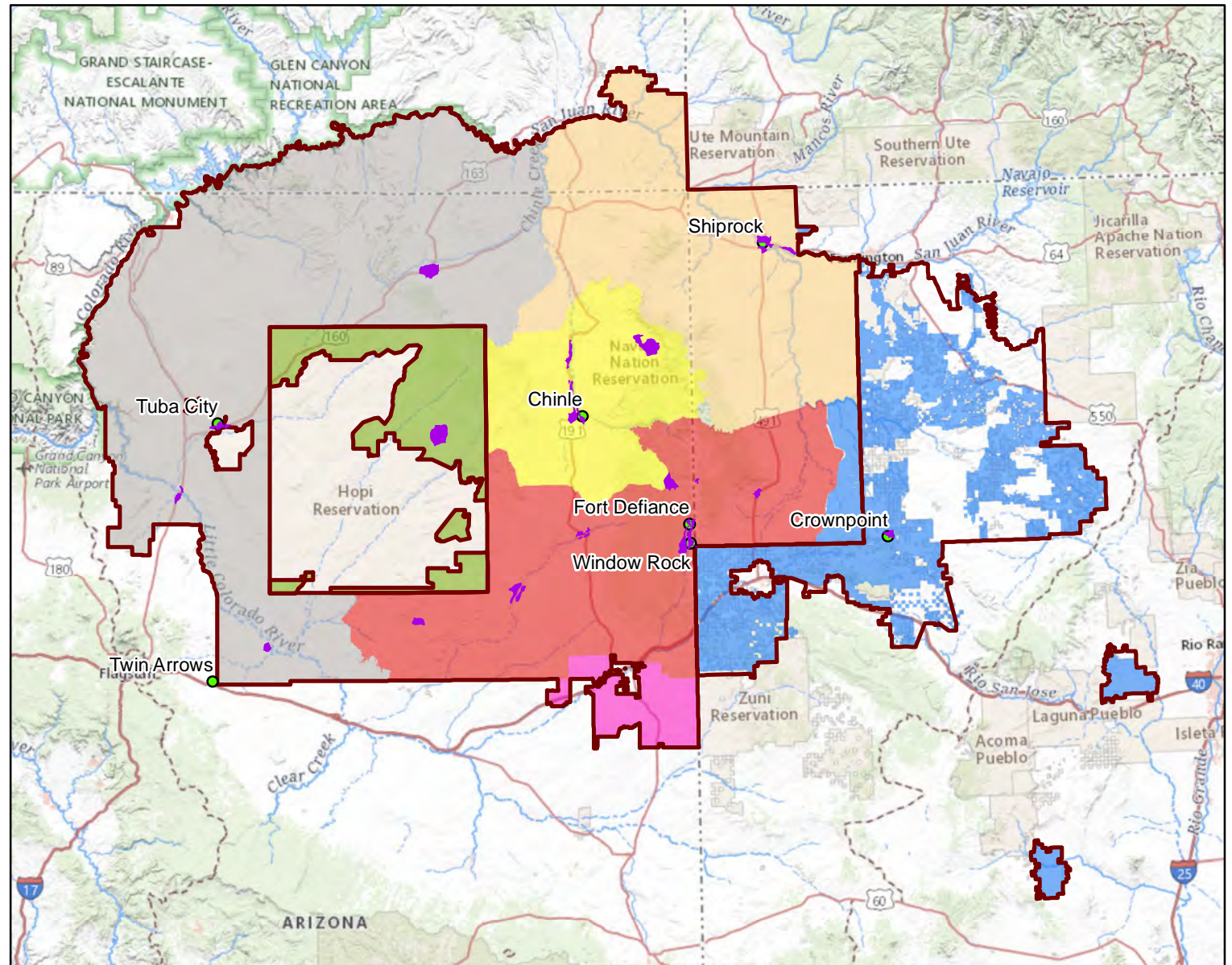


BUREAU OF INDIAN AFFAIRS NAVAJO REGION



Legend

- Navajo Nation Community Development Areas
- Navajo Nation Boundary
- New Lands
- Chinle Agency
- Eastern Navajo Agency
- Navajo Partitioned Lands
- Fort Defiance Agency
- Shiprock Agency
- Western Navajo Agency



0 20 40 80 Miles

INTEGRATED WEED MANAGEMENT PLAN
COMMUNITY DEVELOPMENT AREAS



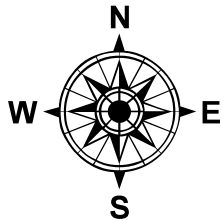
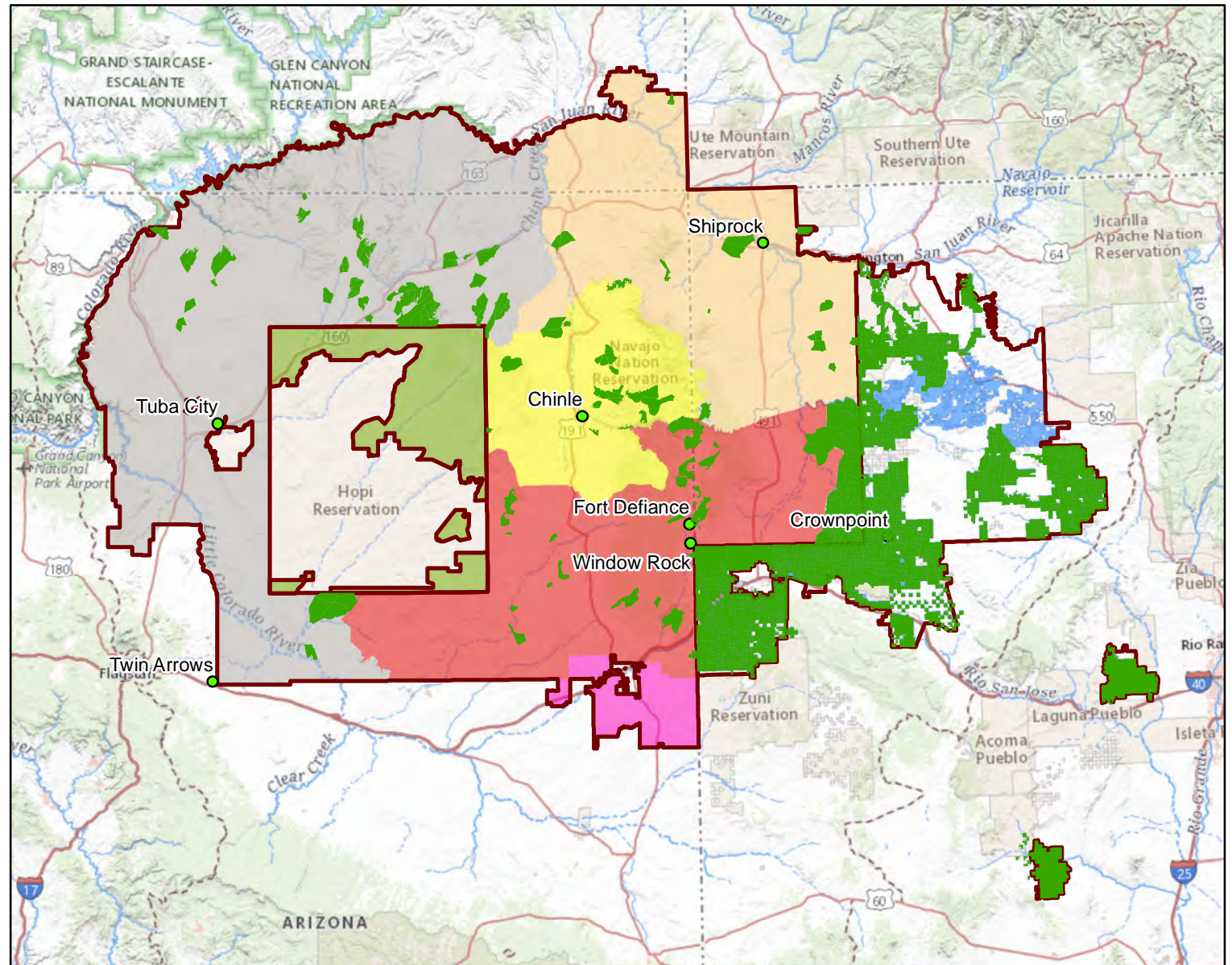
BUREAU OF INDIAN AFFAIRS

NAVAJO REGION



Legend

- Designated Rangeland
- Navajo Nation Boundary
- New Lands
- Chinle Agency
- Eastern Navajo Agency
- Navajo Partitioned Lands
- Fort Defiance Agency
- Shiprock Agency
- Western Navajo Agency

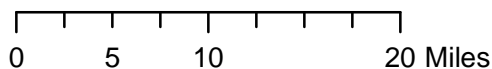


0 20 40 80 Miles

INTEGRATED WEED MANAGEMENT PLAN
DESIGNATED RANGELAND



This topographic map shows the Chinle area within the Navajo Nation Reservation. A large yellow-shaded region indicates the study area. Key features include the town of Chinle, Many Farms Lake, and the Coote Wash. The map displays elevation contours, with labels for 1900 and 2500 feet. A dashed vertical line is present on the right side of the map. A red outline is visible on the left edge.



INTEGRATED WEED MANAGEMENT PLAN
CHINLE AGENCY DESIGNATED FARMLAND

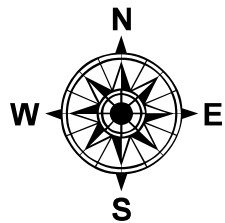
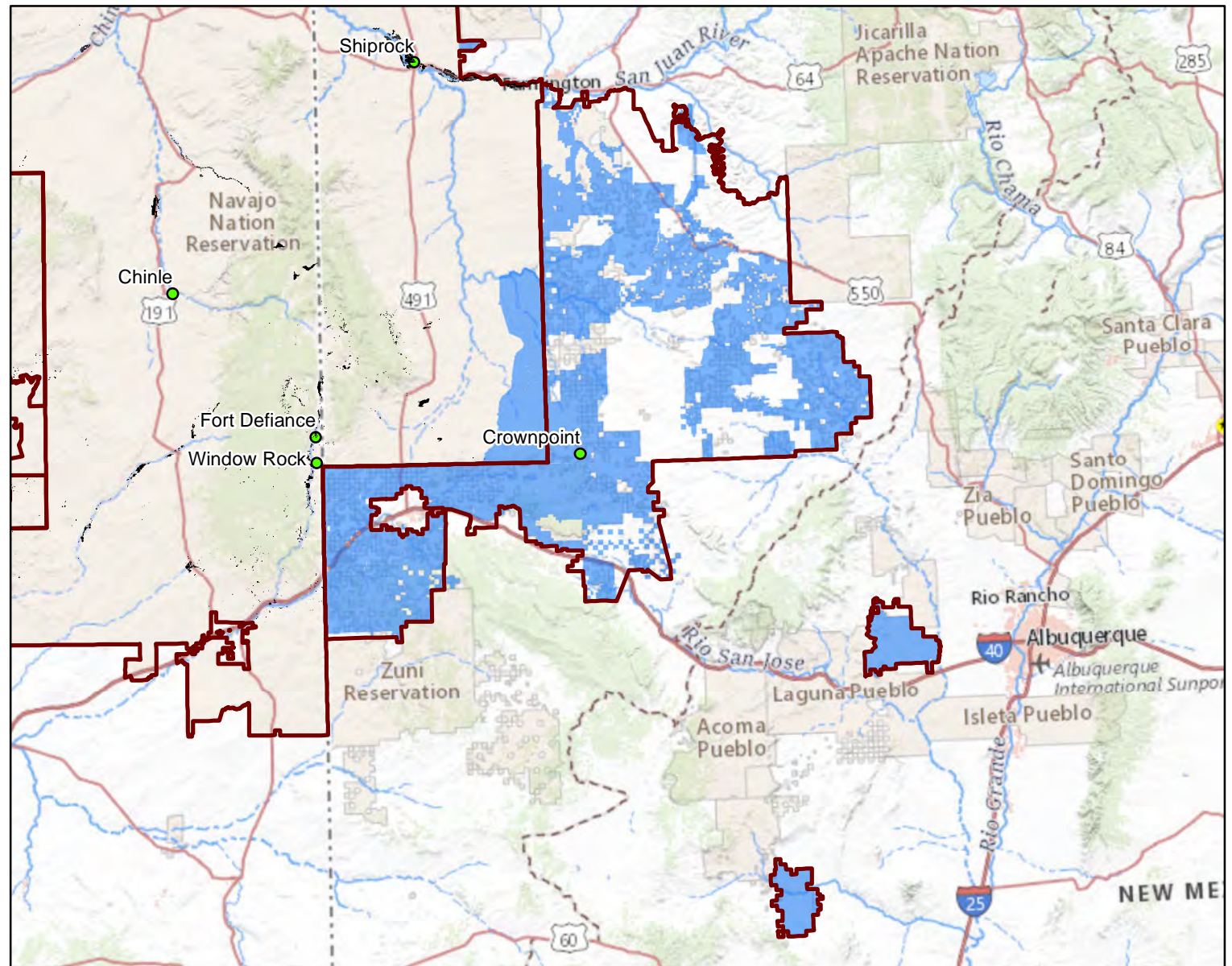


BUREAU OF INDIAN AFFAIRS NAVAJO REGION



Legend

- Designated Cropland (0.56 ac)
- Navajo Nation Boundary
- Eastern Navajo Agency



0 15 30 60 Miles

INTEGRATED WEED MANAGEMENT PLAN
EASTERN NAVAJO AGENCY DESIGNATED FARMLAND

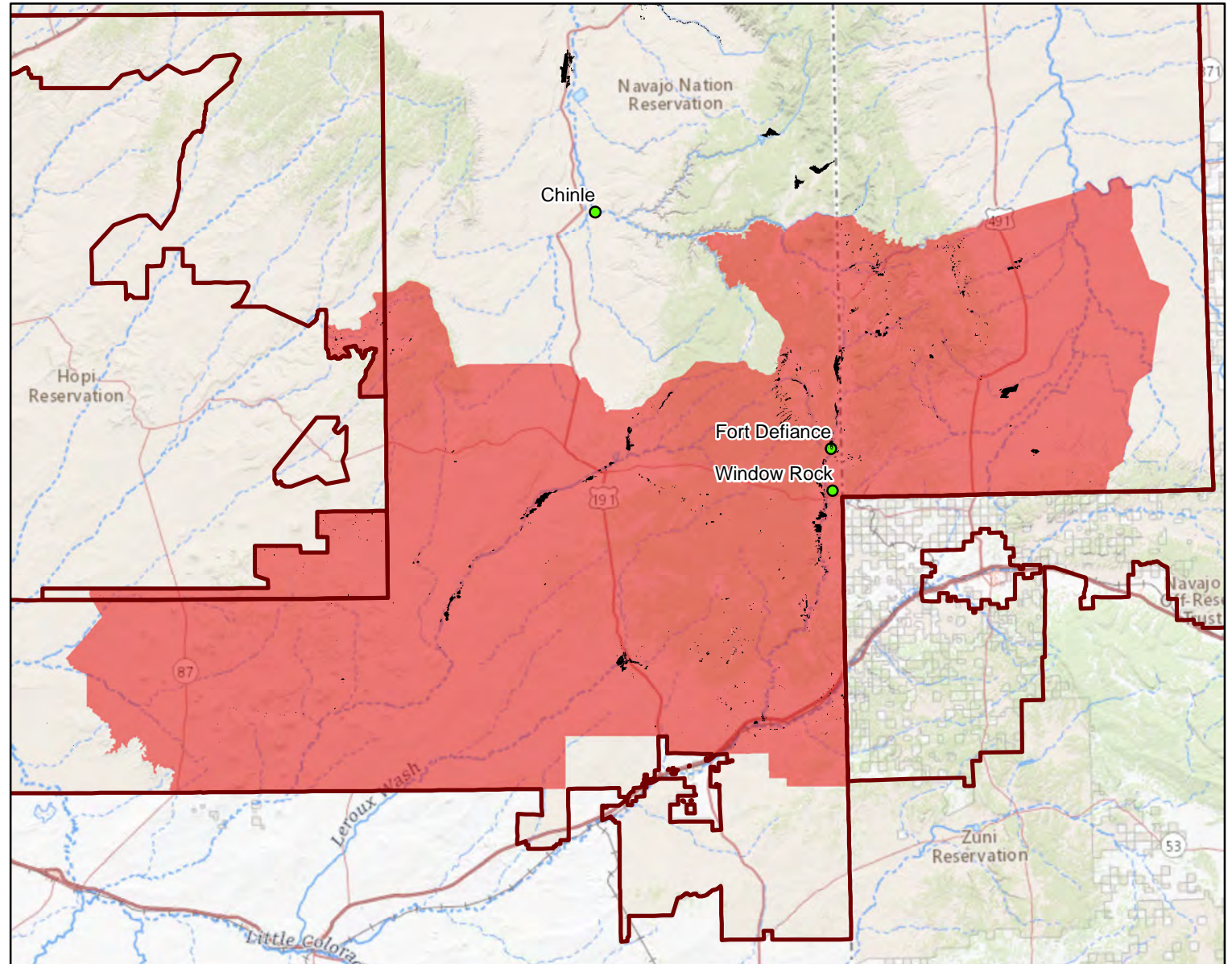


BUREAU OF INDIAN AFFAIRS NAVAJO REGION



Legend

- Designated Cropland (16,204.9 ac)
- Navajo Nation Boundary
- Fort Defiance Agency



INTEGRATED WEED MANAGEMENT PLAN FORT DEFIANCE AGENCY DESIGNATED FARMLAND

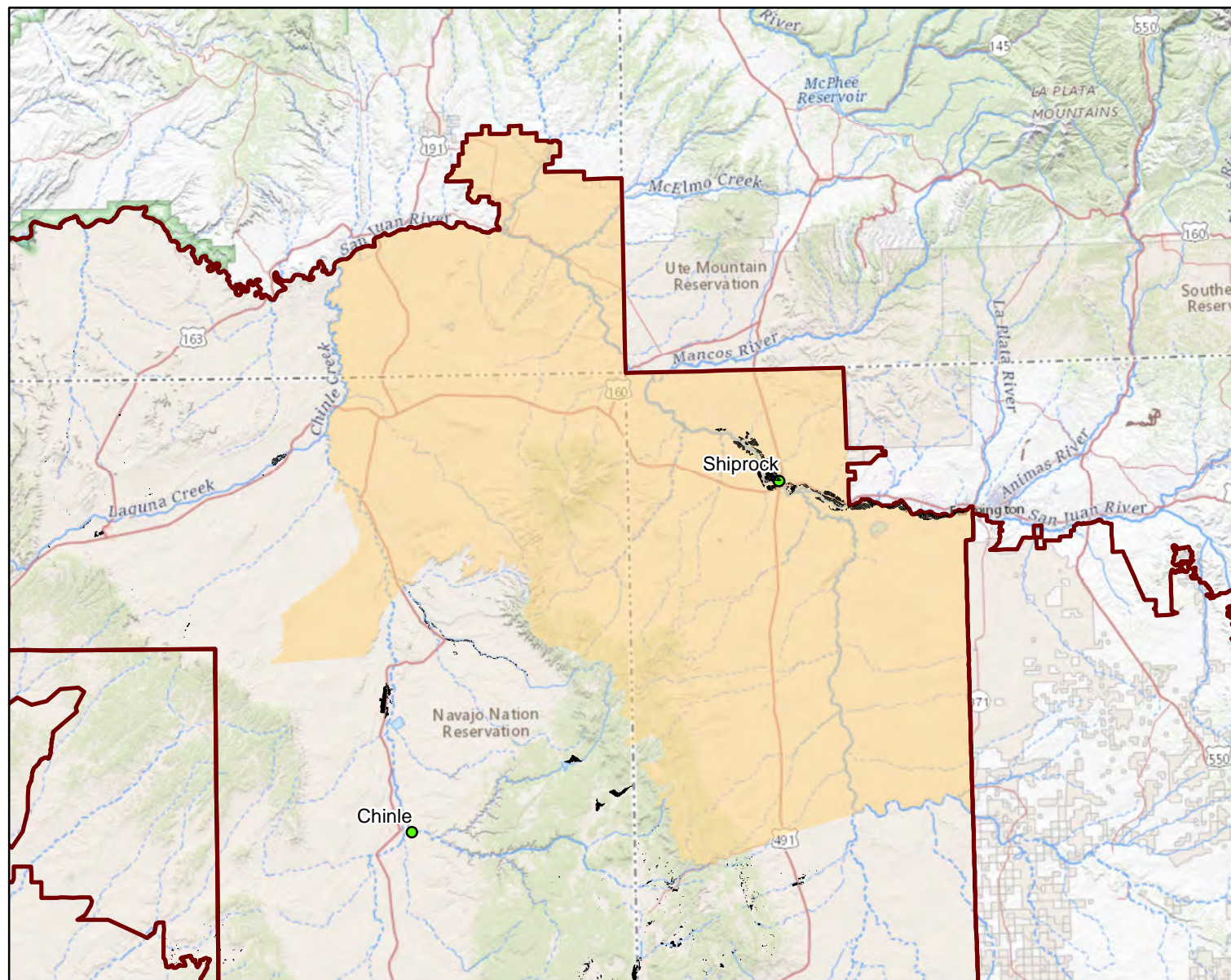


BUREAU OF INDIAN AFFAIRS NAVAJO REGION



Legend

- Designated Cropland
(11,612.4 ac)
- Navajo Nation Boundary
- Shiprock Agency



0 10 20 40 Miles

INTEGRATED WEED MANAGEMENT PLAN
SHIPROCK AGENCY DESIGNATED FARMLAND

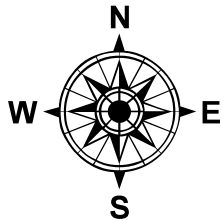
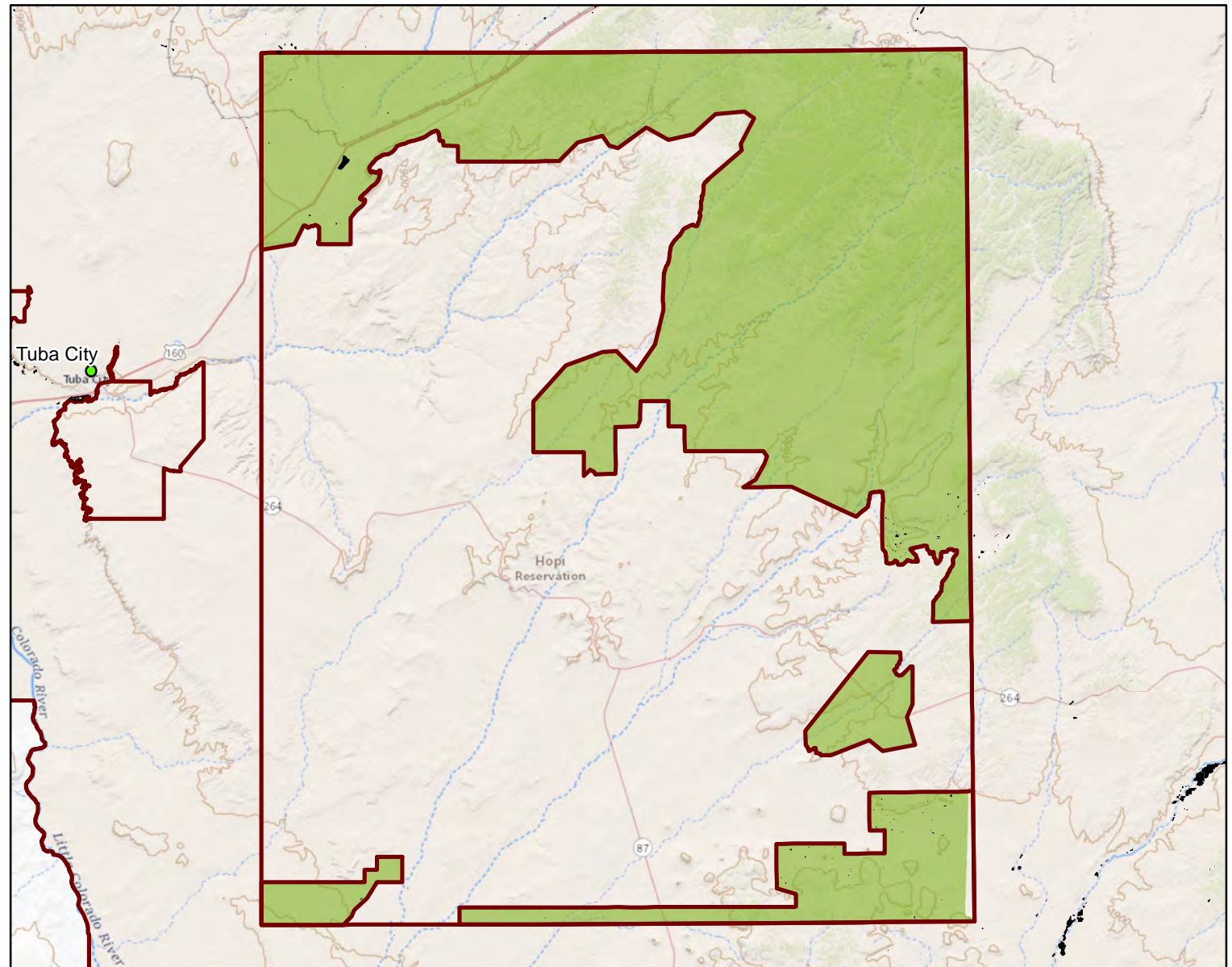


BUREAU OF INDIAN AFFAIRS NAVAJO REGION



Legend

- Designated Cropland
(1,112.7 ac)
- Navajo Nation Boundary
- Navajo Partitioned Lands



0 5 10 20 Miles

INTEGRATED WEED MANAGEMENT PLAN
NAVAJO PARTITIONED LANDS DESIGNATED FARMLAND

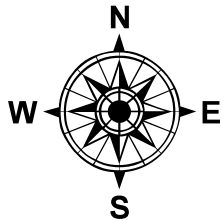
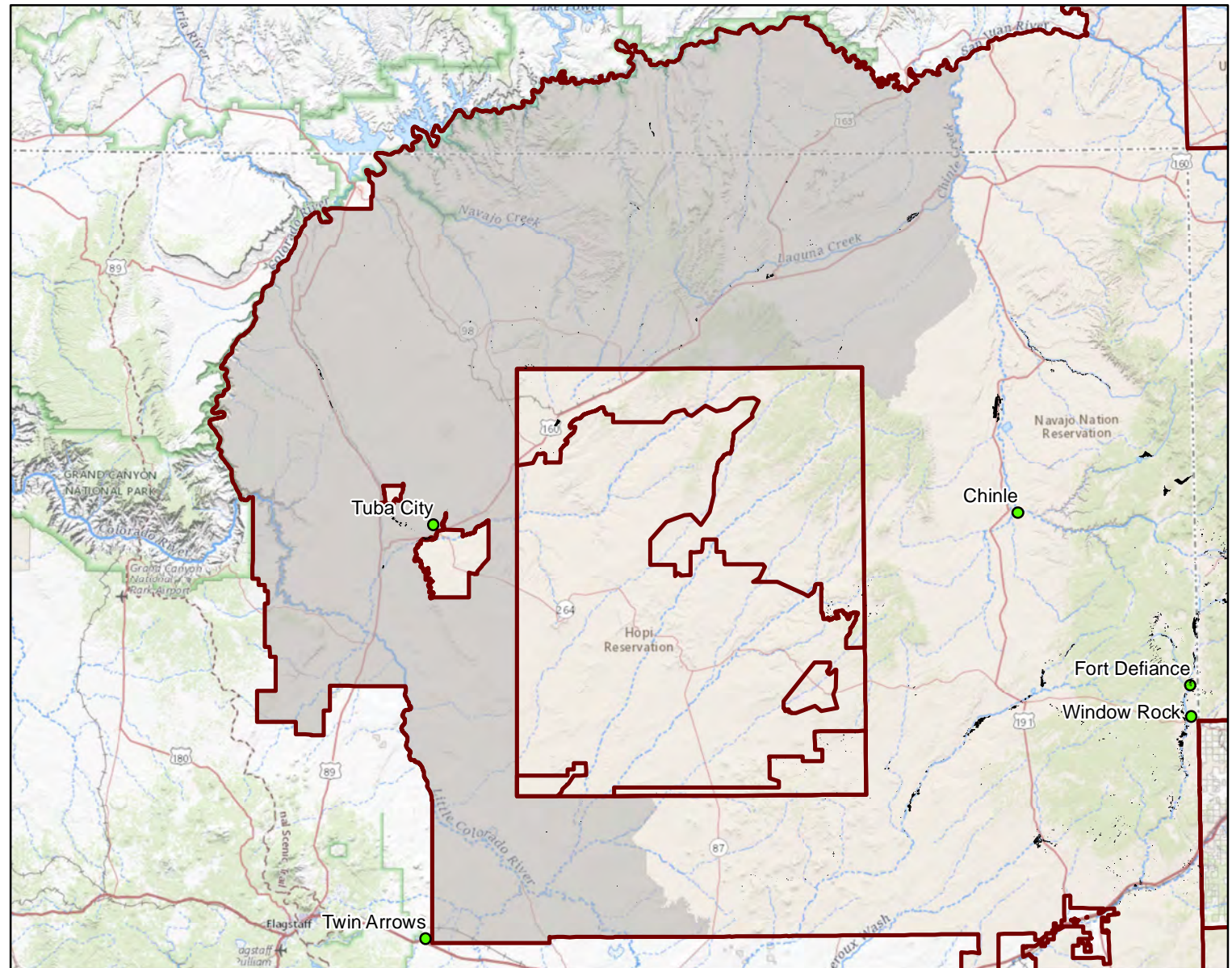


BUREAU OF INDIAN AFFAIRS NAVAJO REGION



Legend

- Designated Cropland
(3,615.5 ac)
- Navajo Nation Boundary
- Western Navajo Agency



0 12.5 25 50 Miles














INTEGRATED WEED MANAGEMENT PLAN
WESTERN NAVAJO AGENCY DESIGNATED FARMLAND

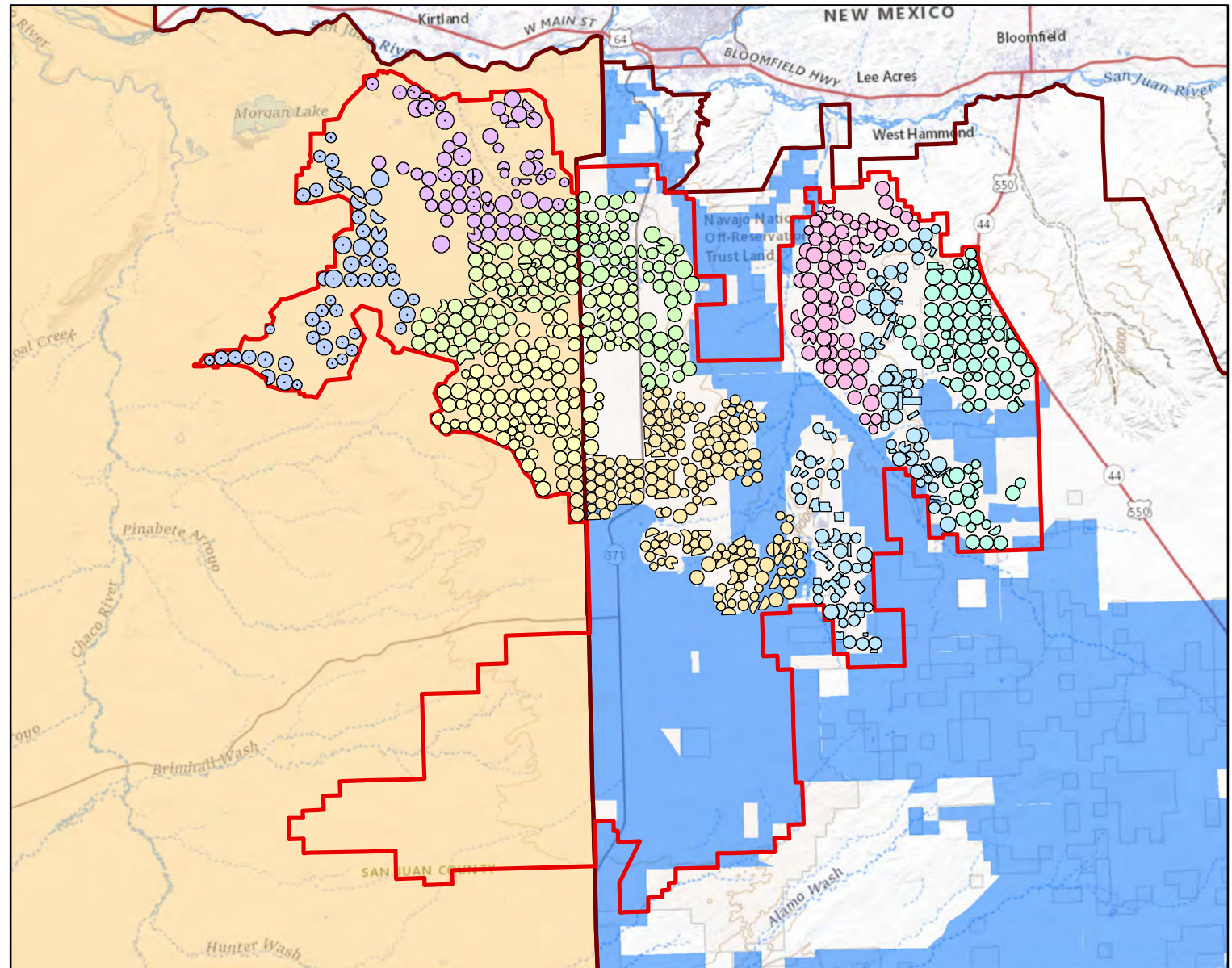


BUREAU OF INDIAN AFFAIRS NAVAJO REGION



Legend

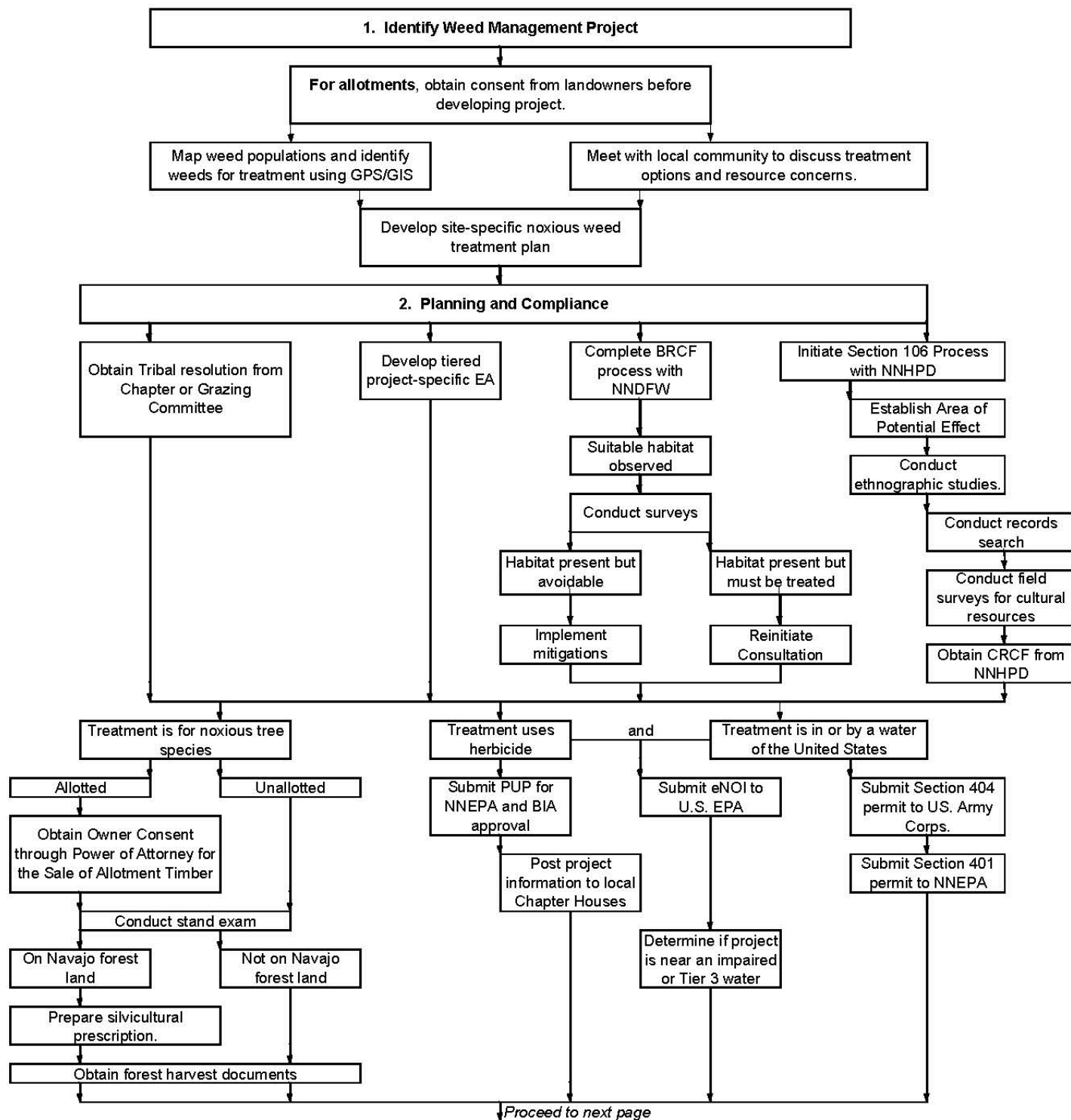
-  Navajo Nation Boundary
-  Eastern Navajo Agency
-  Shiprock Agency
-  NAPI/NIIP (Commercial Farmland)
-  Block One
-  Block Two
-  Block Three
-  Block Four
-  Block Five
-  Block Six
-  Block Seven
-  Block Eight
-  Block Nine

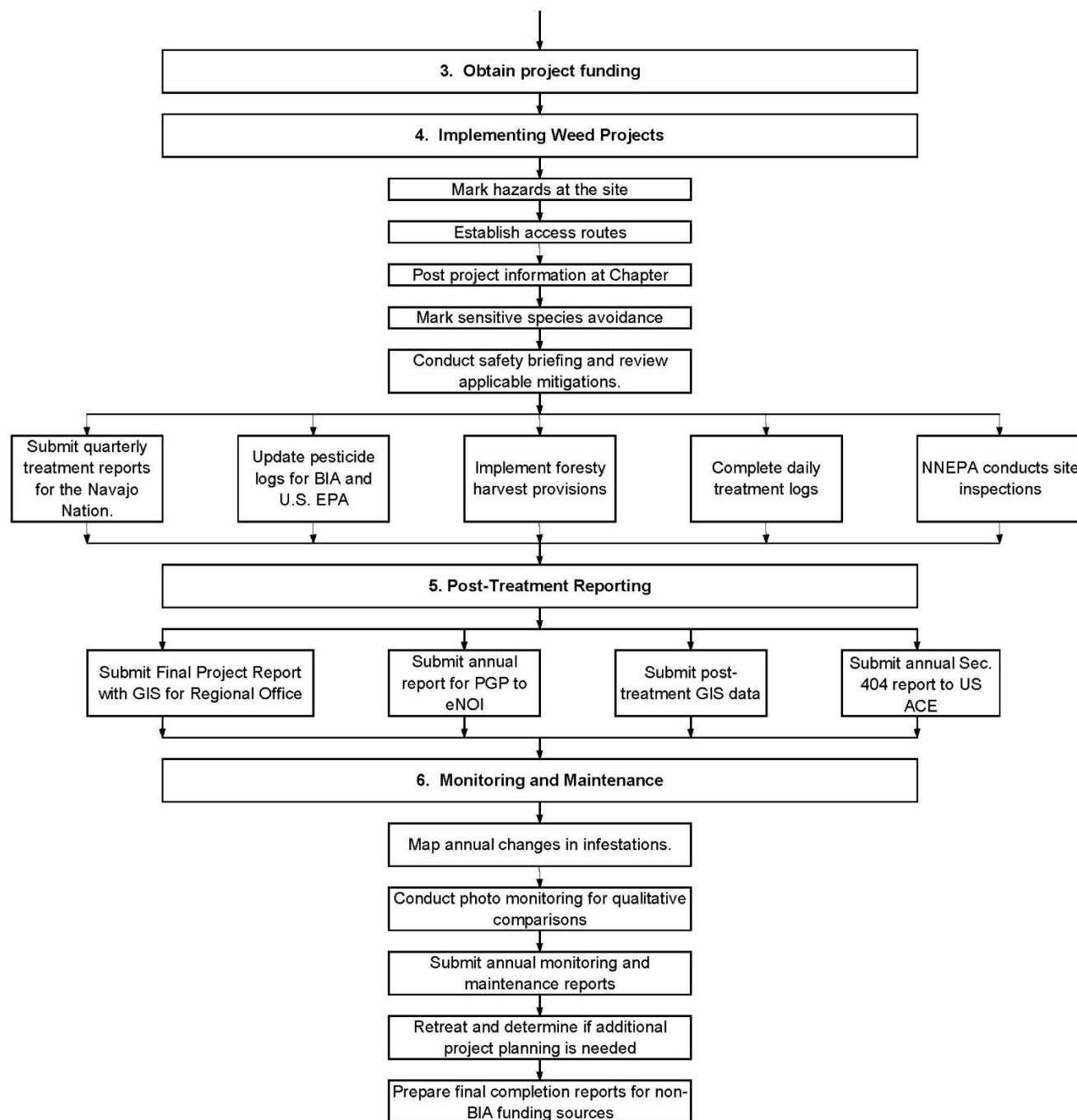


INTEGRATED WEED MANAGEMENT PLAN COMMERCIAL FARMLAND

Appendix C. Weed Project Checklist

Weed Project Flow Chart





Noxious/Invasive Weed Project Checklist

Below are steps for planning, implementing, and completing a noxious weed project under the Navajo Nation Integrated Weed Management Plan (NNIWMP). These steps are described in detail in the NNIWMP. Steps with a “➤” indicate a **required step** for all weed projects. Other steps must be completed if identified criteria is met (i.e., project uses herbicide, project takes place in a WOTUS).

Step 1: Identify Weed Management Project

- ☐ **For allotted lands**, obtain consent from Indian owner for weed projects as the law requires¹.
- ☐ Conduct weed mapping/inventory to determine scope of weed treatments:
 - ☐ If weed mapping data is older than 5 years old, conduct weed mapping to determine size and intensity of infestation. See Appendix D. Noxious Weed Mapping Protocol
 - ☐ If treating noxious trees species, conduct a stand exam to estimate number of trees for removal. Stem counts should be broken down by tract number, Section, Township, and Range. Refer to the Navajo Forestry Department Compartment Exam Handbook.
- ☐ Identify each noxious weed species present and the size and cover of each species' infestation (for example: tamarisk – 10 acres, 90% cover, Russian olive – 3 acres, 50% cover, camelthorn – 1 acre, 10% cover). See Appendix D. Noxious Weed Mapping Protocol
- ☐ Meet with local community, land users, grazing officials, and/or neighboring agencies to discuss treatment options and resource concerns.
 - ☐ Determine cost-sharing opportunities and indirect contributions from stakeholders.
 - ☐ Determine resource concerns for stakeholders and review grazing permit history.
 - ☐ Describe previous weed treatments including the methods used, estimated dates, duration, and size. Include herbicides were used and application rates, if known.
 - ☐ Describe potential causes or contributing factors that influenced the establishment of invasives species at the site where possible.
 - ☐ Determine potential traditional cultural properties (TCPs, see Appendix G) in the area that could be affected by weed treatments, such as plant collection sites for traditional practices.

¹ If consent for weed treatments is provided under an existing grazing management plan for grazing permittees, consent has been obtained.

- ☐ Develop site-specific noxious weed treatment plan (project timeline, species targeted, methods proposed, number of treatments, contracted activities, etc.).
- ☐ Write a description of the area (i.e. vegetation, nearby water sources, land use, terrain, potential conflicts) and project needs. Plan should include goals and objectives for the area of interest for the next 3-5 years.
 - ☐ For projects in Navajo forestlands (timberlands or woodlands), develop a Silvicultural Prescription for noxious tree treatments (see below).
- ☐ Describe restoration plan for native plant communities. Identify native species, restoration methods, and planting design.
- ☐ Develop a safety and communications plan with specific safety measures for all treatment measures, including equipment handling, required Personal Protection Equipment (PPE), and emergency response communication.
- ☐ Prepare monitoring and maintenance plan. Outline recommended maintenance activities for up to 8 years post-treatment.

On Indian Allotment Lands

- ☐ Obtain consent from Indian owner for weed projects as the law requires.
- ☐ **For projects with noxious trees** (i.e., tamarisk, Russian olive, Siberian elm, tree of heaven), contact BIA Branch of Forestry for all treatments on allotment lands. Obtain consent of the majority Indian interest of the beneficial Indian owner(s), documented by their signature(s) on a Power of Attorney for the Sale of Allotment Timber, contract or permit is required for any noxious tree weed treatment within allotment lands.

Step 2: Project Planning, Permitting and Compliance:

- ☐ Obtain Tribal Resolution supporting the project. This task can be approval from the local Chapter meeting or a District Grazing/Farm Board/Land Board meeting.
- ☐ Develop an environmental assessment to assess site-specific impacts of project based on Programmatic EIS. Any projects using the NNIWMP can incorporate by reference the existing Programmatic EIS BIA's NEPA Reference Number and/or citation of the NNIWMP (BIA 2022).
 - ☐ Resource analysis should be based on site-specific resources, stakeholder concerns, and resources identified in the Programmatic EIS.
- ☐ Complete and submit the Data Request Form (<https://www.nndfw.org/nnhp/drs2012.pdf>) to Navajo Natural Heritage Program, Navajo Nation Department of Fish and Wildlife to obtain a Biological Resource Clearance Form (BRCF).

- ☐ Establish avoidance buffers around potential habitat for federal and tribal sensitive species based on NNDFW occurrence/potential occurrence data.

OR

- ☐ Hire a qualified biologist to conduct surveys of suitable habitat for federal and tribal sensitive species based on NNDFW occurrence/potential occurrence data. Coordinate surveys with Navajo Nation Department of Fish and Wildlife.

IF suitable habitat is observed:

- ☐ Set-up species-specific buffers around suitable habitat.

OR

- ☐ Conduct surveys supervised by a qualified biologist to determine if endangered species are present. Biologist must have a Biological Investigation permit from NNDFW for the project.
- ☐ Report survey findings to NNDFW.
- ☐ Set up buffer zones and species avoidance measures per the Endangered Species mitigation measures based on treatment AND species for the areas occupied by observed species (Appendix F).
- ☐ Have a qualified biologist on site to monitor activity during all phases of implementation.

IF Treatments need to occur within suitable/occupied habitat:

- ☐ Open formal consultations with USFWS and NNDFW.
 - ☐ Prepare a separate project Biological Assessment or Biological Evaluation.
- ☐ Initiate consultation with Navajo Nation Heritage and Historic Preservation Department (NNHPD) to initiate Section 106 process (Appendix G).
- ☐ Determine Area of Potential Effect (APE) based on area directly impacted by project in consultation with BIA Archeologist. If conducting herbicide applications, the APE shall include potential overspray areas.
 - ☐ Hire cultural resource consultant with an approved annual permit from NNHPD to prepare the Archaeological Inventory Report (AIR) for the project. The consultant shall obtain all necessary project permits, conduct field surveys and ethnographic interviews, and prepare the Archaeological Inventory Report (AIR).
 - ☐ Conduct records search of previous cultural resource surveys with NNHPD, State Historic Preservation Office, and university records.

- ☐ Conduct ethnographic inquiries with local community to identify plant gathering sites and other traditional cultural properties (TCPs) used by the community.
- ☐ Conduct field surveys to record and document location of cultural resources in the area APE and within a 35-50ft buffer around the APE.
- ☐ Submit the report to BIA for review and NNHPD for approval.
- ☐ Obtain cultural resource clearance form (CRCF) from NNHPD for project. Project sponsor will be responsible for obtaining approval from BIA Archaeologist and Regional Director.
- ☐ Provide copies to all project partners. NNHPD will provide copies to the project sponsor, BIA, and the consultant.

If project includes removal of noxious trees (i.e., tamarisk, Russian olive, Siberian elm, tree of heaven):

- ☐ Submit map of project area to Navajo Nation Forestry Department (if on unallotted land) or BIA Branch of Forestry (if on allotted land).
- ☐ Conduct a stand exam to estimate current stand density, number of trees for removal, and remaining tree counts. Stand exam should provide stem counts for noxious trees and detailed information on any native trees at the project site. See Appendix D for Stand Exam Protocol.
- ☐ Contact Navajo Nation Forestry (or BIA Branch of Forestry if on allotted lands) to draft a Timber Harvest Permit (BIA Form 5-5331) for removal of noxious trees. Permit application should include a breakdown of trees identified for treatment by tract, Township, Range, and Section per stand exam results, project sponsor information, description of removal activities, and project map. See Appendix K. Project Planning Forms (BIA only).

If tree removal is also on Navajo Nation forestland²

- ☐ Prepare a silvicultural prescription to describe treatment methods, silvicultural system for forestland management, and restoration activities (i.e., artificial regeneration) methods. The silvicultural prescription must be approved by a certified silviculturist for treatments on unallotted trust lands. For treatments on allotted trust lands, the silvicultural prescription should be approved by a certified silviculturist but is not required.
- ☐ Submit stand exam, permit application (BIA Form 5-331), and silvicultural prescription to Navajo Forestry Department (if on trust land) or BIA Branch of

² Monocultures of invasive tree species are not classified as forestlands.

Forestry (if on allotted land). BIA Branch of Forestry should review the application prior to submittal.³

If using herbicide:

- ☐ Submit Pesticide Use Proposal for project review and approval by NNEPA. PUP must identify the name and license number of the certified pesticide applicator and supervised applicators, herbicide being used, application method, and application rate.
- ☐ Post herbicide treatment information (Project Treatment Flyer in Appendix K) to local Chapter Houses to notify public of pesticide applications.

If herbicide is applied to a water of the United States (WOTUS):

- ☐ Submit an electronic Notice of Intent (eNOI) to the U.S. EPA for coverage under the EPA's Region 9 Pesticide General Permit⁴. Send copies to the Navajo Nation EPA Surface & Ground Water Pollution Program and the Navajo Nation EPA Pesticide Program. The eNOI must be submitted 10-30 days prior to the start of the project. The eNOI will require:
 - Permit Contact Information (BIA Navajo Agency designated Weed Coordinator).
 - Description of the project location with a map.
 - List of weeds to be controlled.
 - List of pesticides proposed for use, including application method, application concentration, and number of proposed treatments.
 - Rationale for the treatment methods proposed.
 - Applicator Contact Information (If, applicator is a contractor, provide their information, if the applicator is BIA personnel, provide the Agency's Weed Coordinator information).
- The website for the EPA's PGP eNOI is available here: <https://cdx.epa.gov/>
- ☐ Consult with the Navajo Nation EPA Surface Water Quality Program to determine if projects have the potential to affect impaired or Outstanding (Tier 3) waters. Such waters are not covered under U.S. EPA Pesticide General Permit.

If work takes place in a waterway (i.e. total clearing of vegetation along a river or stream):

- ☐ Write a letter with location, map and action to US Army Corps of Engineers via email or normal mail. Contact respective state U.S. Army Corps of Engineers' Office and prepare a Section 404 permit.

³ Timber Cutting Permits should be submitted after the BRCF and CRCF processes are complete as copies must be included with the permit application.

⁴ Each local BIA Navajo Region Agency will be responsible as the Operator for all Pesticide General Permit eNOI submissions. To be eligible to apply under the EPA's General Permit, each BIA Navajo Region Agency will need to submit a Pesticide Discharge Management Plan. A template for the plan is available here: <https://www.epa.gov/npdes/pesticide-permitting-2021-pgp>.

- ☐ Submit application to obtain a Section 401 permit to Navajo Nation EPA.

If wellheads are identified on the project site:

- ☐ Document the location of wellheads and note if they are active or inactive.
- ☐ Consult with Navajo EPA Public Water Systems Supervision Program (PWSSP) to determine protection buffers for the project based on treatment method and alternative weed removal measures for inside the buffer zone (i.e., manual removal).⁵

Step 3: Obtain Weed Project Funding:

- ☐ Submit project proposal to BIA Navajo Regional Weed Coordinator for funding. BIA Weed Project funding proposal are solicited annually.
- ☐ Coordinate and identify project cost-share with land user, land management organization, and/or project partners.
- ☐ Seek additional grant funding through other resources (Appendix J).

Step 4: Implementing Treatments

Before Implementing Treatments:

- ☐ Do an initial site survey to mark potential hazards (i.e. electricity lines, fences).
- ☐ Establish access routes for travel to and around the site.
- ☐ Post project information on when and where treatments will occur at nearby Chapter House(s) at least a week prior. Specifically note the following, if applicable:
 - ☐ Information on burning operations (if applicable)

IF using herbicide,

- ☐ Establish wash areas for equipment, vehicles, and staff.
- ☐ Establish storage sites for chemicals and equipment.
- ☐ Herbicide treatment information
- ☐ Mark the site for sensitive species treatment boundaries, buffers for waterways, etc. (see Section 8.0 and Appendix F).
- ☐ Conduct a safety briefing with all personnel conducting weed treatments. Review all required Personal Protection Equipment for methods proposed.

⁵ Per the Navajo Nation Aquatic Resource Protection Program (1994) under the Navajo Nation Forest Management Plan.

- ☐ Review all mitigation measures, and forest product harvesting provisions (if applicable), with contractors and volunteers.

While Implementing Treatments

- ☐ Implement relevant mitigation measures (see Section 8.0. and Appendix F).
 - ☐ **If treating noxious trees**, implement necessary forest product harvesting provisions (standard provision, special provision, B provisions, etc.) for noxious tree treatments.
 - ☐ **If using herbicide**, update pesticide logs for BIA and U.S. EPA, including GPS/GIS data. Information will be included in annual report for the U.S. EPA, NNEPA, and the BIA.
 - ☐ **If using herbicide**, complete daily record treatment logs for herbicide treatments.
- ☐ Submit treatment reports for the Navajo Nation Resource and Community Development (RCD) Quarterly Reports.

Step 5: Post-Treatment Report

- ☐ Submit final noxious weed project report to the BIA Navajo Region Noxious Weed Coordinator. Due at the end of each calendar year.
- ☐ **If treatment uses herbicide near a WOTUS**, the project sponsor must complete U.S. EPA and Navajo EPA Annual Report for NPDES Pesticide General Permit on herbicide use for the year. Reports must be submitting using the Permit Tracking Number provided by the U.S. EPA when the original project eNOI was submitted.
- ☐ **If treatment is in a waterway**, submit annual Army Corps of Engineer report for Section 404 permits.

Step 6: Post-Treatment Monitoring and Maintenance

- ☐ Map annual changes in infestations size. Note expansions, reductions, migrations, and new species present at the site.
- ☐ Conduct photo monitoring at the site to provide qualitative comparison.
- ☐ Prepare annual monitoring and maintenance reports.
- ☐ Re-treat areas with noxious weed re-growth in coordination with local land users.
- ☐ Prepare final completion reports for non-BIA funding sources.

Appendix D. Noxious Weed Mapping Protocol

Sample Weed Mapping Protocol

The following protocol is adapted from Heibert & Hudson 2010 and the Navajo Forestry Compartment Exam Handbook 2012.

Regular weed mapping is needed for project planning and prioritization. The following protocol is intended to collect and maintain consistent noxious weed data. This protocol should be used for all mapping efforts, whether developing specific weed treatment projects, large-scale mapping work for districts or high-use areas, or for early detection efforts. Noxious weed projects need mapping data that is no more than 5 years old. Large-scale mapping efforts are recommended every 5-10 years to document and track weed populations in priority treatment areas. Finally, active weed removal and treatment projects should map changes in treated populations annually to document treatment effectiveness as part of adaptive management under the IWMP.

Pre-Field Evaluation

These steps are recommended for large-scale mapping and project-specific mapping efforts.

1. Identify priority areas in each BIA Agency. Priority areas include roadways, utility rights-of-way, designated cropland/farmland, designated range management units, riparian areas and wetlands, and NNDFW Community Development Areas. Prioritize areas based on the Site Prioritization criteria. This should identify where mapping and inventory should take place.
2. Using aerial imagery, identify survey transects for each location. This can be done by taking the priority areas identified in the previous step and dividing the area into a set grid (e.g., 100m x 100m, 150m x 150m, 1mi x 1mi, etc.). Eliminate areas where surveys will be dangerous (steep slopes), not permitted (private property or other landowners), or not feasible (far from access routes). Randomly select around 30% of the remaining grid cells for surveying. From the center of each selected grid cell, establish a standard length transect from the center of each grid cell (e.g., 50m, 100m, etc.). Orient transects in either a North-South or East-West orientation.
3. If survey locations include noxious trees, develop a stand exam design plan based on the Navajo Forestry Compartment Exam Handbook. Stands should be divided based on stand, which are defined based on forest type, density, slope, age, and accessibility.
4. Stand exams for noxious trees should evaluate at least 10% of the total stand.
5. Upload transect locations and stand exam plot locations to GPS units or mapping application (i.e. Field Maps). Each transect should have a unique location identifier to make it easy to locate in the field. This unique transect ID should also be recorded on associated data sheets.

6. If using volunteers or work crews, provide training on how to conduct a weed survey which covers the following topics.
 - a. Proper use of GPS units and navigation techniques
 - b. Review of Data Collection Sheets
 - c. Review of Priority Weed Species
 - d. How to estimate the size and coverage of identified infestations
 - e. Safety precautions for field work (i.e., water and food, sun protection)
 - f. Review schedule of areas to be surveyed

Field Surveys

Field Equipment Checklist:

- GPS units (enough for one for every two people) or smartphone with access to Esri Field Maps
 - Clipboards
 - Data Collection Sheets (one for each transect plus extra)¹
 - Priority Weed list (with PLANT codes)
 - Pens/pencils
 - Compass
 - 100-foot measuring tape
 - Plastic Bags
 - Sharpies
 - Calibration templates (for estimating coverage)
 - Box for collecting plant samples
 - Water
 - Snacks
 - Weather Appropriate clothing
1. Drive to survey location. Establish a central meeting location for the day. Conduct a safety briefing for the day and to establish a protocol in case of injuries or illness.
 2. Have surveyors work in pairs and assign each a set of transects to survey for the day.
 3. Surveyors will walk the distance of the line and look for priority weed species along the transect line. Surveyors should use a compass to maintain the correct orientation of the transect line during the survey. The measuring tape will set the transect distance. Distances will be set during the Pre-Field Evaluation when developing the survey design.

¹ Data sheets should be provided even if GPS unit/smart phone apps are used in case of transmission or coverage issues.

4. For each survey transect, record the transect ID, land use description (i.e., rangeland, cropland, right of way, road, riparian area, or community development area), the date and year of the survey, and the surveyor name and contact information.
5. Record any resource concerns observed along the transect or area such as wellheads, fences, barriers, washes, streams, rivers, and structures. Collect GPS points for these items, if feasible.
6. For each infestation (which can be a single species or a group of different species) encountered along the transect, record the location of the infestation by either (a) walking around the perimeter of the infestation or (b) recording a GPS point in the approximate center of the infestation.
7. Record each species found in the infestation and the approximate area covered by each species in acres or square feet. Species will be recorded based on the USDA PLANTS database code (see Appendix L).
8. If a species cannot be identified, a sample may be taken for identification later. When taking a sample, try to take as much of a single plant as possible (flowers, leaves, seeds, roots, etc.). Place in a plastic bag and record the transect grid ID, date, recorded GPS point or location, and a unique ID for the plant. Record the plant ID on the datasheet.
9. Record estimated foliar cover for each species along the transect (Figure 1). This can be done by measuring and adding together the total distance a species intercepts or covers the transect line, divided by the total distance of the line (i.e., foliar cover). Calculate the percent cover and use the following scale:
 - a. <1%
 - b. 1-5%
 - c. 5-10%
 - d. 10-25%
 - e. 25-50%
 - f. >50%
10. If estimating cover for a specific spot or location, cover can be estimated using the following cover estimate (Figure 2).

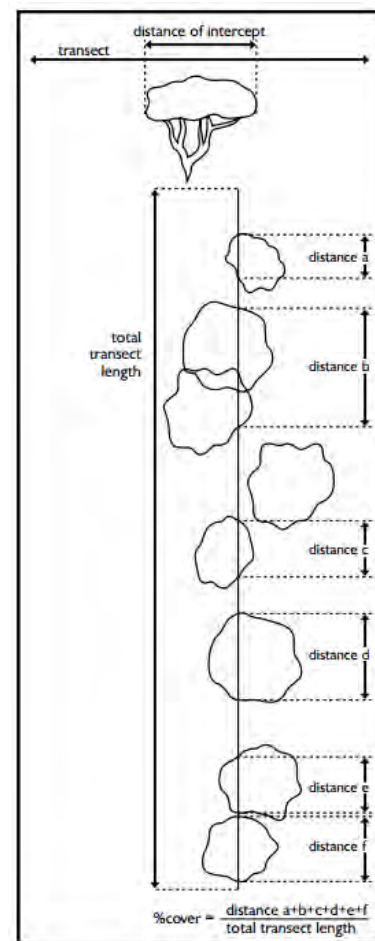


Figure 1. Line intercept method of measuring cover for a single species. From C.L. Elzinga, D.W. Salzer, and J.W. Willoughby.

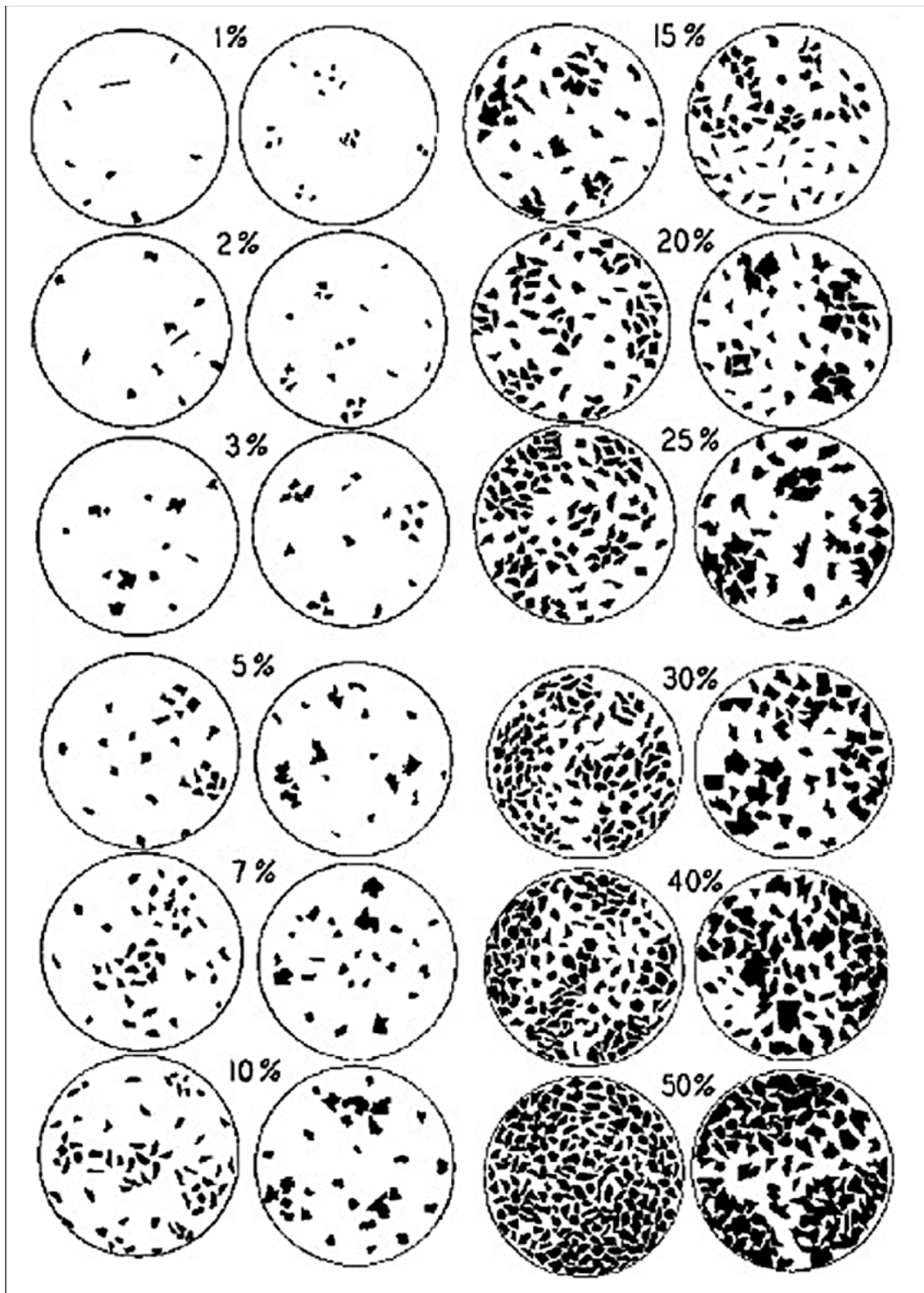


Figure 2. Reference plots for estimating percent cover. U.S. Forest Service FIA manual, 2003.

For Stand Exams (NFD, 2012)

Stand exams are required when evaluating potential treatment areas where non-native tree species occur and will be removed. Consult with BIA Forestry or the Navajo Forestry Department on exam parameters and requirements for forest product harvest procedures. Stand exams will require equipment listed in the NFD Compartment Exam Handbook. Those conducting stand exams should be familiar with the Navajo Forestry Compartment Exam Handbook protocols for establishing, measuring, and inventorying stand plots. Data collected during stand exams should provide an estimate of current stocking and stand dynamics.

1. Follow Steps 2-5 of the Pre-Field Evaluation and Steps 1 and 2 for Field Surveys.
2. Surveyors will travel to each plot and establish plot centers and boundaries.
3. Within the plot, identify the tree species and whether they are native, non-native, and/or invasive. Record the size of the plots established.
4. Denote the location of each plot and the Tract, Township, Range, and Section.
5. Count and measure the individual trees for each species in the plot. Reference the NFD Compartment Exam Handbook for specific guidance. Using the plot size and the tree data, estimate stand metrics.
6. For **native trees**, additional information will be collected as described in the NFD Compartment Exam Handbook.

For more information, refer to the Navajo Forestry Compartment Stand Handbook (2012).

Data Entry and Analysis

1. If data is not collected with Field Maps, GPS files and datasheets should be entered soon after field surveys are completed. Using ArcGIS, create a GIS shapefile from the GPS data. This can be done a variety of ways:
 - a. Create an Excel file of the GPS data points with Northing and Easting locations
 - b. Convert the GPS file directly into a GIS file from either the GPS computer software or from the unit
 - c. Create the GIS shapefile directly on the GPS unit.
2. Once a shapefile is created for each survey, merge or append the GPS data together into one shapefile for each agency. Weed survey data should be combined for each year.
3. The following information should be included the attribute table for each species infestation identified (* indicates a required attribute)
 - a. Agency*
 - b. Navajo Nation Chapter
 - c. Date of the Survey*
 - d. Name of surveyor*
 - e. Transect grid ID

- f. Infestation ID*
 - g. Species name (common, scientific, or USDA Plants code)*
 - h. Priority weed area description
 - i. Size of area surveyed (this is NOT the same as the size of the infestation)*
 - j. Approximate size of each species infestation (make the units are uniform, either all in square feet or all in acres)*
 - k. Approximate % cover of each species*
 - l. Weed Project name (if applicable)
 - m. New infestation or old infestation (based on previous survey data)
 - n. For old infestations, expansion or decrease in population size (based on previous survey data)
4. Each agency should conduct the following analyses annually based on all data collected, whether through formal mapping efforts or informal field data
- a. Size and cover for each Priority Weed Species (recording approximate acres and average cover density).
 - b. Location of Priority Weed Species found and associations with priority treatment areas.
 - c. Location and identification of new invasive weed species found. This should be done by referencing state, county, and federal noxious weed lists for species that are not currently on the BIA Navajo Region Weed List.
5. For stand exam calculations
- a. Establish size of plots based on acre sizes
 - b. Calculate trees per acre for seedlings, saplings, and trees.
 - c. Divide tree counts based on tract, Township, Range, and Section for permits.
 - d. For native trees, also calculate:
 - i. Basal area per acre
 - ii. Volume per acre

References

- Hiebert, R.D., and H. Hudson. 2010. Inventory of exotic plant species occurring in the Resource Preservation Zone of Walnut Canyon National Monument, Arizona. Natural Resource Technical Report NPS/SCPN/NRTR—2010/314. National Park Service, Fort Collins, Colorado.
- Elzinga, C.L., D.W. Salzer, and J.W. Willoughby. 1998. Measuring and Monitoring Plant Populations U.S. Department of the Interior, Bureau of Land Management, National Applied Resource Sciences Center, Denver, CO. BLM Technical Reference. BLM/RS/ST-98/005+1730.
- Navajo Forestry Department (NFD). 2012. Navajo Forestry Department Compartment Exam Handbook. 52 pp.
- U.S.D.A. Forest Service (USFS). 2003. Forest Inventory and Analysis national core field guide, volume 1: field data collection procedures for phase 2 lots, version 1.7. Internal report.

Washington DC: U.S. Department of Agriculture, Forest Service, Washington Office. Available online at: <http://fia.fs.fed.us/library/field-guides-methods-proc/>.

USDA PLANT Codes

CATEGORY A - HIGH		
COMMON NAME	SPECIES	USDA CODE
African rue	<i>Peganum harmala</i>	PEHA
Blue mustard	<i>Chorispora tenella</i> (Pall.) DC.	CHTE2
Bull thistle	<i>Cirsium vulgare</i>	CIVU
Canada thistle	<i>Cirsium arvense</i>	CIAR4
Common Mediterranean grass	<i>Schismus barbatus</i>	SCBA
Dalmatian toadflax	<i>Linaria dalmatica</i>	LIDA
Fountaingrass	<i>Pennisetum setaceum</i>	PESE3
Leafy spurge	<i>Euphorbia esula</i>	EUES
Musk thistle	<i>Carduus nutans</i>	CANU4
Perennial pepperweed	<i>Lepidum latifolium</i>	LELA2
Tree of Heaven	<i>Ailantus altissima</i>	AIAL
Squarrose knapweed	<i>Centaurea virgata</i>	CEVI
Ravenna grass	<i>Saccharum ravennae</i>	SARA3
Sahara mustard	<i>Brassica tournefortii</i>	BRT0
Scotch thistle	<i>Onopordum acanthium</i>	ONAC
Spotted knapweed	<i>Centaurea maculosa</i> , <i>C. stoebe</i>	CESTM
Sulphur cinquefoil	<i>Potentilla rect L.</i>	PORE5
Tall Whitetop	<i>Cardaria draba</i>	CADR
Tamarisk (other species) ²	<i>Tamarix</i> spp., including hybrids	TAMAR
Yellow starthistle	<i>Centaurea solstitialis</i>	CESO3
Uruguyan pampas grass	<i>Cortaderia sellonana</i>	COSE4
Yellow nutsedge	<i>Cyperus esculentus</i>	CYES
CATEGORY B - MEDIUM		
COMMON NAME	SPECIES	USDA CODE
Camelthorn	<i>Alhagi camelorum</i>	ALMA12
Diffuse knapweed	<i>Centaurea diffusa</i>	CEDI3
Halogeton	<i>Halogeton glomeratus</i>	HAGL
Johnsongrass	<i>Sorghum halepense</i>	SOHA
Russian knapweed	<i>Acroptilon repens</i>	ACRE3
Russian Olive	<i>Elaeagnus angustifolia</i>	ELAN
Siberian elm	<i>Ulmus pumila</i>	ULPU
Tamarisk, Saltcedar	<i>Tamarix ramosissima</i>	TARA
CATEGORY C - LOW		
COMMON NAME	SPECIES	USDA CODE
Bald brome	<i>Bromus racemosus</i>	BRAA2
California burclover	<i>Medicago polymorpha</i>	MEPO3
Cheatgrass	<i>Bromus tectorum</i>	BRTE
Field bindweed	<i>Convolvulus arvensis</i>	COAR4
Field brome	<i>Bromus arvensis</i>	BRAR5
Horehound	<i>Marrubium vulgare</i>	MAVU
Jointed goatgrass	<i>Aegilops cylindrica</i>	AECY
Kochia	<i>Bassia scoparia</i>	BASC5
Puncturevine	<i>Tribulus terrestris</i>	TRTE
Red brome	<i>Bromus rubens</i>	BRRU2
Rescuegrass	<i>Bromus catharticus</i>	BRCA6
Russian thistle	<i>Salsola kali</i> , <i>S. collina</i> , <i>S. paulsenii</i> , <i>S. tragus</i>	SATR12
Ripgut brome	<i>Bromus diandrus</i>	BRDI3
Smooth brome	<i>Bromus inermis</i>	BRIN2
Spreading wallflower	<i>Erysimum repandum</i>	ERRE4

² Saltcedar is a Category B species due to its high density and cover, making it a target for management. All other tamarisk species are considered Category B species due to the limited distribution on the Navajo Nation

Appendix E. Best Management Option for Control by Noxious Weed Species

CATEGORY A - HIGH

Invasive Weeds	Best Option for Control
African Rue	Hand pulling, grubbing, tilling, and prescribed burn are not recommended because the roots are too deep and will promote spread. Grazing is not an option because of the bad smell and taste, livestock will not eat. Treatment should occur when the plant is healthy and robust in the late summer (September-October) when using foliar spray. Using imazapyr alone or in combination with other herbicides provides the best control.
Blue Mustard	Changing crop rotation for heavily infested fields is effective. Tilling before plants produce flowers will reduce amount of seed in seed bank. Herbicide most effective when applied before stems elongate.
Bull thistle	Use integrated treatments. Cut-off seed heads and pull up roots repeatedly. Tillage, mowing and pulling at proper time will be effective. No burning. Livestock will graze young thistle. Biocontrol suitable for remote locations where other methods are not practical. Use biocontrol for large populations. Chemical treatment is effective
Canada thistle	Repeated mechanical control should focus on destroying seed heads and root systems. Tillage provides limited control. Do not burn. Goats and sheep can be used to graze young thistle. Best controlled by a selective post-emergent broadleaf herbicide.
Common Mediterranean Grass	Growth inhibited by shade. Plant dense shrubs. Hand removal is impractical. Plowing, disking or scraping reduces biomass initially then further encourages growth. Can be grazed, although disturbance will encourage growth. Herbicide use can be effective. ##
Dalmatian toadflax	Mechanical removal should focus on root systems. Hand-pulling and digging can be effective for small populations. Mowing, chopping, and cutting are not recommended. Burning is not recommended. Do not graze, it can be toxic to livestock. Long-term biocontrol effectiveness is unknown. Chemical treatment can be effective with re-seeding efforts if native grasses are not present.
Fountain Grass	Small populations can be hand pulled if roots are extracted. Hand pulling should occur every 1-2 months. Mow or till if infestations are accessible. Prescribed burn is not recommended. Fountain grass is not palatable to livestock, except when very young. Best method is to apply herbicide (glyphosate) spot treatments to actively growing plants annually for good control.
Leafy spurge	Hand-pulling and grubbing are not effective. Tillage should be combined with re-seeding effort. Long-term grazing with sheep and goats can be effective to control (>5 years). Biocontrol most effective when used with chemical control and grazing. Herbicide treatments are effective when done repeatedly.
Musk thistle	Use integrated treatments. Cut-off seed heads and pull up roots repeatedly. Tillage, mowing and pulling at proper time will be effective. No burning. Livestock will graze young thistle. Biocontrol suitable for remote locations where other methods are not practical. Use biocontrol for large populations. Chemical treatment is effective
Perennial pepperweed	Hand-pulling, hoeing, or grubbing are effective for seedlings. Do not mow or till unless used in combination with herbicide. Do not burn. Use grazing with other tools. Goats, sheep, and cattle should graze new foliage growth. Herbicides are effective especially when using with other integrated approaches.
Ravenna Grass	Seed heads can be cut, bagged and incinerated. Remove whole plant by their root and place in a high and dry area. Spray glyphosate on foliage for control of larger populations.
Sahara mustard	Hand pull, particularly seed heads, bag, and incinerate.
Scotch thistle	Use integrated treatments. Cut-off seed heads and pull up roots repeatedly. Tillage, mowing and pulling at proper time will be effective. No burning. Livestock will graze young thistle. Biocontrol suitable for remote locations where other methods are not practical. Use biocontrol for large populations. Chemical treatment is effective.

CATEGORY A - HIGH	
Invasive Weeds	Best Option for Control
Spotted knapweed	Hand pulling can be effective for small populations-repeated pulling is necessary. Do not till. Mow young plants. Do not burn. Sheep and goat can graze during spring. Control burning is effective, but hard to keep ignited through a dense monoculture. Biocontrol is highly effective when using other control methods. Herbicide treatment with follow-up treatments are effective.
Squarrose knapweed	Hand pulling can be effective for small populations-repeated pulling is necessary. Do not till. Mow young plants. Do not burn. Sheep and goat grazing can be grazed during spring. Biocontrol is highly effective when using other control methods. Herbicide treatment with follow-up treatments will be effective.
Sulphur Cinquefoil	Best method is prevention. If infestation is small, shovels and tillers can be used to reach below the root crown to destroy plant. Till before the plant goes to seed. Mowing is not suggested. Plant with native seed and plants to reduce population. Chemical control is most effective. ###
Tall whitetop	Hand digging and grubbing may be feasible for small populations. Mowing is not recommended unless combined with herbicide applications. Tilling is effective if done repeatedly. Do not burn. Not recommended for livestock grazing. Bio-control agents are not available. Herbicides will provide effective control but need to be cautious about herbicide selection when spraying near crops.
Tamarisk, saltcedar	Hand removal methods are effective for sprouts/young plants. Mechanical clearing requires repeated applications. A grubbing tool mounted on a tractor will works well to pull root ball out. Mulching and excavating can be used for individual trees. Prescribed fire is not recommended for long term management but can be used to burn brush pile or dead saltcedar. Biological control not approved. Herbicide control can be effective: aircraft, helicopter, tractor, truck, ATV, backpack, etc.
Tree of Heaven	Hand-pull very young seedlings. Grub saplings or young trees if you can remove the root system. Not palatable for grazing. Tree will come back after a controlled burn. Basal spray or girdling with herbicide application with follow-up foliar spot spraying for new seedlings, sprouts and root suckers is a good option. Re-vegetating with native species should occur.
Uruguayan pampas grass	Pulling or hand grubbing seedlings is effective. A pulaski, pickaxe, or shovel can be used to remove clumps. Can use chainsaw or weed whacker to remove the crown, to expose the base of the plant making it easier to remove the root system. It can be controlled with glyphosate in the fall. Top foliage can be removed or burned and the re-growth treated with glyphosate.#
Yellow nutsedge	Controlling the tubers of this plant is important. Remove plants before they have 5-6 leaves by hand or hand hoe. Make sure to remove entire plant. Till only small areas before plants have 6 leaves. Can till and then dry tubers (do not provide irrigation). Can cover an area with polypropylene polymer fabric to suppress nutsedge growth. Few herbicides are effective. Use repeated applications of glyphosate to young and mature plants to kill tubers. Apply chlorsulfuron to nutsedge prior to the fifth-leaf stage. Dichlobenil will reduce number of plants, but needs repeated treatments.*
Yellow starthistle	Reproduces solely by seed so mechanical control should focus on that-hand removal for small populations, tillage can be effective. Mowing can be effective over a 3-year period. Burning can be effective from January to May. Goat and sheep grazing can be effective. Limited experience with biocontrol in AZ. Herbicide spraying is effective.

CATEGORY B - MEDIUM

Invasive Weeds	Best Option for Control
Camelthorn	Do not till, mow or burn. Can pull small populations. Grazing may be effective for young growth. Chemical is the most effective treatment over multiple years.
Diffuse knapweed	Hand pulling can be effective for small populations-repeated pulling is necessary. Do not till. Mow young plants. Do not burn. Sheep and goat grazing can be grazed during spring. Biocontrol is highly effective when using other control methods. Herbicide treatment with follow-up treatments will be effective.
Halogeton	Can be controlled by mechanical tillage but should be followed up by re-seeding. Can be controlled using repeated herbicide treatments. ***
Johnsongrass	Can remove individual plants by hand if you can remove all the roots. Herbicide is the most effective method.##
Russian knapweed	Hand-pulling or hoeing can be effective for small populations if repeated over multiple years. Tillage should not be used w/out herbicide application. Burning should not occur, except for debris disposal. Cattle, sheep, and goats can graze during early growth. Toxic to horses. Biocontrol agents can be effective. Best controlled with selective, post-emergent herbicide.
Russian Olive	Hand removal of small trees (shovel, hoe) Can mow sapling stems <1 inch diameter. Repeated tillage is effective in agricultural situations and should be coordinated with reseeding. Excavator can be used to remove trees. Burning is a suppression technique can modestly control saplings and reduce top growth of more mature trees. Mature goats will graze on seedlings and young trees. No biocontrols available. Herbicide treatment is effective especially when used with other methods.
Siberian Elm	Basal spray or cut-surface treatment initially and follow-up with foliar spot spray to control new seedlings, sprouts and root suckers. Can use heavy machinery to grub trees (uproot from ground). Plant dense native shrubs and trees to prevent re-growth.

CATEGORY C - LOW

Invasive Weeds	Best Option for Control
Bald Brome	Hand removal effective if before seed heads are produced; remove roots. May require several return visits. Mowing can occur in winter or early spring before seeds develop to reduce plant size but may cause plant to increase in number of stems produced. Burning can be used with other control methods. Can use grazing but will not provide complete control. Apply herbicide in the fall when the grass has uniform germination and establishment. Once treated, the area should be seeded or planted with native species to out-compete recolonizing brome.
California Burclover	Hand pulling plants may control small populations if roots are removed. Maintain or plant native vegetation for competition. Glyphosate may be effective.
Cheat grass	Hand-pulling or hoeing will work for small infestations. Disking or tilling repeatedly may be effective if seed is buried at least 4-6 inches. Mowing every 2-3 weeks may be effective. Burning is effective when used with other methods. Grazing is effective during 6-8 weeks early in the season. No biocontrols available. Herbicides are effective, however may affect native species.
Field bindweed	Deep tillage of root system and hand removal of top growth can be effective if done repeatedly. Hoeing is partially effective when treated every 2-3 weeks. Herbicides are effective.*
Field Brome	Hand removal effective if before seed heads are produced-remove roots. May require several return visits. Mowing can occur in winter or early spring before seeds are developed can reduce plant size but may cause plant to increase in number of stems produced. Burning can be used with other control methods. Can use grazing but will not provide complete control. Apply herbicide in the fall when the grass has uniform germination and establishment. Once treated the area should be seeded or planted with native species to out-compete recolonizing brome.
Horehound	Hand pull before seeding small populations. Plants do not persist in areas of clean cultivation. Plants can be mowed to the ground as they begin to grow in spring, will need to be repeated. Deep plow ag fields with crop rotation to improve control. Sheep will graze if other feed is scarce but may open up new areas for infestation. Control burn with follow-up treatments for germinating plants. Herbicides will work with follow-up treatments.!!!

CATEGORY C - LOW

Invasive Weeds	Best Option for Control
Jointed goatgrass	Hand pulling effective for small populations. Deep tillage can be effective. Mowing can be effective during late winter. Control burn can be effective in agricultural setting but limited for range or non-crop lands. Grazing can be effective in combination with glyphosate spraying. No biocontrol. Effective control with non-selective herbicide.
Kochia	Small infestations can be hand-pulled to remove whole root. Mowing reduces seed production but should be done repeatedly. Deep tillage may prevent seed germination. Can be grazed in small amounts but toxic in large amounts. Will re-grow after grazing. Competitive native vegetation, such as perennial grass plantings, can inhibit establishment. Chemical treatment will work, however there are chemical resistant populations. ¹
Puncturevine	Best controlled by hand-removal or hoeing to cut plant off taproot. Mulch can be used around ornamentals to prevent this species. Biocontrol may be effective. Herbicides are an effective control.*
Red brome	Hand removal effective if before seed heads are produced; remove roots. May require several return visits. Mowing can occur in winter or early spring before seeds develop to reduce plant size but may cause plant to increase number of stems produced. Burning can be used with other control methods. Can use grazing but will not provide complete control. Apply herbicide in the fall when the grass has uniform germination and establishment. Once treated the area should be seeded or planted with native species to out-compete recolonizing red brome.
Rescuegrass	Hand removal effective if before seed heads are produced; remove roots. May require several return visits. Mow in winter or early spring before seeds develop to reduce plant size but could cause increase number of stems produced. Burning can be used with other control methods. Can use grazing but will not provide complete control. Apply herbicide in the fall when the grass has uniform germination and establishment. Once treated the area should be seeded or planted with native species to out-compete recolonizing weeds.
Ripgut Brome	Small populations can be hand pulled if roots are extracted. Hand pulling will need to occur repeatedly. Mowing or cutting should occur regularly. Deep tillage can be effective. Herbicide application can be successful.@@
Russian thistle	Mowing or hand-pulling young plants can prevent seed production but must be repeated. Do not burn. Planting competitive native species can prevent establishment. Can use preemergent and post emergent herbicides. Repeated use of a single herbicide should be avoided due to herbicide resistance.*
Smooth brome	Can hand pull small populations. Spray herbicide in fall after a killing freeze for best results. Can use control burn in a field during the dormant period and followed by cattle grazing of re-growth. @
Spreading Wallflower	2,4-D provides good control.

NOTES ON TABLES

Weed management strategies for above-mentioned weeds extracted from USDA Forest Southwestern Region Field Guides for Managing Species

(<http://www.fs.usda.gov/detail/r3/forest-grasslandhealth/invasivespecies/?cid=stelprdb5228481>)

- * Statewide Integrated Pest Management Program at the University of California at Davis (<http://ucipm.ucdavis.edu/PMG/PESTNOTES/pn74139.html>)
- *** USDA NRCS Plant Guide (<http://plants.usda.gov/java/>)
- **** BugwoodWiki- High Plains Integrated Pest Management (<http://wiki.bugwood.org/HPIPM>)
- # Produced by the USDA Forest Service, Forest Health Staff, Newtown Square, PA. Invasive Plants website: http://www.na.fs.fed.us/fhp/invasive_plants
- ## Lake Mead Exotic Plant Management Plan
- ### University of Nevada, Cooperative Extension Fact sheet
- ! DiTomaso, J.M., G.B. Kyser et al. 2013. Weed Control in Natural Areas in the Western United States. Weed Research and Information Center, University of California
- @ http://www.ks.nrcs.usda.gov/news/coneds12/brome_grass.html and [Restoring Native Grassland Species](http://www.ks.nrcs.usda.gov/news/coneds12/brome_grass.html)
- !!! <http://sdrsnet.snr.arizona.edu/data/sdrs/www/docs/marrvulg.pdf>
- @@ Montana Utah Wyoming Cooperative Extension Weed Management Handbook

Herbicide Rankings based on Human Toxicity

Herbicides proposed under Alternative 2 ranked based on adverse human health impacts from harmful doses. Herbicides are listed from least toxic to most toxic based on oral ingestion. However, toxicity based on oral or ingest exposure and dermal exposures are also included. LD₅₀ corresponds to the dose at which 50% of tested animals died and are reported by the USEPA as part of the pesticide registration process. The order can be used to prioritize herbicide selection, with a preference for herbicides with lower toxicity rates based on exposure method.

Herbicide	Application Rates (lbs a.i./acre)	Oral LD ₅₀ (mg/kg)	Dermal LD ₅₀	Inhalation LD ₅₀ (mg/L)	Adverse Human Health Effects
Chlorsulfuron	0.047 – 0.062	5,545	>2,000	5.9	Little to no effect on fertility, reproduction, or offspring development. Does not cause genetic damage, cancer, or birth defects.
Aminopyralid	0.03 – 0.11	>5,000	>5,000	>5.79	Causes eye irritation. Potential effects on development and reproduction at high doses. No evidence of carcinogenicity or mutagenicity.
Imazapic	0.0313 – 0.1875	>5,000	>5,000	>2.38	Can cause moderate skin and eye irritation. Not a known carcinogen or mutagen.
Imazapyr	0.45 – 1.5	>5,000	>2,000	>1.3	Can cause moderate skin and eye irritation. Not a known carcinogen or mutagen.
Isoxaben	0.66 – 1.33	>5,000	>2,000	>2.68	Can cause eye irritation and corneal damage. The additive, crystalline silica, is a listed carcinogen. can cause birth defects and adverse effects on reproduction. Classified as a possible human carcinogen and mutagen.
Metsulfuron methyl	0.0125 – 0.15	>5,000	>5,000	>5.3	Mild to moderate skin and eye irritant. Not classed as a carcinogen or mutagen. Not known to impact or inhibit reproduction or development.
Prodiamine	0.75 – 1.5	>5,000	>2,000	>1.81	Does show increased toxicity during pregnancy for fetus and mother. Adverse impacts on liver and thyroid. Classified as a possible human carcinogen.
Thifensulfuron methyl	0.0023 – 0.028	>5,000	>2,000	>5.03	Mild eye irritant. Not carcinogenic or mutagenic. Has little to no effect on reproduction, development, or fertility.
Glyphosate	0.5 – 4	4,320	>2,000	1.6 - 5.63	Possible alteration of intestinal microbial community. Some evidence of endocrine disruption. Linked to increased risk of Non-Hodgkin's Lymphoma for workers.
Clopyralid	0.35 – 1	4,300	>5,000	>3.0	Can cause severe eye damage. Does not cause cancer or genetic mutations. Some evidence of reproductive or developmental effects at higher doses.

Herbicide	Application Rates (lbs a.i./acre)	Oral LD ₅₀ (mg/kg)	Dermal LD ₅₀	Inhalation LD ₅₀ (mg/L)	Adverse Human Health Effects
Dichlobenil	4 -6	4,250	>2,000	>3.3	Impacts to liver and kidneys with acute exposure. Classified as a possible human carcinogen. Potential endocrine disruptor.
Picloram*	0.125 – 1	4,012	>2,000	>8.11	Acute poisoning can lead to nervous system damage, weakness, and diarrhea. Chronic exposure can cause liver damage. Mild to moderate skin and eye irritant. Chronic exposure can lead to developmental effects. Not a known carcinogen or mutagen.
Fluroxypyr	0.12 – 0.5	2,405	>2,000	>6.2	Can cause damage to the liver at high doses. Potential effects if swimming in or drinking contaminated water. Not likely to be carcinogenic or mutagenic.
Metribuzin	0.17 - 3	2,300	>5,000	0.72	Sub-chronic exposure linked to abnormal liver function and adverse impacts to reproduction. Known endocrine disruptor. Not a known carcinogen or mutagen.
Fluazifop –p-butyl	0.1 – 0.375	>2,000	>2,110	1.7-5.2	Slight eye irritation, moderate skin irritation, and adverse effects to the liver with prolonged exposure. Increased risk to the public from long-term consumption of contaminated vegetation. Not likely to be carcinogenic or mutagenic.
Indaziflam	0.046 – 0.091	>2,000	>2,000	>2.3	Can cause degenerative neuropathology and damage to kidneys, liver, and thyroid with chronic exposure. No evidence of carcinogenicity or genotoxicity.
Atrazine	1-4	1869	>2,000	5.8	Causes endocrine disruption. Most impacts affect pregnant women and children. Known effects include preterm delivery, fetal growth retardation, delayed onset of puberty, and mammary tumors. Not likely to be carcinogenic or mutagenic. Potential endocrine disruptor.
Pendimethalin	1.485 – 1.98	>1050	>2,000	320	Possible human carcinogen affecting the thyroid. Mild skin and eye irritant. Some adverse effects on liver function. Has not been shown to cause birth defects or affect reproduction.
Triclopyr	0.5 - 8	630	>2000	>4.8	Mildly toxic to developing embryos. High doses can cause adverse birth defects and maternal toxicity. Not classified as a human carcinogen. Can cause mutations but with no adverse effects.

Herbicide	Application Rates (lbs a.i./acre)	Oral LD ₅₀ (mg/kg)	Dermal LD ₅₀	Inhalation LD ₅₀ (mg/L)	Adverse Human Health Effects
2,4-D	0.23 - 9	579 - 1646	>2,000	0.78 – 5.4	Neurological, cardiac, hepatic, and renal toxicity with high doses. Chronic high doses could increase risk of cataracts and retinal degeneration. Some correlation with non-Hodgkin's lymphoma and cervical cancer. Currently classed as not a human carcinogen. Potential endocrine disrupter.
Paraquat	0.07 - 1	283	>2,000	0.001	Toxic if ingested or dermally adsorbed. Known to adversely impact the liver, kidneys, and lungs. Can cause moderate to severe eye irritation and moderate skin irritation. Reclassed as non-carcinogenic but found to be weakly mutagenic.

Appendix F. Mitigation and Species Conservation Measures

APPENDIX F. MITIGATION AND SPECIES CONSERVATION MEASURES

Mitigation Measures

The following measures are required when implementing weed management projects. These measures should be printed and checked off when implementing a project.

1. General Measures

Project Planning

- Complete all necessary permits and authorizations prior to implementing a project (see Section 7.0 and Appendix C of the NNIWMP).
- If treatments are planned for allotment lands, the project sponsor must contact the landowner(s) and obtain consent from the majority Indian interest of the beneficial Indian owner(s), documented by their signature(s) for the weed project.
- Noxious tree treatments require consent of the majority Indian interest of the beneficial Indian owner(s), documented by their signature(s) on a Power of Attorney for the Sale of Allotment Timber, contract, or permit.
- Conduct surveys for cultural resources by a qualified cultural resource specialist before treatments in coordination with the Navajo Nation Historic Preservation Department (NNHPD).
- Surveys and clearance for paleontological resources are required before any surface disturbing activities, mechanical treatments, or chemical treatments in coordination with the Navajo Nation Minerals Department.
- 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 NNHPD 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 NNHPD to ensure compliance with Section 106 and NHPA.
- Complete and submit a Data Request Form for the project area to NNDFW NNHP (<https://www.nndfw.org/nnhp/drs2012.pdf>) and obtain a Biological Resource Compliance Form (BRCF) from NNHPD.

- If potential habitat for endangered or threatened species is present, conduct a habitat assessment by a qualified biologist. If potential habitat is found, protection measures, including species buffers will be applied to the habitat or additional surveys for species presence will be conducted by a qualified biologist. If the species is present at the site, species protection measures will be employed, NNDFW will be notified, and a biological monitor will be present during all phases of project implementation (Appendix F of the NNIWMP).
- 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.
- 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 Personal Protection Equipment (PPE), equipment handling, and safety protocols. Personnel will be required to use PPEs during herbicide and mechanical (chainsaw, control burn, etc.) applications.

Prior to Project Implementation

- Designate staging areas and/or equipment wash stations for cleaning and prep work before and after treatments. These sites will be used to mix herbicides, refuel equipment and vehicles, and store materials for the duration of the treatment. Equipment wash stations may be temporary and will have a filter system, for example at least 6 inches of large cinder or gravel spread over an area 10 feet x 30 feet. Filter cloth may be used for temporary stations. The area will be a perched drainage to allow excess moisture to drain after being filtered and will be located at least 300 feet away from surface water, natural drainages or wellheads.
- 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.
- To reduce the risk of weed spread, access routes will avoid heavy infestation areas. Access routes will be closed when the project is completed.
- 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.

During Project Implementation

- Vehicles will use only established roads for accessing project sites. Vehicles will be parked at designated parking spots near established roadways during treatments.
- If camping, project personnel will use designated and established campsites, with approval from NNHPD or a qualified archeologist.
- 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.
- 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.
- If potential habitat for an endangered or threatened species is present a qualified biological monitor will be on site during all phases of project implementation.
- Vehicles and equipment should be turned off if periods between use are longer than 15 minutes.

Post Project Implementation

- Post-treatment monitoring will evaluate treatment effectiveness, potential re-infestations or new introductions, and impacts to resources (Appendix D of the IWMP)
- Limit the number of people and trips to sensitive areas for follow-up treatments and/or monitoring.

2. Chemical Treatments

Project Planning

- 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.

- If wellheads or source water areas are identified within the project area, notify NNEPA Public Water System Safety Program to determine protection zones for herbicide applications and alternative treatment methods to be used in the protection area.
- For aerial herbicide treatments, native vegetation communities in or near treatment sites should be documented with GPS, especially cottonwood-willow woodlands and native sagebrush communities.

Prior to Project Implementation

- All herbicides must be USEPA 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.

During Project Implementation

- All herbicides must be used according to the USEPA 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. Wells and wellheads will also require a 100 feet buffer based on the NNEPA PWSSP's Source Water-Wellhead Protection Guidance.
- *Near riparian areas*, only aquatic formulations of 2,4-D, glyphosate, triclopyr, and imazapyr will be 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 ft (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.
- Aerial herbicide treatments should use GPS monitoring to track the aircraft's position, provide a record of where herbicide was applied, and ensure all applicable avoidance buffers were enforced.
- 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.
- Only aquatic approved herbicides will be used for aerial applications by either fixed wing or rotary aircraft applications.
- Water for mixing herbicide and cleaning herbicide equipment will be potable water obtained off-site or through a Water Use Permit. For remote sites, there is a possibility of a Water Use Permit with the local water code. 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.

Post Project Implementation

- 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.

3. Mechanical

Prior to Project Implementation

- 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 burning is used as a control method.

- Prescribed burning will not be conducted during migratory bird breeding season.

During Project Implementation

- 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.

4. Cultural

During Project Implementation

- Projects using targeted grazing treatments will develop a grazing treatment plan for review by NNHP.
- 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.

Post Project Implementation

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

Species Conservation Measures

The species conservation measures below are intended for the proposed action and serve as a guide for mitigating impacts to Navajo Endangered species (NESL) and Federally Threatened and Endangered species when conducting weed treatments on Navajo Nation. However, the Navajo Natural Heritage Program (NNHP) 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. Therefore, 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. Buffers for mechanical, cultural, manual (low impact), and non-aerial herbicide use 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.

Species Conservation Measures (Project Design Features)

The Recommended Protection Measures for Pesticide Applications (RPR) in USFWS Region 2 (White 2007) and the Avoidance Measures listed in the Navajo Nation Endangered Species List, Species Accounts (NNDFW 2020) were used as a starting point for the conservation measures. The BIA requires the most conservative avoidance measures of the two documents be implemented for IWMP projects. BIA conducted nine informal discussions with the USFWS and the NNHP, NNDFW to help refine the conservation measures.

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>).
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. Obtain federally listed species permits from USFWS and Biological Investigations Permits from 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.

Navajo Nation Endangered Species List

General Project Best Management Practices (BMPs)

1. Include General Project BMPs species conservation measures listed above (2, 4-7).
2. 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.
3. 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.
4. Obtain Biological Investigation Permits from NNDFW prior to conducting species surveys.

Table 1. Required species conservation measures for federally listed endangered and threatened and Group 2 and 3 Navajo Nation listed plant species.

Plants (Federally Listed and NNHP G3) – Species Conservation Measures																					
USFWS Status	E			T				T													
NNDFW Group	G2	G3	G2	G2	G3	G3	G2	G2	Group 3												
Conservation Measure	Brady pincushion cactus (<i>Pediocactus bradyi</i>)	Fickeisen plains cactus (<i>Pediocactus peeblesianus</i> ssp. <i>fickeiseniae</i>)	Mancos milk-vetch (<i>Astragalus humilimus</i>)	Zuni (Rhizome) fleabane (<i>Erigeron rhizomatus</i>)	Welsh' s milkweed (<i>Asclepias welshii</i>)	Navajo sedge (<i>Carex specuicola</i>)	Cutler' s milk-vetch (<i>Astragalus cutleri</i>)	Mesa Verde cactus (<i>Sclerocactus mesae-verdae</i>)	Aztec gilia (<i>Aliciella formosa</i>)	Gooding' s onion (<i>Allium goodingii</i>)	Alcove death camas (<i>Anticlea vaginatus</i>)	Marble Canyon milk-vetch (<i>Astragalus cremnophytax</i> var. <i>hevronii</i>)	Cronquist' s milk-vetch (<i>Astragalus cronquistii</i>)	Naturita milk-vetch (<i>Astragalus naturitensis</i>)	Acoma fleabane (<i>Erigeron aconianus</i>)	Round dunebroom (<i>Erazurizia rotundata</i>)	Navajo Penstemon (<i>Penstemon navajoa</i>)	Alcove rock daisy (<i>Perityle specuicola</i>)	Navajo bladderpod (<i>Physaria navajensis</i>)	Alcove bog-orchid (<i>Platanthera zothecina</i>)	Brack' s hardwall cactus (<i>Sclerocactus cloverae</i> ssp. <i>brackii</i>)
Low and high aerial spraying of herbicides requires a 1-mile (1.6 km) buffer from identified listed species locations.									X	X	X	X	X	X	X	X	X	X	X	X	X
Mechanical, cultural, chemical, and prescribed burn treatments require a 200 ft (60 m) buffer from identified listed plant species locations. A burn plan must be developed for each project using prescribed fire, which will include specific treatment buffers.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Manual treatments (low impact treatments) require a 20 ft (6 m) buffer from identified listed species locations.	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X
When doing treatments, workers will place flagging, and/or fencing around listed or sensitive plant populations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Conservation Measure	Brady pincushion cactus (<i>Pediocactus bradyi</i>)	Fickeisen plains cactus (<i>Pediocactus peeblesianus</i> ssp. <i>fickeiseniae</i>)	Mancos milk-vetch (<i>Astragalus humillimus</i>)	Zuni (Rhizome) fleabane (<i>Erigeron rhizomatus</i>)	Welsh' s milkweed (<i>Asclepias welshii</i>)	Navajo sedge (<i>Carex specuicola</i>)	Cutler' s milk-vetch (<i>Astragalus cutleri</i>)	Mesa Verde cactus (<i>Sclerocactus mesae-verdae</i>)	Aztec gilia (<i>Aliciella formosa</i>)	Gooding' s onion (<i>Allium gooddingii</i>)	Alcove death camas (<i>Anticlea vaginatus</i>)	Marble Canyon milk-vetch (<i>Astragalus crennophytax</i> var. <i>hevronii</i>)	Cronquist' s milk-vetch (<i>Astragalus cronquistii</i>)	Naturita milk-vetch (<i>Astragalus naturitensis</i>)	Acoma fleabane (<i>Erigeron acoma</i>)	Round dunebroom (<i>Errazurizia rotundata</i>)	Navajo Penstemon (<i>Penstemon navajo</i>)	Alcove rock daisy (<i>Perityle specuicola</i>)	Navajo bladderpod (<i>Physaria navajoensis</i>)	Alcove bog-orchid (<i>Platanthera zothecina</i>)	Brack' s hardwall cactus (<i>Sclerocactus cloverae</i> ssp. <i>brackii</i>)
Vehicles will use only established roads for accessing project sites.	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Vehicles will be parked at previously disturbed parking areas located at least 20 ft (6 m) from known populations when treating. Parking areas will be near established Navajo-BIA, tribal, State, or County roads that receive moderate to heavy use.	X	X	X	X	X	X	X	X													
Treatments occurring in the Mesa Verde Biological Preserves require additional consultation with USFWS and the NNHP botanist. A qualified biological is required on-site to monitor all phases of implementation.								X													
Manual treatments (low impact treatments) require a 50 ft (15 m) buffer from identified listed species locations.								X													

Table 2. Recommended species conservation measures for NNHP Group 4 plants.

NNHP Group 4 Plants – Recommended Species Conservation Measures														
Conservation Measure	San Juan milkweed (<i>Asclepias sanjuanensis</i>)	Heils milk-vetch (<i>Astragalus heilii</i>)	Navajo saltbush (<i>Atriplex garrettii</i> var. <i>navajoensis</i>)	Atwoods camissonia (<i>Camissonia atwoodii</i>)	Welchs American-aster (<i>Symphotrichum welshii</i>)	Arizona rose sage (<i>Salvia pachyphylla</i> ssp. <i>eremopictus</i>)	Rydberg' s thistle (<i>Cirsium rydbergii</i>)	Utah bladder-fern (<i>Cystopteris utahensis</i>)	Sivinski' s fleabane (<i>Erigeron sivinskii</i>)	Sarah' s buckwheat (<i>Eriogonum lachnogynum</i> var. <i>sarahiae</i>)	Bluff phacelia (<i>Phacelia indecora</i>)	Cave primrose (<i>Primula specuicola</i>)	Marble Canyon dalea (<i>Psoralea arborescens</i> var. <i>pubescens</i>)	Parish' s alkali grass (<i>Puccinella parishii</i>)
Low and high aerial spraying of herbicides require a 1-mile (1.6 km) buffer from identified listed species locations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Mechanical, cultural, chemical, and prescribed fire treatments require a 200 ft (60 m) buffer from identified listed plant species locations. A burn plan must be developed for each project using this technique, which will include specific treatment buffers.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Manual treatments (low impact treatments) require a 20 ft (6 m) buffer from identified listed species locations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X
When doing treatments, workers will place flagging, and/or fencing around listed or sensitive plant populations.	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Table 3. Required species conservation measures for Federally listed endangered, threatened, and experimental population and NNHP Group 2 and 3 bird species.

Birds (NNHP G2, G3, and G4 Exp Pop) – Species Conservation Measures								
USFWS Status	T	E, Exp. Pop.*	E	T				
NNDFW Group	G3	G4	G2	G2	G2	G3	G3	G3
Conservation Measure	Mexican spotted owl (<i>Strix occidentalis lucida</i>)	California condor (<i>Gymnogyps californianus</i>)	Southwestern willow flycatcher** (SWFL) (<i>Empidonax traillii extimus</i>)	Western yellow-billed cuckoo (YBCU) (<i>Coccyzus americanus</i>)	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Golden Eagle (<i>Aquila chrysaetos</i>)	Ferruginous hawk (<i>Buteo regalis</i>)	American dipper (<i>Cinclus mexicanus</i>)
Breeding season is March 1 through August 31.	X							
All treatments require a ¼ mile (0.4 km) buffer from protected activity centers (PACs) and suitable nesting habitat during the breeding season. A PAC is approximately 600 acres (240 ha) around an owl activity center (nest, roost, or best roost habitat).	X							
Specified herbicides may be applied along road and utility rights-of-way in MSO PACS during the breeding season, but applicators should make sure that pesticide spray drift does not occur beyond rights-of-way.	X							
Contact NNDFW for background information on known nesting sites, suitable nesting sites, or known communal roosting sites in species habitat.		X						
Mechanical, prescribed fire, and ground application of herbicide treatments require a one-mile (1.6 km) buffer from known nesting sites, suitable nesting sites, or known communal roosting sites in species habitat of canyon lands and mountain ridges.		X						
Aerial applications of herbicides require a 1.5-mile (2.4 km) buffer from release sites, suitable nesting sites, or known communal roosting sites in species habitat of canyon lands and mountain ridges.		X						
If a condor is present all weed treatment activities will cease and NNDFW will be contacted. Field crews will avoid interacting with condors if present on site.		X						
All trash and debris will be disposed of properly off site.		X						
No new populations biological control for saltcedar on the Navajo Nation.			X					
A permitted biologist will confirm occupancy during the breeding season (May 15 through July 17, "SWFL Recovery Plan") within a year prior to conducting treatments to determine suitable habitat, breeding habitat, important migration corridors, or potential territory for occupied habitat.			X					
A qualified SWFL biologist in coordination with NNDFW will determine breeding patch size for nesting areas per the "SWFL Recovery Plan" and identify sites on the ground prior to treatments.			X					

USFWS Status	T	E, Exp. Pop.*	E	T				
NNDFW Group	G3	G4	G2	G2	G2	G3	G3	G3
Conservation Measure	Mexican spotted owl (<i>Strix occidentalis lucida</i>)	California condor (<i>Gymnogyps californianus</i>)	Southwestern willow flycatcher** (SWFL) (<i>Empidonax traillii extimus</i>)	Western yellow-billed cuckoo (YBCU) (<i>Coccyzus americanus</i>)	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Golden Eagle (<i>Aquila chrysaetos</i>)	Ferruginous hawk (<i>Buteo regalis</i>)	American dipper (<i>Cinclus mexicanus</i>)
In occupied breeding areas, mechanical and mechanized and low and high aerial chemical treatments require a ¼ mile (0.4 km) buffer from the breeding patch boundary or suitable habitat.			X	X				
Prescribed fires outside of a breeding patch will be conducted outside of the migrating and breeding season. Small pile burns will be conducted outside of the floodplain or 300 ft (90 m) buffer from edge of waterway.			X	X				
Manual treatments will be used up to the breeding patch boundary or suitable habitat.			X	X				
Important migratory corridors for SWFL will be buffered as listed above from May 15 to July 17.			X					
All projects within the riparian zone near occupied habitat will require restoration with native riparian/wetland vegetation following noxious weed removal.			X	X				
A permitted biologist will confirm occupancy during the breeding season (June 15 through August 15) within a year prior to conducting treatments. No activity will occur within ¼ mi (0.4 km) of potential habitat no survey information exists.				X				
A qualified yellow-billed cuckoo (YBCU) biologist, in coordination with NNDFW, will determine breeding patch size for nesting areas and identify sites on the ground prior to treatments.				X				
The breeding season for bald and golden eagles is January 15 – July 15 ('Navajo Nation Golden and Bald Eagle Nest Protection Regulations').					X	X		
Brief activities that occur for up to one hour per day and involve only personnel and passenger or maintenance vehicles (one hour of spot spraying, mechanical, or manual treatments) require a 0.4 mi (600 m) buffer from an active nest.					X	X		
Breeding season occurs March 1 – July 31 (Navajo Nation Endangered Species List: species accounts).							X	
Light activities that occur for up to one day in the same general area and involve up to five vehicles and up to ten personnel (mechanical treatments and mechanized ground chemical treatments) require a 0.5 mi (800 m) buffer from an active nest.					X	X	X	
Heavy activities that exceed at least one of the criteria for Light Activities that involve human activity of up to one visit per week (prescribed fire, low and high aerial chemical treatments) will be conducted outside of the breeding season and ¾ mi (1 km) from a nesting site.					X	X	X	

USFWS Status	T	E, Exp. Pop.*	E	T				
NNDFW Group	G3	G4	G2	G2	G2	G3	G3	G3
Conservation Measure	Mexican spotted owl (<i>Strix occidentalis lucida</i>)	California condor (<i>Gymnogyps californianus</i>)	Southwestern willow flycatcher** (SWFL) (<i>Empidonax traillii extimus</i>)	Western yellow-billed cuckoo (YBCU) (<i>Coccyzus americanus</i>)	Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Golden Eagle (<i>Aquila chrysaetos</i>)	Ferruginous hawk (<i>Buteo regalis</i>)	American dipper (<i>Cinclus mexicanus</i>)
Brief activities that occur for up to one hour per day and involve only personnel and passenger or maintenance vehicles (one hour of spot spraying, mechanical, or manual treatments) require a ½ mile (0.8 km) buffer from an occupied nest.							X	
Mechanical treatments require a 50–200 ft (15-60 m) buffer from occupied nesting habitat outside of breeding season.								X
No mechanical, mechanized ground, low or high aerial chemical treatments within 1/8 mile (0.2 km) from the active nest during March 15- August 15.								X
Spot chemical spraying or manual treatments require a buffer of 330 ft (0.1 km) from the active nest during March 15- August 15.								X
Small migratory birds- Class 2 or Class 3 herbicides require 30 ft (9 m) buffer for spot and mechanized ground application of herbicide, 150 ft (50 m) with low aerial chemical treatments, and 1/8 mi (200 m) for high aerial chemical treatments near the species habitat.								X

***Exp. Pop = Experimental Population**

****Southwestern willow flycatcher (*Empidonax traillii extimus*)**

Definitions (from "Southwestern Willow Flycatcher Recover Plan ("SWFL Recovery Plan)

Currently suitable habitat is defined as a riparian area with all the components needed to provide conditions suitable for breeding flycatchers. These conditions are generally dense, mesic riparian shrub and tree communities 0.25 acre (0.1 ha) or greater in size within floodplains large enough to accommodate riparian patches at least 33 ft (10 m) wide. Suitable habitat may be occupied or unoccupied.

Potentially suitable habitat is defined as a riparian system that does not currently have all the components needed to provide conditions suitable for nesting flycatchers, but which could – if managed appropriately – develop these components over time. Potential habitat occurs where the flood plain conditions, sediment characteristics, and hydrological setting provide potential for development of dense riparian vegetation.

Breeding Patch is the area used by breeding flycatchers. Breeding patches include all flycatcher territories, and most flycatcher breeding patches are larger than the sum total of the flycatcher territory sizes at that site.

Table 4. Recommended species conservation measures for NNHP Group 4 bird species and bird species protected under the Migratory Bird Treaty Act.

NNHP Group 4 Bird – Species Conservation Measures																
Conservation Measure	Northern goshawk (<i>Accipiter gentilis</i>)	Clarks grebe (<i>Aechmophorus clarkia</i>)	Northern saw-whet owl (<i>Aegolius acadicus</i>)	Burrowing owl (<i>Athene cunicularia</i>)	Belted kingfisher (<i>Ceryle alcyon</i>)	Mountain plover (<i>Charadrius montanus</i>)	Dusky grouse (<i>Dendragapus obscurus</i>)	Yellow warbler (<i>Dendroica petechial</i>)	Hammond' s flycatcher (<i>Empidonax hammondi</i>)	Northern pygmy-owl (<i>Glaucidium gnoma</i>)	Flammulated owl (<i>Otus flammeolus</i>)	Band-tailed pigeon (<i>Patagioenas fasciata</i>)	American three-toed woodpecker (<i>Picoides dorsalis</i>)	Tree swallow (<i>Tachycineta bicolor</i>)	Sora (<i>Porzana carolina</i>)	Gray vireo (<i>Vireo vicinior</i>)
All treatments require a ¼ mi (0.4 km) buffer from nest site during March 1- August 15 and within 0.20 mi (0.2 km) of nest site year-round.	X			X												
Mechanical treatments require 200 ft (60 m) buffer from lake-side vegetation or within the 100-yr floodplain, whichever is greater.		X														
Prescribed fire, target livestock grazing, and mechanized ground, low and high aerial chemical spraying require a 1/8-mile (0.2km) buffer from the active nest.		X*			X*	X*	X ∞								X ‡	
Chemical spot and manual treatments require a 330 ft (0.1 km) buffer from active nest.		X*			X*	X*	X ∞		X ϕ			X ‡	X ‡	X ‡	X ‡	X***
All treatments require a 1/8- mile (0.2 km) buffer from the nest site year-round or during nesting.			X					X**								
Pesticides that rate as Class 2 or Class 3 in the Predatory Avian, Small Mammal, or Terrestrial Arthropod toxicity groups should have a ½ mile (0.8 km) buffer from occupied nests.			X	X						X	X					
No treatments within nesting habitats year-round.					X	X										
Mechanical treatments require 1/8-mile (0.2 km) buffer from nest site year-round.							X				X					
Mechanical, mechanized ground and low and high aerial chemical treatments require a 1/8-mile (0.2 km) buffer from habitat patches used for breeding or potential habitat year-round.								X	X	X		X	X	X		X

Conservation Measure	Northern goshawk (<i>Accipiter gentilis</i>)	Clarks grebe (<i>Aechmophorus clarkia</i>)	Northern saw-whet owl (<i>Aegolius acadicus</i>)	Burrowing owl (<i>Athene cunicularia</i>)	Belted kingfisher (<i>Ceryle alcyon</i>)	Mountain plover (<i>Charadrius montanus</i>)	Dusky grouse (<i>Dendragapus obscurus</i>)	Yellow warbler (<i>Dendroica petechial</i>)	Hammond' s flycatcher (<i>Empidonax hammondi</i>)	Northern pygmy-owl (<i>Glaucidium gnoma</i>)	Flammulated owl (<i>Otus flammeolus</i>)	Band-tailed pigeon (<i>Patagioenas fasciata</i>)	American three-toed woodpecker (<i>Picoides dorsalis</i>)	Tree swallow (<i>Tachycineta bicolor</i>)	Sora (<i>Porzana carolina</i>)	Gray vireo (<i>Vireo vicinior</i>)
Chemical spot and manual treatments require a 1/8-mile (0.2 km) buffer from the nest site.										X [∞]	X [#]					
Mechanical treatments require 200 ft (60 m) buffer from lakes and Category I wetlands and 150 ft (45 m) of Category II wetlands, per Navajo Natural Heritage Program 1994.															X	
* - nesting period May 1- July 31, ** - nesting period April 15 – July 31	*** - nesting period May 1 – August 31 ∞ - nesting period April 1- July 15					♢ - nesting period May 15 – August 15 ‡ - nesting period May 1 – August 1					# - nesting period May 1 – August 15					

Migratory Birds – Species Conservation Measures
Mechanical treatments within the buffer zone will be conducted outside of the breeding season (March through August).
Non-endangered raptors - All treatments require a 490 ft (0.15 km) buffer from the active nest from March-August or until juveniles have left the nest.
Predatory birds - Spot and mechanized ground herbicide treatments with Class 2 or Class 3 liquid formulation herbicides require a 300 ft (90 m) buffer from the active nest from March- August or until juveniles have left the nest. Low and high aerial treatments require a 1/8 mi (200 m) buffer from the active nest.
Small migratory birds - Class 2 or Class 3 herbicides require 30 ft (9 m) buffer for spot and mechanized ground application of herbicide, 150 ft (50 m) with low aerial chemical treatments, and 1/8 mi (200 m) for high aerial chemical treatments near the species habitat.
Waterfowl - avoid using Class 2 or 3 herbicides in areas where waterfowl are concentrated and wait until birds have migrated for the season. Applications of liquid formulations of Class 2 and 3 herbicides require a 30 ft (9m) buffer for spot applications, 60 ft (20 m) for mechanized ground, 200 ft (60 m) for low aerial spraying, and 1/8 mi (200 m) for high aerial spraying.
Prescribed fires outside of a breeding patch will be conducted outside of the migrating and breeding season.

Table 5. Required species conservation measures for federally listed candidate and endangered and NNHP Group 2 fish species and recommended species conservation measures for NNHP Group 4 fish species.

Fish – Species Conservation Measures						
USFWS Status	E	E	C	E	E	
NNDFW Group	G2	G2	G2	G2	G2	G4
Conservation Measure	Colorado pikeminnow (<i>Ptychocheilus lucius</i>)	Razorback sucker (<i>Xyrauchen texanus</i>)	Roundtail chub (<i>Gila robusta</i>)	Humpback chub (<i>Gila cypha</i>)	Zuni bluehead sucker (<i>Catostomus discobolus yarrowii</i>)	Bluehead sucker (<i>Catostomus discobolus</i>)
Weed removal projects will require restoration of native vegetation to prevent erosion. Weed removal activities in the riparian zone will be conducted in patches to prevent erosion. Patch size will be determined in consultation with NNDFW.	X	X	X	X	X	X
Best Management Practices (see NNIWMP, BIA 2020) will be used to reduce sedimentation and chemical run-off from mechanical and chemical weed treatments along bank lines within the 100-year floodplain.	X	X	X	X	X	X
Pile burning and prescribed burning will be conducted 300 ft (90 m) outside of the floodplain.	X	X	X	X	X	X
Approved herbicides (aquatic formulations only): 2,4-D, glyphosate, triclopyr and imazapyr will exclusively be used within 25 ft (7.6 m) of the daily high-water mark.	X	X	X	X	X	X
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.	X	X	X	X	X	X
Non-aquatic approved and moderate to high aquatic toxicity herbicides require a 300 ft (90 m) buffer from the daily high-water mark (see NNIWMP, EPP 2020).		X	X	X	X	
No surface disturbance year-round within 98 – 200 ft (30 – 60 m) from the top of the stream bank. NNDFW fish biologist will determine exact distance on a case-by-case basis.					X	X
Only the cut-stump method will be used to remove large trees or shrubs in the floodplain. Debris will be piled outside of the floodplain.					X	
Heavy machinery (bulldozers/root plows) mechanical treatments require a 300 ft (90 m) buffer from edge of the waterway.					X	

Table 6. Required species conservation measures for federally listed endangered and NNHP Group 3 invertebrate species and recommended species conservation measures for NNHP Group 4 invertebrate species.

Invertebrates – Species Conservation Measures				
USFWS Status				
NNDFW Group	G4	G3	G4	G4
Mitigation Measure	Kanab ambersnail (<i>Oxytoma kanabense</i>)	Great Basin silverspot (<i>Speyeria nokomis</i>)	Rocky mountainsnail (<i>Oreohelix strigosa</i>)	Yavapai mountainsnail (<i>Oreohelix yavapai</i>)
Mechanized, manual and chemical spot treatments require a 200 ft (60 m) buffer from suitable habitat.	X			
Low aerial spraying requires a 150 ft (50 m) buffer and high aerial spraying requires a 1/8 mile (200 m) buffer from suitable habitat.	X			
Surveys will be conducted from August 1 - September 1.		X		
Avoidance measures will be applied to the host plant, violet.		X		
No chemical or mechanical treatments permitted within 200 ft (60 m) of occupied habitat year-round.		X		
No target livestock grazing in wet areas containing host plants during the mating season.		X		
No broadcast or aerial herbicide applications will be permitted within western seep fritillary habitat or in areas containing host plants.		X		
Mechanical and manual treatments require a 200 ft (60 m) buffer from occupied habitat year-round.			X	X

Table 7. Required species conservation measures for NNHP Group 2 amphibian and reptile species and recommended species conservation measures for NNHP Group 4 amphibian and reptile species.

Amphibians and Reptiles – Species Conservation Measures			
NNDFW Group	G2	G4	G4
Mitigation Measure	Northern leopard frog (<i>Lithobates pipiens</i>)	Milk snake (<i>Lampropeltis triangulum</i>)	Chuckwalla (<i>Sauromalus ater</i>)
Mechanized and manual treatments require a 200 ft (60 m) buffer from open water habitats.	X		
Prescribed fire requires a 200 ft (60 m) buffer zone from the edge of the wetland vegetation.	X		
No applications of herbicides will be used inside occupied or potentially occupied aquatic habitat.	X		
Mitigation measures will be applied in dispersal and migration corridors after rain events.	X		
All projects in riparian/wetland habitats near occupied habitat will require native riparian/wetland vegetation restoration following invasive species removal.	X		
Only herbicides labeled for aquatic use and the cut-stump method on tree species will be used in potential habitat.	X		
No target grazing will be used in the habitat.	X		
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.	X		
No mechanical treatments (surface disturbance) within occupied habitats.		X	X

Table 8. Required species conservation measures for NNHP Group 3 mammal species and recommended species conservation measures for NNHP Group 4 mammal species.

Mammals – Species Conservation Measures							
NNDFW Group	G3	G4	G4	G4	G4	G4	G4
Mitigation Measure	Pronghorn (<i>Antilocapra americana</i>)	Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Chisel-toothed kangaroo rat (<i>Dipodomys microps</i>)	Banner-tailed kangaroo rat (<i>Dipodomys spectabilis</i>)	Navajo Mountain vole (<i>Microtus mogollonensis</i>)	Arizona (Wupatki) pocket mouse (<i>Perognathus amplus cineris</i>)	Kit fox (<i>Vulpes macrotis</i>)
All treatments require a 1-mile (1.6 km) buffer from potential lambing areas from May 1 through June 15.	X						
All treatments require a 200 ft (60 m) buffer from occupied roost site during April 15- August 31.		X					
Mechanical and target grazing treatments require a 200 ft (60 m) buffer from occupied habitats year-round.			X	X	X	X	X
All treatments require a 1/8 mi (0.2 km) buffer from active den during December 1- August 31							X

Black-footed ferret (*Mustela nigripes*) and Northern river otter were extirpated from the Navajo Nation. Both species have been reintroduced in areas adjacent to the Navajo Nation. For black-footed ferret, reintroduction efforts have occurred at Babbitt Ranches, adjacent to the Navajo Nation, and may be considered for other areas within or around the Navajo Nation. Northern river otters were detected in southern Colorado, but no sightings have occurred on the Navajo Nation. If black-footed ferrets and Northern river otters are reintroduced or expand into the Navajo Nation the conservation measures, listed below, for this species would be initiated in addition to the regulations outlined in the reintroduction guidelines.

Table 9. Recommended species conservation measures for NNHP Group 1 mammal species.

Mammals (G1 Extirpated) – Species Conservation Measures		
Mitigation Measure	Northern river otter (<i>Lontra canadensis</i>)	Black-footed ferret (<i>Mustela nigripes</i>)
No activity year-round within 300 ft (100 m) of occupied habitat that could result in destruction of burrows/runways and take of individuals or prevent changes to water chemistry.	X	
Breeding season for black-footed ferret is from mid-March to August, with most sensitive period from mid-March to June. Only occur in medium to large active prairie dog towns (>198 acres (80 hectare (ha), and ≥20 burrows/ha).		X
Notify USFWS and NNDFW of any project that will impact prairie dog towns greater than 200 acres (80 ha).		X
Weed treatments will be scheduled outside of breeding season.		X
No disking, plowing or prescribed burns around habitat during the breeding season (March to September).		X
No herbicide limitations for this project per the RPMPA, pg. 109.		X

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.

Species	Herbicides						
	2,4-D (acid)	2,4-D (aquatic amine salt)	2,4-D (aquatic ester)	2,4-D (non-aquatic amine salt)	2,4-D (non-aquatic ester)	Aminopyralid	Atrazine
Federally Listed Species							
California condor	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites.	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. Low and high aerial spraying- 1 1/2 mile from suitable nests, roosts, and release sites. Aerial spraying made in swaths parallel to nest site and aerial buffer zone.		No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites.			
Southwestern willow flycatcher and Yellow-billed cuckoo	All treatments require 1/4 mile buffer from habitat patches or potential habitat until surveyed. No activity within migratory habitat from May 1- June 15.						
Mexican spotted owl	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground, Low aerial and High Aerial- 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season.		All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.			
Colorado pikeminnow, Humpback chub, Razorback sucker, Roundtail chub, Zuni bluehead sucker	No buffer			Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Spot applications- 300ft buffer from waterway.		No buffer	Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Liquid- 10ft Mechanized ground-80ft No aerial applications.
Welsh's milkweed, Brady pincushion cactus, Fickeisen plains cactus, Zuni/Rhizome fleabane, Navajo sedge, Mesa Verde cactus	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot applications from edge of occupied sites: 1/8 mile. Mechanized ground: 2 miles, in non-habitat areas can have buffer of 80ft from occupied habitat during flower period if application is made no later than one hour after sunrise or early evening (6pm or later). Low and high aerial: 2 miles; in non-habitat areas can have buffer of 1/4 mile from occupied habitat during flower period if application is made no later than one hour after sunrise or early evening (6pm or later).		Spot applications from edge of occupied sites: 1/8 mile. Mechanized ground: 2 miles, in non-habitat areas can have buffer of 80ft from occupied habitat during flower period if application is made no later than one hour after sunrise or early evening (6pm or later). No aerial applications.		Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	
Mancos milk-vetch	Spot and mechanized spraying - 200ft from suitable habitat. No aerial applications.	Spot and mechanized spraying - 200ft from suitable habitat. Low and high aerial applications- 1 mile from suitable habitat.		Spot and mechanized spraying - 200ft from suitable habitat. No aerial applications.			
Migratory birds	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No low or high aerial or prescribed burn during breeding season (March-August).		Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.			

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Chlorsulfuron methyl	Clopyralid	Dichlobenil	Fluroxpyr
Federally Listed Species				
California condor	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. No aerial applications.			
Southwestern willow flycatcher and Yellow-billed cuckoo	All treatments require 1/4 mile buffer from habitat patches or potential habitat until surveyed. No activity within migratory habitat from May 1- June 15.			
Mexican spotted owl	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.			
Colorado pikeminnow, Humpback chub, Razorback sucker, Roundtail chub, Zuni bluehead sucker	No buffer	Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Liquid- 10ft Mechanized ground-80ft No aerial applications.	Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Liquid- 10ft Mechanized ground-80ft No aerial applications.	
Welsh's milkweed, Brady pincushion cactus, Fickeisen plains cactus, Zuni/Rhizome fleabane, Navajo sedge, Mesa Verde cactus	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.			
Mancos milk-vetch	Spot and mechanized spraying - 200ft from suitable habitat. Low and high aerial applications- 1 mile from suitable habitat.			
Migratory birds	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.			

Species	Herbicides				
	Fluazifop-P-butyl	Glyphosate (aquatic)	Glyphosate (non-aquatic)	Imazapic	Imazapyr (aquatic)
Federally Listed Species					
California condor	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. No aerial applications.	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. Low and high aerial spraying- 1 1/2 mile from suitable nests, roosts, and release sites. Aerial spraying made in swaths parallel to nest site and aerial buffer zone.	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. No aerial applications.	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. Low and high aerial spraying- 1 1/2 mile from suitable nests, roosts, and release sites. Aerial spraying made in swaths parallel to nest site and aerial buffer zone.	
Southwestern willow flycatcher and Yellow-billed cuckoo	All treatments require 1/4 mile buffer from habitat patches or potential habitat until surveyed. No activity within migratory habitat from May 1- June 15.				
Mexican spotted owl	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground, Low aerial and High Aerial- 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season.	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground, Low aerial and High Aerial- 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season.	
Colorado pikeminnow, Humpback chub, Razorback sucker, Roundtail chub, Zuni bluehead sucker	Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Spot applications- 300ft buffer from waterway. No aerial applications.	No buffer	Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Liquid- 10ft Mechanized ground-80ft No aerial applications	No buffer	
Welsh's milkweed, Brady pincushion cactus , Fickeisen plains cactus, Zuni/Rhizome fleabane, Navajo sedge, Mesa Verde cactus	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.		Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.
Mancos milk-vetch	Spot and mechanized spraying - 200ft from suitable habitat. Low and high aerial applications- 1 mile from suitable habitat.				
Migratory birds	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No low or high aerial or prescribed burn during breeding season (March-August).	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.		Spot and mechanized ground applications- 1/4 mile buffer from active nests. No low or high aerial or prescribed burn during breeding season (March-August).

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.					
Species	Herbicides				
	Imazapyr (non-aquatic)	Indaziflam	Isoxaben	Metsulfuron methyl	Metribuzin
Federally Listed Species					
California condor	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. No aerial applications.				
Southwestern willow flycatcher and Yellow-billed cuckoo	All treatments require 1/4 mile buffer from habitat patches or potential habitat until surveyed. No activity within migratory habitat from May 1- June 15. No aerial applications				
Mexican spotted owl	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.				
Colorado pikeminnow, Humpback chub, Razorback sucker, Roundtail chub, Zuni bluehead sucker	Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Liquid- 10ft Mechanized ground-80ft No aerial applications				
Welsh's milkweed, Brady pincushion cactus, Fickeisen plains cactus, Zuni/Rhizome fleabane, Navajo sedge, Mesa Verde cactus	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.				
Mancos milk-vetch	Spot and mechanized spraying - 200ft from suitable habitat. Low and high aerial applications- 1 mile from suitable habitat.				
Migratory birds	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.				

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Paraquat	Pendimethalin	Picloram	Prodiamine
Federally Listed Species				
California condor	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. No aerial applications			
Southwestern willow flycatcher and Yellow-billed cuckoo	All treatments require 1/4 mile buffer from habitat patches or potential habitat until surveyed. No activity within migratory habitat from May 1-June 15.			
Mexican spotted owl	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.			
Colorado pikeminnow, Humpback chub, Razorback sucker, Roundtail chub, Zuni bluehead sucker	Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Spot applications- 300ft buffer from waterway. Mechanized ground - 80 ft. No aerial applications.			
Welsh's milkweed, Brady pincushion cactus , Fickeisen plains cactus, Zuni/Rhizome fleabane, Navajo sedge, Mesa Verde cactus	Spot applications from edge of occupied sites: 1/8 mile Mechanized ground: 2 miles, in non-habitat areas can have buffer of 80ft from occupied habitat during flower period if application is made no later than one hour after sunrise or early evening (6pm or later). No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.		Spot applications from edge of occupied sites: 1/8 mile Mechanized ground: 2 miles, in non-habitat areas can have buffer of 80ft from occupied habitat during flower period if application is made no later than one hour after sunrise or early evening (6pm or later). No aerial applications.
Mancos milk-vetch	Spot and mechanized spraying - 200ft from suitable habitat. Low and high aerial applications- 1 mile from suitable habitat.			
Migratory birds	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.			

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.			
Species	Herbicides		
	Thifensulfuron-methyl	Triclopyr (amine salt)	Triclopyr (ester)
Federally Listed Species			
California condor	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. No aerial applications	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. Low and high aerial spraying- 1 1/2 mile from suitable nests, roosts, and release sites. Aerial spraying made in swaths parallel to nest site and aerial buffer zone.	No buffer zone in ROW. Spot and mechanized ground treatments- 1/4 mile from suitable nests, roosts, and release sites. No aerial applications.
Southwestern willow flycatcher and Yellow-billed cuckoo	All treatments require 1/4 mile buffer from habitat patches or potential habitat until surveyed. No activity within migratory habitat from May 1- June 15.		
Mexican spotted owl	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications.	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground, Low aerial and High Aerial- 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season.	All formulations: Spot- 80ft from the PAC during breeding season. Mechanized ground - 1/4 mile from PAC during breeding season. May be sprayed along road or utility ROW during breeding season. May be sprayed in PAC outside the breeding season. No aerial applications
Colorado pikeminnow, Humpback chub, Razorback sucker, Roundtail chub, Zuni bluehead sucker	No buffer		Spot applications in following areas: one-half mile upstream (including tributaries), all species habitat, and 300ft downstream of habitat. Spot applications- 300ft buffer from waterway. No aerial applications.
Welsh's milkweed, Brady pincushion cactus, Fickeisen plains cactus, Zuni/Rhizome fleabane, Navajo sedge, Mesa Verde cactus	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.
Mancos milk-vetch	Spot and mechanized spraying - 200ft from suitable habitat.	Spot and mechanized spraying - 200ft from suitable habitat. Low and high aerial applications- 1 mile from suitable habitat.	Spot and mechanized spraying - 200ft from suitable habitat.
Migratory birds	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No low or high aerial or prescribed burn during breeding season (March-August).	Spot and mechanized ground applications- 1/4 mile buffer from active nests. No aerial applications.

Species	Herbicides						
	2,4-D (acid)	2,4-D (aquatic amine salt)	2,4-D (aquatic ester)	2,4-D (non-aquatic amine salt)	2,4-D (non-aquatic ester)	Aminopyralid	Atrazine
Navajo Listed Species							
Pronghorn	All formulations- 1 mile buffer from potential lambing areas from May 1- June 15						
Townsend's big eared bat	All formulations require a 197ft buffer from occupied roost site.						
Chisel-toothed kangaroo rat, Banner-tailed kangaroo rat, Navajo Mountain vole, Arizona (Wupatki) pocket mouse	No restrictions						
Kit fox	All formulations require a 1/8 mile buffer from active den from December 1- August 31.						
Bald and golden eagles	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. Aerial applications should be made in swaths parallels to a nest and 3/4 mile buffer zone. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.				
Ferruginous hawk	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. Low and high aerial- 3/4 mile.	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.				
American dipper	All formulations- spot- 350ft buffer. Mechanized ground 1/8 mile buffer from active nest during March 15- August 15. No aerial applications.	All formulations- spot- 350ft buffer. Mechanized ground, low or high aerial within 1/8 mile from active nest during March 15- August 15.	All formulations- spot- 350ft buffer. Mechanized ground - 1/8 mile buffer from active nest during March 15- August 15. No aerial applications.				
Northern goshawk	All formulations require 1/4 mile buffer from nest site during March 1- August 15. All formulations require 0.21 mile buffer from the nest site year-round.						
Clark's grebe	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications.	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during May 1- July 31.	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications.				
Northern saw-whet owl	All formulations require 1/8 mile buffer from the nest site year-round.						
Burrowing owl	All formulations require 1/4 mile buffer from the active nest burrow during March 1- August 15.						
Dusky grouse	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 1-July 15.	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.				
Yellow warbler	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground and low and high aerial- 1/8 mile buffer year-round	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.				

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Chlorsulfuron methyl	Clopyralid	Dichlobenil	Fluroxpyr
Navajo Listed Species				
Pronghorn	All formulations- 1 mile buffer from potential lambing areas from May 1- June 15			
Townsend's big eared bat	All formulations require a 197ft buffer from occupied roost site.			
Chisel-toothed kangaroo rat, Banner-tailed kangaroo rat, Navajo Mountain vole, Arizona (Wupatki) pocket mouse	No restrictions			
Kit fox	All formulations require a 1/8 mile buffer from active den from December 1- August 31.			
Bald and golden eagles	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.			
Ferruginous hawk	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.			
American dipper	All formulations- spot- 350ft buffer. Mechanized ground - 1/8 mile buffer from active nest during March 15- August 15. No aerial applications.			
Northern goshawk	All formulations require 1/4 mile buffer from nest site during March 1- August 15. All formulations require 0.21 mile buffer from the nest site year-round.			
Clark's grebe	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications.			
Northern saw-whet owl	All formulations require 1/8 mile buffer from the nest site year-round.			
Burrowing owl	All formulations require 1/4 mile buffer from the active nest burrow during March 1- August 15.			
Dusky grouse	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.			
Yellow warbler	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.			

Species	Herbicides				
	Fluazifop-P-butyl	Glyphosate (aquatic)	Glyphosate (non-aquatic)	Imazapic	Imazapyr (aquatic)
Navajo Listed Species					
Pronghorn	All formulations- 1 mile buffer from potential lambing areas from May 1- June 15				
Townsend's big eared bat	All formulations require a 197ft buffer from occupied roost site.				
Chisel-toothed kangaroo rat, Banner-tailed kangaroo rat, Navajo Mountain vole, Arizona (Wupatki) pocket mouse	No restrictions				
Kit fox	All formulations require a 1/8 mile buffer from active den from December 1- August 31.				
Bald and golden eagles	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. Aerial applications should be made in swaths parallels to a nest and 3/4 mile buffer zone. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. Aerial applications should be made in swaths parallels to a nest and 3/4 mile buffer zone. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	
Ferruginous hawk	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. Low and high aerial- 3/4 mile.	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. Low and high aerial- 3/4 mile.	
American dipper	All formulations- spot- 350ft buffer. Mechanized ground - 1/8 mile buffer from active nest during March 15- August 15. No aerial applications	All formulations- spot- 350ft buffer. Mechanized ground, low or high aerial within 1/8 mile from active nest during March 15- August 15.	All formulations- spot- 350ft buffer. Mechanized ground - 1/8 mile buffer from active nest during March 15- August 15. No aerial applications	All formulations- spot- 350ft buffer. Mechanized ground, low or high aerial within 1/8 mile from active nest during March 15- August 15.	
Northern goshawk	All formulations require 1/4 mile buffer from nest site during March 1- August 15. All formulations require 0.21 mile buffer from the nest site year-round.				
Clark's grebe	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications.	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during May 1- July 31.	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications.	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during May 1- July 31.	
Northern saw-whet owl	All formulations require 1/8 mile buffer from the nest site year-round.				
Burrowing owl	All formulations require 1/4 mile buffer from the active nest burrow during March 1- August 15.				
Dusky grouse	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 1-July 15.	All formulations: Spot- 328ft buffer from active nest during April 1- July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 1-July 15.	
Yellow warbler	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground and low and high aerial- 1/8 mile buffer year-round	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground and low and high aerial- 1/8 mile buffer year-round	

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.					
Species	Herbicides				
	Imazapyr (non-aquatic)	Indaziflam	Isoxaben	Metsulfuron methyl	Metribuzon
Navajo Listed Species					
Pronghorn	All formulations- 1 mile buffer from potential lambing areas from May 1- June 15				
Townsend's big eared bat	All formulations require a 197ft buffer from occupied roost site.				
Chisel-toothed kangaroo rat, Banner-tailed kangaroo rat, Navajo Mountain vole, Arizona (Wupatki) pocket mouse	No restrictions				
Kit fox	All formulations require a 1/8 mile buffer from active den from December 1- August 31.				
Bald and golden eagles	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.				
Ferruginous hawk	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.				
American dipper	All formulations- spot- 350ft buffer. Mechanized ground -1/8 mile buffer from active nest during March 15- August 15. No aerial applications.				
Northern goshawk	All formulations require 1/4 mile buffer from nest site during March 1- August 15. All formulations require 0.21 mile buffer from the nest site year-round.				
Clark's grebe	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications.				
Northern saw-whet owl	All formulations require 1/8 mile buffer from the nest site year-round.				
Burrowing owl	All formulations require 1/4 mile buffer from the active nest burrow during March 1- August 15.				
Dusky grouse	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.				
Yellow warbler	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.				

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Paraquat	Pendimethalin	Picloram	Prodiamine
Navajo Listed Species				
Pronghorn	All formulations- 1 mile buffer from potential lambing areas from May 1- June 15			
Townsend's big eared bat	All formulations require a 197ft buffer from occupied roost site.			
Chisel-toothed kangaroo rat, Banner-tailed kangaroo rat, Navajo Mountain vole, Arizona (Wupatki) pocket mouse	No restrictions			
Kit fox	All formulations require a 1/8 mile buffer from active den from December 1- August 31.			
Bald and golden eagles	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.			
Ferruginous hawk	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.			
American dipper	All formulations- spot- 350ft buffer. Mechanized ground - 1/8 mile buffer from active nest during March 15- August 15. No aerial applications.			
Northern goshawk	All formulations require 1/4 mile buffer from nest site during March 1- August 15. All formulations require 0.21 mile buffer from the nest site year-round.			
Clark's grebe	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications.			
Northern saw-whet owl	All formulations require 1/8 mile buffer from the nest site year-round.			
Burrowing owl	All formulations require 1/4 mile buffer from the active nest burrow during March 1- August 15.			
Dusky grouse	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.			
Yellow warbler	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.			

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.			
Species	Herbicides		
	Thifensulfuron-methyl	Triclopyr (amine salt)	Triclopyr (ester)
Navajo Listed Species			
Pronghorn	All formulations- 1 mile buffer from potential lambing areas from May 1- June 15		
Townsend's big eared bat	All formulations require a 197ft buffer from occupied roost site.		
Chisel-toothed kangaroo rat, Banner-tailed kangaroo rat, Navajo Mountain vole, Arizona (Wupatki) pocket mouse	No restrictions		
Kit fox	All formulations require a 1/8 mile buffer from active den from December 1- August 31.		
Bald and golden eagles	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. Aerial applications should be made in swaths parallels to a nest and 3/4 mile buffer zone. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.	All formulations: 1/4 mile buffer from active nest during the breeding season January 15- July 15. Buffer zone is unnecessary outside of breeding season for spot and mechanized ground treatments. No aerial applications. If aerial flight over a nest site is necessary, an elevation of 500ft should be maintained over the nest.
Ferruginous hawk	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. Low and high aerial- 3/4 mile.	Brief (1hr) spot- 1/2 mile buffer. Mechanized ground- 5/8 mile buffer. No aerial applications.
American dipper	All formulations- spot- 350ft buffer. Mechanized ground - 1/8 mile buffer from active nest during March 15- August 15. No aerial applications.	All formulations- spot- 350ft buffer. Mechanized ground, low or high aerial within 1/8 mile from active nest during March 15- August 15.	All formulations- spot- 350ft buffer. Mechanized ground - 1/8 mile buffer from active nest during March 15- August 15. No aerial applications.
Northern goshawk	All formulations require 1/4 mile buffer from nest site during March 1- August 15. All formulations require 0.21 mile buffer from the nest site year-round.		
Clark's grebe	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during May 1- July 31.	All formulations: Spot- 328ft buffer from active nest during May 1-July 31. Mechanized ground - 1/8 mile buffer from active nest during May 1- July 31. No aerial applications
Northern saw-whet owl	All formulations require 1/8 mile buffer from the nest site year-round.		
Burrowing owl	All formulations require 1/4 mile buffer from the active nest burrow during March 1- August 15.		
Dusky grouse	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 1-July 15.	All formulations: Spot- 328ft buffer from active nest during April 1-July 15. Mechanized ground - 1/8 mile buffer from active nest during April 1-July 15. No aerial applications.
Yellow warbler	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground and low and high aerial- 1/8 mile buffer year-round	All formulations: Spot- 1/8 mile buffer from active nest from April 15- July 31. Mechanized ground - 1/8 mile buffer year-round. No aerial applications.

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.

Species	Herbicides						
	2,4-D (acid)	2,4-D (aquatic amine salt)	2,4-D (aquatic ester)	2,4-D (non-aquatic amine salt)	2,4-D (non-aquatic ester)	Aminopyralid	Atrazine
Navajo Listed Species							
Belted kingfisher and Mountain plover	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 15-August 15.		All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.			
Hammond's flycatcher	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground and low and high aerial- 1/8 mile from nest year-round.		All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications			
Northern pygmy owl	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.		All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Flammulated owl	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.		All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Band-tailed pigeon, American three-toed woodpecker, Tree swallow	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.		All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Sora	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site May 1-August 1. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site May 1- August 1.		All formulations: spot- 328ft buffer from nest May 1-August 1. No aerial applications.			
Gray vireo	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.		All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Great Basin Silverspot	All formulations require a 60m buffer from occupied habitat						
Rocky mountainsnail, Yavapai mountainsnail, and Kanab ambersnail	No restrictions						

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Chlorsulfuron methyl	Clopyralid	Dichlobenil	Fluroxpyr
Navajo Listed Species				
Belted kingfisher and Mountain plover	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.			
Hammond's flycatcher	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications			
Northern pygmy owl	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Flammulated owl	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Band-tailed pigeon, American three-toed woodpecker, Tree swallow	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Sora	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground - 1/8 mile from nest site May 1-August 1. No aerial applications.			
Gray vireo	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Great Basin Silverspot	All formulations require a 60m buffer from occupied habitat			
Rocky mountainsnail, Yavapai mountainsnail, and Kanab ambersnail	No restrictions			

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.

Species	Herbicides				
	Fluazifop-P-butyl	Glyphosate (aquatic)	Glyphosate (non-aquatic)	Imazapic	Imazapyr (aquatic)
Navajo Listed Species					
Belted kingfisher and Mountain plover	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 15-August 15.	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 15-August 15.	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 15-August 15.
Hammond's flycatcher	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications.	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground and low and high aerial- 1/8 mile from nest year-round.	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications.	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground and low and high aerial- 1/8 mile from nest year-round.	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground and low and high aerial- 1/8 mile from nest year-round.
Northern pygmy owl	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.
Flammulated owl	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.
Band-tailed pigeon, American three-toed woodpecker, Tree swallow	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.
Sora	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground - 1/8 mile from nest site May 1-August 1. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site May 1-August 1.	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground - 1/8 mile from nest site May 1-August 1. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site May 1-August 1.	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site May 1-August 1.
Gray vireo	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.
Great Basin Silverspot	All formulations require a 60m buffer from occupied habitat				
Rocky mountainsnail, Yavapai mountainsnail, and Kanab ambersnail	No restrictions				

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.					
Species	Herbicides				
	Imazapyr (non-aquatic)	Indaziflam	Isoxaben	Metsulfuron methyl	Metribuzin
Navajo Listed Species					
Belted kingfisher and Mountain plover	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.				
Hammond's flycatcher	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications.				
Northern pygmy owl	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.				
Flammulated owl	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.				
Band-tailed pigeon, American three-toed woodpecker, Tree swallow	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.				
Sora	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground - 1/8 mile from nest site May 1-August 1. No aerial applications.				
Gray vireo	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.				
Great Basin Silverspot	All formulations require a 60m buffer from occupied habitat				
Rocky mountainsnail, Yavapai mountainsnail, and Kanab ambersnail	No restrictions				

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Paraquat	Pendimethalin	Picloram	Prodiamine
Navajo Listed Species				
Belted kingfisher and Mountain plover	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15-August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.			
Hammond's flycatcher	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications.			
Northern pygmy owl	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Flammulated owl	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Band-tailed pigeon, American three-toed woodpecker, Tree swallow	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Sora	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground - 1/8 mile from nest site May 1-August 1. No aerial applications.			
Gray vireo	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.			
Great Basin Silverspot	All formulations require a 60m buffer from occupied habitat			
Rocky mountainsnail, Yavapai mountainsnail, and Kanab ambersnail	No restrictions			

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.			
Species	Herbicides		
	Thifensulfuron-methyl	Triclopyr (amine salt)	Triclopyr (ester)
Navajo Listed Species			
Belted kingfisher and Mountain plover	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15- August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15- August 15. Mechanized ground and low and high aerial- 1/8 mile buffer from active nest during April 15-August 15.	All formulations: No treatments in nesting habitat year-round. Spot- 328ft buffer from active nest during April 15- August 15. Mechanized ground - 1/8 mile buffer from active nest during April 15-August 15. No aerial applications.
Hammond's flycatcher	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications.	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground and low and high aerial- 1/8 mile from nest year-round.	All formulations: Spot- 328ft from active nest during May 15- August 15. Mechanized ground - 1/8 mile from nest year-round. No aerial applications.
Northern pygmy owl	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 1/8 mile buffer from nest April 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications
Flammulated owl	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 1/8 mile buffer from nest May 1-August 15. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.
Band-tailed pigeon, American three-toed woodpecker, Tree swallow	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 328ft buffer from nest May 1-August 1. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.
Sora	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground - 1/8 mile from nest site May 1- August 1. No aerial applications	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground, low and high aerial- 1/8 mile from nest site May 1-August 1.	All formulations: spot- 328ft buffer from nest May 1- August 1. Mechanized ground - 1/8 mile from nest site May 1- August 1. No aerial applications.
Gray vireo	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground, low and high aerial- 1/8 mile from nest site year-round.	All formulations: spot- 328ft buffer from nest May 1-August 31. Mechanized ground - 1/8 mile from nest site year-round. No aerial applications.
Great Basin Silverspot	All formulations require a 60m buffer from occupied habitat		
Rocky mountainsnail, Yavapai mountainsnail, and Kanab ambersnail	No restrictions		

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.

Species	Herbicides						
	2,4-D (acid)	2,4-D (aquatic amine salt)	2,4-D (aquatic ester)	2,4-D (non-aquatic amine salt)	2,4-D (non-aquatic ester)	Aminopyralid	Atrazine
Navajo Listed Species							
Northern leopard frog	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 30ft buffer Mechanized- 350ft No aerial applications.	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 30ft buffer Mechanized- 350ft Low aerial- 450ft High aerial-1/8 mile		Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 30ft buffer Mechanized- 350ft No aerial applications.		Spot applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream.	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 100ft buffer Mechanized- 400ft
Milk snake and chuckwalla	No restrictions						
Marble Canyon milk-vetch, Cronquist milk-vetch, Naturita milk-vetch, Acoma fleabane, Round dunebroom, Navajo bladderpod, Navajo Penstemon, Alcove rock daisy, Alcove bog-orchid, Alcove death camas, Gooding's onion, Aztec gilia, San Juan milkweed, Heil's milkvetch, Navajo saltbush, Atwood's camissonia, Rydberg's thistle, Utah bladder-fern, Sivinski's fleabane, Sarah's buckwheat, Bluff phacelia, Cave primrose, Marble Canyon dalea, Parish's alkali grass, Arizona rose sage, Brack hardwall cactus, Welsh' American-aster	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.				
Beath's milkvetch, Cutler's milk-vetch	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications - 1 mile from identified species locations.	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Chlorsulfuron methyl	Clopyralid	Dichlobenil	Fluroxpyr
Navajo Listed Species				
Northern leopard frog	Spot applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream.		Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 30ft buffer Mechanized- 350ft No aerial applications.	
Milk snake and chuckwalla	No restrictions			
Marble Canyon milk-vetch, Cronquist milk-vetch, Naturita milk-vetch, Acoma fleabane, Round dunebroom, Navajo bladderpod, Navajo Penstemon, Alcove rock daisy, Alcove bog-orchid, Alcove death camas, Gooding's onion, Aztec gilia, San Juan milkweed, Heil's milkvetch, Navajo saltbush, Atwood's camissonia, Rydberg's thistle, Utah bladder-fern, Sivinski's fleabane, Sarah's buckwheat, Bluff phacelia, Cave primrose, Marble Canyon dalea, Parish's alkali grass, Arizona rose sage, Brack hardwall cactus, Welsh' American-aster	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.			
Beath's milkvetch, Cutler's milk-vetch	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.		No herbicide treatments permitted in suitable habitat.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.

Species	Herbicides				
	Fluazifop-P-butyl	Glyphosate (aquatic)	Glyphosate (non-aquatic)	Imazapic	Imazapyr (aquatic)
Navajo Listed Species					
Northern leopard frog	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 50ft buffer Mechanized- 350ft No aerial applications.	Spot applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream Liquid- Spot- 30ft buffer Mechanized- 350ft Low aerial- 450ft High aerial-1/8 mile	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 30ft buffer Mechanized- 350ft No aerial applications.	Spot applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream Liquid- Spot- 30ft buffer Mechanized- 350ft Low aerial- 450ft High aerial-1/8 mile	
Milk snake and chuckwalla	No restrictions				
Marble Canyon milk-vetch, Cronquist milk-vetch, Naurita milk-vetch, Acoma fleabane, Round dunebroom, Navajo bladderpod, Navajo Penstemon, Alcove rock daisy, Alcove bog-orchid, Alcove death camas, Gooding's onion, Aztec gilia, San Juan milkweed, Heil's milkvetch, Navajo saltbush, Atwood's camissonia, Rydberg's thistle, Utah bladder-fern, Sivinski's fleabane, Sarah's buckwheat, Bluff phacelia, Cave primrose, Marble Canyon dalea, Parish's alkali grass, Arizona rose sage, Brack hardwall cactus, Welsh' American-aster	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.		Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.
Beath's milkvetch, Cutler's milk-vetch	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications - 1 mile from identified species locations.

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.					
Species	Herbicides				
	Imazapyr (non-aquatic)	Indaziflam	Isoxaben	Metsulfuron methyl	Metribuzin
Navajo Listed Species					
Northern leopard frog	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 30ft buffer Mechanized- 350ft . No aerial applications.				
Milk snake and chuckwalla	No restrictions				
Marble Canyon milk-vetch, Cronquist milk-vetch, Naturita milk-vetch, Acoma fleabane, Round dunebroom, Navajo bladderpod, Navajo Penstemon, Alcove rock daisy, Alcove bog-orchid, Alcove death camas, Gooding's onion, Aztec gilia, San Juan milkweed, Heil's milkvetch, Navajo saltbush, Atwood's camissonia, Rydberg's thistle, Utah bladder-fern, Sivinski's fleabane, Sarah's buckwheat, Bluff phacelia, Cave primrose, Marble Canyon dalea, Parish's alkali grass, Arizona rose sage, Brack hardwall cactus, Welsh' American-aster	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.				
Beath's milkvetch, Cutler's milk-vetch	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	No herbicide treatments permitted in suitable habitat.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	

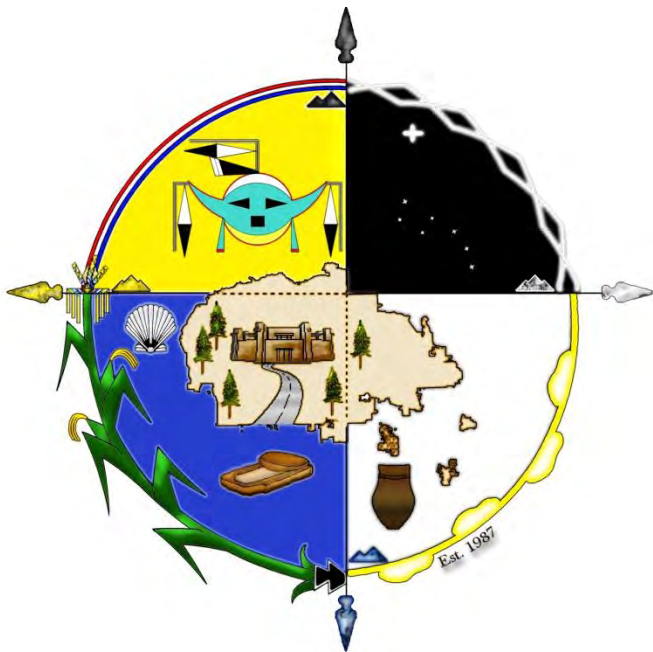
Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.				
Species	Herbicides			
	Paraquat	Pendimethalin	Picloram	Prodiamine
Navajo Listed Species				
Northern leopard frog	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 50ft buffer Mechanized- 350ft No aerial applications.			
Milk snake and chuckwalla	No restrictions			
Marble Canyon milk-vetch, Cronquist milk-vetch, Naturita milk-vetch, Acoma fleabane, Round dunebroom, Navajo bladderpod, Navajo Penstemon, Alcove rock daisy, Alcove bog-orchid, Alcove death camas, Gooding's onion, Aztec gilia, San Juan milkweed, Heil's milkvetch, Navajo saltbush, Atwood's camissonia, Rydberg's thistle, Utah bladder-fern, Sivinski's fleabane, Sarah's buckwheat, Bluff phacelia, Cave primrose, Marble Canyon dalea, Parish's alkali grass, Arizona rose sage, Brack hardwall cactus, Welsh' American-aster	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.			
Beath's milkvetch, Cutler's milk-vetch	No herbicide treatments permitted in suitable habitat for pre-emergent applications. For post-emergent applications, spot and mechanized spraying - 200ft from identified species locations. No aerial applications.		Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	No herbicide treatments permitted in suitable habitat

Figure 1. Required protection measures for herbicide application in Federally and Navajo Nation listed species habitats.			
Species	Herbicides		
	Thifensulfuron-methyl	Triclopyr (amine salt)	Triclopyr (ester)
Navajo Listed Species			
Northern leopard frog	Spot applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. No aerial applications.	Applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid- Spot- 50ft buffer Mechanized- 350ft Low aerial- 1/8 mile High aerial- 1/4 mile	Spot applications on land below or above high water line of species habitat, one-half mile upstream (including tributaries) and 300ft downstream. Liquid Spot - 50 ft. buffer Mechanized - 350 ft. No aerial applications.
Milk snake and chuckwalla	No restrictions		
Marble Canyon milk-vetch, Cronquist milk-vetch, Naturita milk-vetch, Acoma fleabane, Round dunebroom, Navajo bladderpod, Navajo Penstemon, Alcove rock daisy, Alcove bog-orchid, Alcove death camas, Gooding's onion, Aztec gilia, San Juan milkweed, Heil's milkvetch, Navajo saltbush, Atwood's camissonia, Rydberg's thistle, Utah bladder-fern, Sivinski's fleabane, Sarah's buckwheat, Bluff phacelia, Cave primrose, Marble Canyon dalea, Parish's alkali grass, Arizona rose sage, Brack hardwall cactus, Welsh' American-aster	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations. No aerial applications.
Beath's milkvetch, Cutler's milk-vetch	Spot and mechanized spraying - 200ft from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations. Low and high aerial applications- 1 mile from identified species locations.	Spot and mechanized spraying - 200ft from identified species locations.

Appendix G. Navajo Nation Historic Preservation Department Permit Process

THE NAVAJO NATION

PERMIT PACKAGE 2016



Historic Preservation Department

TABLE OF CONTENTS

SECTION	CONTENTS	PAGE
One	Letter to Cultural Resource Permit Holders	1-3
Two	Policies, Procedures & Requirements for Acquiring Cultural Resources Investigation Permits	4-8
	Table 1. Permit Requirements on Navajo Land	9
	Cultural Resources Investigation Permit Fee Schedule	10
	Table 2. Summary of Permit Requirements	11
	Class A - Permit Requirements & Request Form (Visitation/Personal Non-collection)	12-13
	Class B - Permit Request Form (Non-collection pursuant to Section 106/NNCRPA)	14
	Class C / Type 1 - Request Form (Section 106/NNCRPA collection/excavation)	15
	Class C /Type 2 - Permit Requirements & Request Form (Ethnographic Data Collection for Personal/Professional Research)	16-17
	Application for Federal Permit Under the Archaeological Resources Protection Act (ARPA)	18-19
Three	Fieldwork, Report Standards & Guidelines	20-24
	Archaeological Inventory Report (AIRs Form) Documentation Page	25
	Site Survey & Management Form	26-27
	Site Survey & Management Update Form	28
	Site Number Request Form	29
	TCP Record Search Verification Form	30
Four	Guidelines for the Treatment of Historic, Modern Contemporary Abandoned Sites	31-32
Five	Policy to Protect Traditional Cultural Properties	33-38
	Sacred & Traditional Places Documentation Form	39-42
Six	Resolution – Navajo Nation Burial Policy	43-44
	Policies & Procedures Concerning the Protection of Jishchaa': Cemeteries, Gravesites & Human Remains	45 (1-10)
	Identification of Gravesites, Human Remains & Funerary Items & Statement of Wishes – Burials WITH Lineal Descendants	56-60
	Identification of Gravesites, Human Remains & Funerary Items & Statement of Wishes – Burials WITHOUT Lineal Descendants	61-64
Seven	Guidelines for the Treatment of Discovery Situations	65-70
Eight	Navajo Nation Cultural Resource Protection Act (NNCRPA)	71 (1-8)
Nine	Navajo Nation Policy for the Disposition of Cultural Resources Collections	80 (1-14)
Ten	Archaeological Clearance Process Flow Chart	81
	HPD Copy Policy	82



THE NAVAJO NATION HISTORIC PRESERVATION DEPARTMENT Cultural Resource Compliance Section

PO Box 4950, Window Rock, Arizona 86515

TEL: (928) 871-7198 / 7134 FAX: (928) 871-7886 WEBSITE: hpd.navajo-nsn.gov

Navajo Nation Cultural Resources Permit Holder(s):

Enclosed is the Navajo Nation Historic Preservation Department (HPD) updated **2016** Annual Permit package which explains cultural resources management procedures on Navajo Nation lands. Fulfilling Navajo Nation standards and requirements is the responsibility of each permittee. Please discard any old guidelines you may have received from us. The enclosed information includes:

- Policies Procedures & Requirements for Acquiring Cultural Resource Investigation Permits
- Permit Application Procedures, Forms and Fee Schedule
- Interim Fieldwork, Report Standards and Guidelines
- Guidelines for the Treatment of Historic, Modern & Contemporary Sites
- Navajo Nation Policy to Protect Traditional Cultural Properties (TCPs)
- Navajo Nation Burial Policy and Procedures (Jishchaa Policy)
- Guidelines for the Treatment of Discovery Situations
- Nation Cultural Resources Protection Act (NNCRPA)
- Navajo Nation Policy for the Disposition of Cultural Resource Collections

Introduction

HPD is the Navajo Nation's lead agency for cultural resources preservation, protection and management planning. It operates under the authority of the Navajo Nation Cultural Resources Protection Act [NN Code Title 19, Section 1001 (Chapter 8)]. HPD's role in the Navajo Nation is similar to that of a State Historic Preservation Office (SHPO). On behalf of the Navajo Nation, HPD acts as the Tribal Historic Preservation Office (THPO) in the federal "Section 106" review process. HPD advises federal, state/tribal agencies and project sponsors on protection and management of cultural resources in a manner that reflects the unique preservation concerns of the Navajo Nation. HPD is also responsible for reviewing applications and issuing permits for all archaeological and ethnographic investigations within the exterior boundaries of the Navajo Nation: tribal trust lands, fee lands, allotments, PLO 2198..

The following information has been provided in previous permit packages and will serve as a refresher on the history of the funds allocation and the P.L. 93-638 Contracts between the Navajo Nation Historic Preservation Department and the Bureau of Indian Affairs (BIA).

Congress allocates funds through the Federal Historic Preservation Fund for direct preservation grants to Indian tribes. These grants strengthen tribal historic preservation programs and provide the basis for a centralized data base and geographic information system for cultural resources data throughout the Navajo Nation.

In addition, Pursuant to the Indian Self-determination Act of 1976, as amended (P.L. 93-638, P.L. 100-472), HPD has entered into a contract with the Bureau of Indian Affairs-Navajo Regional Office (BIA-NRO). This "638" contract has resulted in several changes in the structure and scope of services provided by HPD.

HPD, BIA and the "638" Contract

Background

The BIA is the lead federal agency for Section 106 review of the majority of undertakings on the Navajo Reservation. (The Indian Health Service, Department of Housing and Urban Development and the Office of Navajo and Hopi Indian Relocation also act as lead agencies for certain undertakings). The BIA cultural resources program has grown over the last decade to include a review and compliance section which handles all Section 106 review and compliance permit issuance, data base maintenance, etc., and individual archaeology field programs for the BIA branches of forestry, roads, Navajo partition lands, land operations and facilities management. The branch archaeologists are responsible for performing small-scale field projects and/or contracting out larger field projects such as road right-of-way mitigation projects, forest compartment surveys, etc. Each of the programs advises the BIA-NRO Regional Director, who issues final notices to proceed with undertakings or "archaeological clearance" in compliance with the National Historic Preservation Act.

The Indian Self-determination Act was established to direct the federal funds spent on BIA programs to tribes, for programs the tribes wish to operate themselves. Many former BIA schools, for example, are now run by tribes, with the funding provided on a contracted basis by the BIA. Through the same process, HPD has contracted the cultural resource management functions of BIA-NRO, which means that the BIA funding for those programs is provided directly to the Navajo Nation. Now, instead of the BIA making the decisions about cultural resources management for the Navajo Nation, HPD makes the decisions on behalf of the Navajo Nation and advises the BIA-NRO Regional Director. Rather than having two independent review procedures, two sets of permitting requirements, and so forth, all functions are now provided through one centralized office. The BIA still functions as the "lead" federal agency, however, and the Area Director makes the final decisions in matters where federal approval is necessary.

HPD Structure

Under the "638" contract, HPD has grown considerably in size and has been divided into a number of sections. These include review and compliance, facilities management, traditional cultural program, etc. The Review and Compliance Section (Cultural Resources Compliance Section) handles all matters pertaining to Section 106 compliance.

Report Submission

Reports prepared for Section 106 review are to be submitted only to HPD-CRCS. Details regarding the submission of reports are outlined in HPD's *Fieldwork and Report Standards and Guidelines*. HPD requires two copies of each report. In addition, two sets of site forms are required. Report review will be handled according to 36 CFR 800, and final approval will be issued by the BIA-NRO Regional Director.

Conclusion

We look forward to a more efficient program for all of us, and one that will ultimately result in the best possible care of the Navajo Nation's cultural resources. Please feel free to call us if you have any questions or if we can be of any assistance at (928)871-7198 or 871-7134.

THE NAVAJO NATION HISTORIC PRESERVATION DEPARTMENT Cultural Resource Compliance Section

POLICIES, PROCEDURES & REQUIREMENTS FOR ACQUIRING CULTURAL RESOURCES INVESTIGATION PERMITS

TYPES OF PERMITS

The Navajo Nation Historic Preservation Department (NNHPD) issues three categories of permits:

Class A:	For site visitation, including personal archaeological research and visitation only
Class B:	For non-collection inventories conducted pursuant to Section 106 of the Nation Historic Preservation Act (NHPA) and/or the Navajo Nation Cultural Resources Protection Act (NNCRPA); activities that are authorized include archaeological inventories as well as ethnographic inquiries that are conducted simultaneously with the archaeological inventories (see 36 CFR Part 800.4, identifying historic properties)
Class C/Type 1:	For archeological excavation or collection purposes (including monitoring), ethnographic inventories conducted as a separate phase of Section 106 and/or NNCRPA, and ethnographic research conducted for the purpose of treating traditional cultural properties pursuant to Section 106 and/or Navajo Nation Policy to Protect Traditional Cultural Properties. An ARPA permit is also required for archeological excavation or collection purposes including monitoring
Class C/Type 2:	For Ethnographic inquiries involving personal/professional research. Ethnographic research includes any systematic collection of oral information from members of the Navajo Nation regardless of differences in academic definitions for specific kinds of ethnography. Explanations regarding ethnographic research appear below in permit-specific contexts

Navajo Nation permits are required on **all** lands of the Navajo Nation. Navajo Nation lands are defined as lands of the Navajo Nation, or of Navajo individuals, that either are under the ownership, jurisdiction or control of the Navajo Nation or are held in trust by the United States or subject to a restriction against alienation imposed by the United States, except for subsurface interests not owned or controlled by the Navajo Nation or a Navajo individual. The most common Navajo land statuses are Tribal Trust, Allotted, Fee Lands (Canoncito Band, Alamo Band, Ramah Band), and P.L.O. 2198. Permit requirements for these land statuses are provided in Table 1 at the end of this section. *It is the responsibility of the sponsor and the permittee to ensure correct identification of land status.* **Fieldwork conducted without the proper permit(s) is illegal and will result in prosecution pursuant to NNCRPA (NN Code Title 19, Section 307 and 308.c) and/or the Archaeological Resources Protection Act (43 CFR Part 7).**

PERMIT APPLICATION PROCEDURES

Permit application procedures are described below and are summarized in Tables 1 & 2. Navajo Nation Cultural Resources Investigation Permit Request Forms and Cultural Resource Permit fee schedule are enclosed.

ANNUAL APPLICATION

An application is required at the beginning of each calendar year (see below for permit-specific requirements). If approved, this application allows the contractor to apply for project-specific permits during the calendar year. The information submitted with the initial application does not need to be resubmitted with each project-specific request. A minimum of ten working days is required to/for review of annual application. Information needed for the annual application includes:

- A statement of the organization's qualifications [including facilities and equipment).
- Current resumes of supervisory/specialist personnel (principal investigators, project director(s), crew chief(s), cultural specialist(s), laboratory director(s), analyst(s), and crew members).

The annual application must clearly and unambiguously identify the applicants for the specific position(s) they will hold. Resumes must be in a simple format that provides all of the information required to document the person's qualifications (e.g. education; time spent in the field [distinguishing between survey, excavating, and ethnographic work, as appropriate], laboratory, etc.). Individuals may not assume positions of greater responsibility than those for which they have been approved; violation of this provision may lead to the nullification of a company's annual application, the disapproval of future project-specific permit requests and/or to the suspension or revocation of project-specific permits that have been already issued.

Resumes for additional personnel, or for persons applying for positions of greater responsibility than were originally approved, must be submitted during the year for review, approval and inclusion in the annual application file. Such individuals may not be listed in requests for project-specific permits or authorizations until approved by HPD.

- A letter outlining the kind(s) and scale(s) of projects that are anticipated during the year and any other relevant information.
- A sample report.
- Application fee of \$100.00 (see enclosed schedule) should submitted to Navajo Nation Cashier's Department, PO Box 3150, Window Rock, Arizona, 86515. Please include Account #107009-1869.

The past performances of both the company and individuals will be taken into account during the review of the annual application. Performance will be continually evaluated throughout the year and determined by the quality of the product submitted to the HPD. Quality is determined by the information provided in reports, including whether permittee have adhered to *The HPD Policies, Procedures, Standards and Guidelines*. In terms of Section 106 and/or NNCRPA compliance, the ultimate standard of quality is whether reports contain the information necessary for HPD-CRCS personnel to make decisions pursuant to 36 CFR 800 and/or NNCRPA. Report quality is the responsibility of the person in Direct Charge. A poor performance record may lead to disapproval of either a company's or an individual's annual application.

Notification of the approval or disapproval of the application will be sent to the applicant upon review. If approved, the notification will include details about individual applicants and the position(s) for which they have been permitted. The approval remains in effect until the end of the calendar year. A poor performance evaluation after an annual application has been issued may lead to the suspension or revocation of the contractor's annual application, disapproval of project-specific permit requests, and/or the revocation of project-specific permits already issued. Poor performance on the part of an individual may lead alternatively to restrictions on the responsibilities they are allowed to assume in the future. The converse is also true (i.e., superior past performance on the part of an individual may lead to their being approved for positions of greater responsibilities than their level of education and experience otherwise indicates).

PROJECT-SPECIFIC PERMITS

HPD will not review reports for purposes of consultation pursuant to Section 106 of the NHPA or NNCRPA unless a project-specific permit number was issued for the project. The project-specific permit number will not be issued by HPD unless resumes have been received for all of the supervisory/specialist personnel participating in the project and these individuals have been approved for their specific positions. ***Requests for project-specific permits must be received by HPD prior to the start of fieldwork;*** HPD will not rush a permit request when fewer than the number of days specified below. The inclusion on the permit request form of individuals not previously approved as a part of the annual application process, and/or the submission of incomplete or inaccurate information about project specifics will lead to delays in the issuance of project-specific permits. When current and accurate information is provided on the permit request form, HPD will make every effort to return the project-specific permit number within the specified number of days; however ***fieldwork may not begin without a project specific permit number.*** If you have not received a response to your request by the specified number of days after its receipt by HPD, you may telephone to inquire as to its status; we will process the permit in as timely a fashion as possible. The project specific permit number must be included on all reports submitted for review. *The project-specific permit fee must be submitted to the Navajo Nation's Cashier's Department.* See the enclosed fee schedule for the applicable fee for each individual permit (for permits related to the Section 106/CRPA process, fees are based on the cultural resource management costs of the project).

Class A Permits (Site Visitation/Personal Non-collection Archaeological Research)

Class A permits are for visitation and/or personal research on archaeological sites. No collection, disturbance or any activity other than visitation is authorized under Class A permits. Personal ethnographic research is conducted under a Class C permit (see below). No initial annual application is necessary for personal research projects but requests for Class A permits must be made in writing (via the enclosed Class A request form) at least ten days prior to the site visitation. The request must specify:

- The identity and location of site(s) to be visited.
- The proposed date(s) of visitation.
- The names of all individuals visiting archaeological site(s).
- The purpose of visitation.

Except for group tours, there is no fee for personal research or visitation conducted under Class A permits. Formal group site tours require a permit fee (see the enclosed fee schedule). This permit is only for visits to archaeological sites, *other off road trips require back country permits from the Navajo Nation Parks and Recreation Department.* Class A permits are valid only for the dates on the actual permit.

Class B Permits (Inventory for Section 106 and/or NNCRPA Purposes)

Under approval of the annual application, project-specific Class B permits may be requested at any time during the year. The form used to request a Class B permit is enclosed on page 16. Class B authorizes Section 106 and/or NNCRPA non-collection archaeological inventories and ethnographic inquiries conducted simultaneously with archaeological inventories (see 36 CFR Part 800.4, identifying historic properties). While no additional Class C ethnographic permit is necessary for collecting basic ethnographic data in concert with archaeological inventories, the Class B permit application must specify the personnel responsible for the ethnographic data collection (pursuant to the Navajo Nation Policy for the Protection of Traditional Cultural Properties [enclosed in Section Five]) along with the other supervisory/specialist personnel participating in the project. Requests for Class B permits must be received by HPD at least 10 days prior to start of fieldwork.

Class B permits are valid for 90-days from the date of issue (or if requested after October 31st) the permit is valid up until December 31st of that calendar year. An extension may be requested in writing prior to the expiration date. A Class B permit is required for each undertaking unless given special permission by HPD.

Class C Permits - Type 1 (Ethnographic research for Section 106 and/or NNCRPA purposes)

A Class C ethnographic permit is necessary for ethnographic inventories conducted as a separate phase of Section 106 and/or NNCRPA investigations, if data collection is for the purpose of treating cultural resources that are included, or eligible for inclusion, in the Navajo Register of Historic Places or the National Register of Historic Places (that is, when mitigation of damage that is expected to occur to such sites as a result of an undertaking, is required.) If treatment of traditional cultural places and archaeological resources are occurring in a single phase of an undertaking, it is not necessary to request a separate Class C ethnographic permit in addition of a Class C archaeological collection/excavation permit. In such a case, however, the permit request must include detailed information (e.g., a treatment proposal outlining the scope of work, project personnel and qualifications, evidence of logistical support, and the like as detailed below for ARPA permits) as they pertain to both traditional and archaeological resources.

An annual application is required prior to requesting this type of Class C permit. Once the annual application has been approved, these permits may be requested on a case-by-case basis at any time during the calendar year. The form used to request the project-specific permits are enclosed. Neither Navajo-owned company blanket nor indefinite services permits are issued for Class C permits. Requests for permits involving treatment of cultural resources (i.e., those that include research proposals) must be received at least 30 days prior to the initiation of fieldwork, while requests for permits for ethnographic inventories being conducted as a separate phase of Section 106 and/or NNCRPA investigations must be received at least 10 days in advance. See the enclosed fee schedule for applicable fees.

Class C Permits - Type 1 (Archaeological Collection/Excavation and Monitoring for Section 106 and/or NNCRPA Purposes)

An annual application is required prior to requesting Class C archaeological collection/excavation and monitoring permits for Section 106 and/or NNCRPA purposes. Once the annual application has been approved, these permits may be requested on a case-by-case basis at any time during the calendar year; the form used to request them is enclosed. These Class C permit applications must be accompanied by an ARPA permit application with the attendant information (see below). Class C Permit requests must be received at least 30 days prior to the initiation of fieldwork. See the attached fee schedule for applicable fees.

Class C Permits – Type 2 (Personal/ Professional Ethnographic Research)

No annual application is necessary for personal ethnographic research projects. Requests for Class C personal ethnographic research permits require a \$100.00 application fee; however, the fee may be waived by special arrangement with the HPD for formal research that will result in data provided to the Navajo Nation. Application must be made in writing (using the request form enclosed) and include the following information:

- A copy of the research design or grant proposal outlining the purpose of the project and the methods to be used (including copies of interview forms and consent forms to be used).
- A resume or other statement of the researcher's qualifications.

- Evidence that the officials of the chapter(s) in which the work is to be conducted have been informed of the proposed research project, i.e. chapter resolution.
- The final report must include evidence that the individuals who were interviewed consented to participating in the research, as well as forms regarding use of the interviewee's name(s) and the information provided by them for publication purposes.

Class C personal ethnographic research permit requests are subject to a 30-day review period, during which time the research proposal will be evaluated in terms of its contribution or benefit to the Navajo Nation.

ARCHEOLOGICAL RESOURCES PROTECTION ACT (ARPA) PERMITS

ARPA permit requests are made to HPD for the BIA on the enclosed ARPA permit application form. They are reviewed by HPD on behalf of the BIA, and they are issued by the BIA. A minimum of 35-40 days should be allowed between application and issuance of an ARPA permit. Application requirements for the ARPA permit include:

- A copy of the research proposal.
- Names, addresses, institutional affiliations and qualifications of individuals responsible for conducting the proposed work and for carrying out the terms of the permit.
- Evidence of logistical support and laboratory facilities.
- Evidence of the curation agreement with the Navajo Nation or a qualified curatorial facility approved by the Navajo Nation (refer to 43 CFR Part 7, Section 6[b] for more detailed information).

Table 1. **2016****Permit Requirements for Common Land Statuses on Navajo Nation Lands**

LAND STATUS	ACTIVITY	NN PERMIT	BIA PERMIT
Navajo Tribal Trust	Visitation	Class A	None
	Inventory	Class B or C	None
	Collection/Excavation	Class C	ARPA
	Ethnographic	Class B or C	None
Allotment	Visitation	Class A	None
	Inventory	Class B or C	None
	Collection/Excavation	Class C	ARPA
	Ethnographic	Class B or C	None
Tribal Fee Land	Visitation	Class A	None
	Inventory	Class B or C	None
	Collection/Excavation	Class C	None
	Ethnographic	Class B or C	None
P.L.O. 2198	Visitation	Class A	None
	Inventory	Class B or C	None
	Collection/Excavation	Class C	ARPA
	Ethnographic	Class B or C	None

CLASS A PERMIT

-Casual site visitation for personal non-collection research by professional or serious amateurs - No Fee.

-Group Tours -
\$5.00/person/day

****This permit is for trips to archaeological sites only.** Other off road trips require a back country permit from the Navajo Nation Parks & Recreation Department . Call (928) 871-6647 for more information.

ANNUAL APPLICATION

ANNUAL APPLICATION

\$100.00/year

Payments should be submitted to the Navajo Nation Cashier's Department, PO Box 3150, Window Rock, Arizona 86515. You must include Account #107009-1869.

CLASS B PERMIT

-For non-collection archaeological & ethnographic inventory for Section 106 & NNCRPA purposes

****See permit fee schedule below**

CLASS C PERMIT - TYPE 1

-Archaeological testing, excavation & monitoring
-Ethnographic research for treatment of resources or ethnographic inventory if conducted as a separate phase of work pursuant to Section 106 and/or NNCRPA

****See permit fee schedule below**

Class B & C-Type 1 permits are based on cultural resource management project cost(s):

\$100.00 - \$999.99	\$50.00
\$1,000.00 - \$4,999.99	Greater of \$110.00 or 4%
\$5,000.00 - \$9,999.99	Greater of \$275.00 or 3.5%
\$10,000.00 - \$24,999.99	Greater of \$550.00 or 3%
\$25,000.00 - \$99,999.99	Greater of \$1,100.00 or 1.75%
>\$100,000	Greater of \$1,650.00 or 0.75%

Table 2 | 2016

Summary of Navajo Nation Permit Requirements

PERMIT CLASS	PURPOSE	ANNUAL APPLICATION	PERMIT FEE	HPD REVIEW PERIOD
Class A	Site Visitation and/or Group tours	No	\$5 per day, per person	10 days
	Non-collection: personal research on archaeological sites: i.e. photography, rock art documentation	No	No	10 days
Class B	Non-collection: Archaeological/ethnographic inventory for Section 106/NNCRPA Purposes	Yes	Yes (See Permit Fee Schedule)	10 days
Class C Type 1	Archaeological testing, excavation, monitoring for Section 106/NNCRPA requirements	Yes	Yes (See Permit Fee Schedule)	30 Days
	Ethnographic research: for treatment of ethnographic properties/ inventories conducted as a separate phase of work pursuant to Section 106/NNCRPA	Yes	Yes (See Permit Fee Schedule)	30 days
Class C Type 2	Ethnographic data collection for personal research or professional research	No	Yes (See Permit Fee Schedule)	30 days

THE NAVAJO NATION HISTORIC PRESERVATION DEPARTMENT Cultural Resource Compliance Section

CLASS A PERMITS REQUIREMENTS **VISITATION/PERSONAL NON-COLLECTION ARCHEOLOGICAL RESEARCH**

Class A permits are for visitation and/or personal research to archaeological sites. No collection, disturbance or any activity other than visitation and documentation is authorized under Class A permits. Personal ethnographic research is conducted under a Class C permit (see below). No initial annual application is necessary for personal research projects but requests for Class A permits must be made in writing (via the enclosed Class A form) at least ten days prior to the site visitation. The request must specify:

1. The identity and location of site(s) to be visited.
2. The proposed date(s) of visitation.
3. The names of all individuals visiting archaeological site(s).
4. The purpose of visitation/research (e.g., photography, rock art documentation, mapping, etc.).

Except for group tours, there is no fee for personal research or visitation conducted under Class A permits. Formal group site tours require a permit fee (see the enclosed fee schedule).

PERMIT NUMBER	
----------------------	--

Type of Permit Requested	Site Visitation <input type="checkbox"/>	Documentation <input type="checkbox"/>
Proposed Starting Date:		
Proposed Ending Date:		
Person in Charge (if applicable):		
Visitation Location		
State:		
County:		
Chapter:		
Legal Location (Township & Range, Section)		
Land Status:		
Description/purpose of visitation/research (e.g. photography, rock art documentation, etc.)		
Name of Organization		
Address	Telephone No./Contact Info.	
Names of Individuals Visiting		
*Please remit permit fee to Navajo Nation Cashier's Department, PO Box 3150, Window Rock, AZ 86515 (Include account #107009-1869 and permit number)		

*Return this form to:

Attn: PERMITTING SECTION

Navajo Nation Historic Preservation Department

Cultural Resource Compliance Section

P.O. Box 4950

Window Rock, AZ 86515

TEL: (928) 871-7198 FAX: (928) 871-7886 Fax

Inventory for Section 106/NNCRPA**PERMIT NUMBER**

Brief Description of Project (including approximate acreage)	
Proposed Starting Date:	
Proposed Ending Date:	
Project Location	
State:	
County:	
Chapter:	
Legal (Township & Range, Section if platted, project if unplatted):	
Land Status:	
Name(s) of U.S.G.S 7.5 minute map(s) (attach map(s) to request form)	
Name of Organization	
Address	Telephone No./Contact Info.
Project Personnel	
Person(s) in General Charge - Principal Investigator[s]:	
Person(s) In Direct Charge - Project Director[s] (specify positions):	
*Please remit permit fee to Navajo Nation Cashier's Department, PO Box 3150, Window Rock, AZ 86515 <i>(Include account #107009-1869 and permit number)</i>	

Return this form to:Attn: **PERMITTING SECTION**

Navajo Nation Historic Preservation Department

Cultural Resource Compliance Section

P.O. Box 4950

Window Rock, AZ 86515

TEL: (928) 871-7198 FAX: (928) 871-7886

Pursuant to Section 106/NNCRPA

PERMIT NUMBER	
----------------------	--

Type of Permit Requested (Refer to Section Two of permit package)			
Section 106/CRPA - Archaeological Collection/Excavation & Monitoring		<input type="checkbox"/>	
Section 106/CRPA – Ethnographic Research (Research for treatment of Ethnographic properties/inventories – if conducted as separate phase of work)		<input type="checkbox"/>	
Name of Organization			
Address		Telephone No./Contact Info.	
Project Personnel			
Person(s) in General Charge - Principal Investigator[s]:			
Person(s) In Direct Charge - Project Director[s] (specify positions):			
Project Location			
State:			
County:			
Chapter:			
Legal (Township & Range, Section if platted, project if unplatted):			
Land Status:			
Name(s) of U.S.G.S 7.5 minute map(s) (attach map(s) to request form)			
Brief Description of Project			
Start Date:		End Date:	
*Please remit permit fee to Navajo Nation Cashier's Department, PO Box 3150, Window Rock, AZ 86515 (Include account #107009-1869 and permit number)			

Return this form to:
 Attn: **PERMITTING SECTION**
 Navajo Nation Historic Preservation Department
 Cultural Resource Compliance Section
 P.O. Box 4950
 Window Rock, AZ 86515
 TEL: (928) 871-7198 FAX: (928) 871-7886

The Navajo Nation
Historic Preservation Department
Cultural Resource Compliance Section

CLASS C/Type 2 PERMIT REQUIREMENTS
ETHNOGRAPHIC DATA COLLECTION FOR PERSONAL/PROFESSIONAL RESEARCH

No annual application is necessary for personal/professional ethnographic research projects. Request for Class C/Type 2 personal/professional ethnographic research permits require a \$100.00 application fee; however, the fee may be waived by special arrangements with the NNHPD for formal research that will result in data provided to the Navajo Nation. The request must be made in writing along with the enclosed request form. The following information must be included:

1. A copy of the research design or grant proposal outlining the purpose of the project and the methods to be used (include copies of interview forms and consent forms)
2. A resume or other statement of the researcher's qualifications
3. Evidence that the officials of the chapter(s) in which the work is to be conducted have been informed of the proposed research project, i.e. chapter resolution
4. The final report must include evidence that the individuals who were interviewed consented to participating in the research, as well as forms regarding use of the interviewees name(s) and the information provided by them for publication purposes

Class C/Type 2 personal/professional ethnographic research permit requests are subject to thirty day review period, during which time the research proposal will be evaluated in terms of its contributions or benefit to the Navajo Nation.

ETHNOGRAPHIC DATA COLLECTION FOR PERSONAL/PROFESSIONAL RESEARCH

PERMIT NUMBER	
----------------------	--

Type of Permit Requested (Refer to Section Two of permit package)	
Ethnographic Data Collection for Personal Research	<input type="checkbox"/>
Ethnographic Data Collection for Professional Research	<input type="checkbox"/>
Name of Organization/Individual	
Address	Telephone No./Contact Info.
Names of all individuals conducting research	
Project Location	
State:	
County:	
Chapter:	
Brief Description of Project	
Proposed Starting Date:	
Proposed Ending Date:	
*Please remit permit fee to Navajo Nation Cashier's Department, PO Box 3150, Window Rock, AZ 86515 (Include account #107009-1869 and permit number)	

Return this form to:
Attn: PERMITTING SECTION
 Navajo Nation Historic Preservation Department
 Cultural Resource Compliance Section
 P.O. Box 4950
 Window Rock, AZ 86515
 TEL: (928) 871-7198 FAX: (928) 871-7886

United States Department of the Interior**Application for Permit for Archeological
Investigations**

Under the Authority of
The Archaeological Resources Protection Act of 1979
(16 U.S.C. 470aa-mm; 43 CFR 7);

and/or **The Antiquities Act of 1906**
(P.L. 59-209; 34 Stat. 225; 16 U.S.C. 431-433; 43 CFR 3)

and/or the appropriate **Bureau-specific statute** Such as
The Reclamation Act; The National Park Service Organic Act; The National Wildlife
Refuge System Administration Act; The Federal Land Policy and Management Act

Instructions: Complete and return two copies of this application form and required attachments to the appropriate State or Regional Office of the land managing bureau involved. All information requested must be completed before the application will be considered. Use separate pages if more space is needed to complete a section.

1. **Name of applicant** (institution, corporation, partnership, individual, or other entity)

2. **Mailing address**

3. **Telephone number(s)**

4. **Email address(es)**

5. **Nature of archeological work proposed**

- ☐ Survey and Recordation
- ☐ Limited Testing and/or Collection (project-specific)
- ☐ Excavation and/or Removal (project-specific)

6. **Location of proposed work** (attach additional sheets)

a. Description of Federal lands involved. Indicate State, county, and Federal administrative unit. Specify the best available location data, e.g., GPS coordinates, UTM coordinates, township, range and section (cadastral) subdivisions, or metes and bounds. Include a readable copy of a map or plan at an appropriate scale showing specific areas for which permit is desired.

b. Identification of archeological resource(s) or other cultural resource(s) involved (if applicable).

7. **Time of proposed work**

Overall duration of project: From To

Estimated duration of fieldwork: From To

8. **Principal Investigator**

Name of individual(s) responsible for planning and generally overseeing field projects, including overall supervision of staff and overall responsibility for the professional quality of resource evaluations and recommendations.

Principal Investigator contact information

Telephone number(s):

Email address(es):

9. Field Director Name of individual(s) responsible for carrying out field projects, for technical quality of fieldwork through direct on-the-ground supervision of all aspects of fieldwork and data gathering, for proposing resource evaluations and recommendations for further treatment, and for preparing field records and descriptive reports.	Field Director contact information Telephone number(s): Email address(es):
10. Permit Administrator Name of individual responsible for fulfilling the terms and conditions of the permit (must be legally empowered to obligate applicant organization).	Permit Administrator contact information Telephone number(s): Email address(es):
11. Applicant must include the following attached to the application form. <ol style="list-style-type: none"> Description of the purpose, nature, and extent of the work proposed, including how and why it is proposed to be conducted: (include research design, methods, curation); Summary of organizational capabilities, including information on location(s) and description of facilities and equipment, on organizational structure and staffing, and on facilities, equipment and staff to be involved in the proposed work; Summary of organizational history in completing work of the kind proposed, including similar past projects, government contracts, and Federal permits (previously held, currently in force with effective dates, and currently pending or planned, by agency and region/state), reports and/or publications resulting from similar work, and any other pertinent organizational experience; For each individual named in 8 and 9 above, a curriculum vitae or similar resume or summary of education, training, and experience in the kind of work proposed and in the role proposed; Written certification, signed by a properly authorized official of the proposed curatorial facility, attesting to the facility's capability and willingness to accept any collections, as applicable, and records, data, photographs, and other documents generated during the proposed term of the permit, and to assume permanent curatorial responsibility for such materials on behalf of the United States Government pursuant to 36 CFR 79. In the case of an application on Indian lands where the Indian Tribe or Indian owner(s) do not wish to take custody, written consent to undertake curation is required from the Indian Tribe or the Indian owner(s) pursuant to 25 CFR 262.8. Custody of any Native American human remains or cultural items subject to the Native American Graves Protection and Repatriation Act (NAGPRA), 25 USC 3001-3013, removed from public lands or Indian lands shall be determined in accordance with NAGPRA and its implementing regulations, 43 CFR 10. 	
12. Proposed outlet(s) for public written dissemination of the results	
13. Signature of individual named in 10	14. Date signed

Paperwork Reduction Act and Estimated Burden Statement: This information is being collected pursuant to 16 U.S.C. 470cc and 470mm, to provide the necessary facts to enable the Federal land manager (1) to evaluate the applicant's professional qualifications and organizational capability to conduct the proposed archeological work; (2) to determine whether the proposed work would be in the public interest; (3) to verify the adequacy of arrangements for permanent curatorial preservation, as United States property, of specimens and records resulting from the proposed work; (4) to ensure that the proposed activities would not be inconsistent with any management plan applicable to the public lands involved; (5) to provide the necessary information needed to complete the Secretary's Report to Congress on Federal Archeology Programs; and (6) to allow the National Park Service to evaluate Federal archeological protection programs and assess compliance with the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470). Submission of the information is required before the applicant may enjoy the benefit of using publicly owned archeological resources. To conduct such activities without a permit is punishable by felony-level criminal penalties, civil penalties, and forfeiture of property. A federal agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. Public reporting for this collection of information is estimated to average one hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Departmental Consulting Archeologist; NPS; 1849 C Street, NW (2275); Washington, DC 20240-0001.

THE NAVAJO NATION

HISTORIC PRESERVATION DEPARTMENT

Cultural Resource Compliance Section

FIELDWORK, REPORT STANDARDS AND GUIDELINES

The Navajo Nation Historic Preservation Department (HPD) has prepared these guidelines as a fieldwork and reports standards manual for contractors working on Navajo Nation lands. The guidelines contained in this manual replace those dated August 01, 1991. They are not, however, all inclusive.

FIELDWORK

- Prior to any fieldwork, a permit must be acquired from NNHPD (refer to Section 2 of permit package). Fieldwork conducted without the proper permit(s) is illegal and will result in prosecution pursuant to NNCRPA (NN Code Title 19, Section 307 and 308.c) and/or the Archaeological Resources Protection Act (43 CFR Part 7).
- Prior to fieldwork, a thorough records check will be conducted at NNHPD CRCS & TCP Offices.
- Spacing between surveyors or individual transects will not exceed fifteen (15) meters. The minimal area for a block survey is 1 acre. The minimal width of a linear survey is fifteen (15) meters.
- At minimum, a 35 to 50-ft buffer zone will be surveyed around the area of potential effect, i.e. home sites, block surveys, linear surveys.
- All cultural resources encountered in the survey area will be documented completely, even if they are partly outside of the survey boundary. For questions about "historic" resources, refer to the *Navajo Nation Guidelines of the Treatment of Historic, Modern and Contemporary Abandoned Sites*. For traditional cultural properties (sacred sites), refer to the *Navajo Nation Policy to Protect Traditional Cultural Properties* [Section 5], and the National Park Service's National Register [Bulletin 38](#) (The bulletin can be accessed via internet at www.nps.gov).

DEFINITIONS

- Site: A site is "the location of a prehistoric or historic occupation or activity, or a building or structure, whether standing or ruined."¹ A site is anything that falls within the preceding definition and is more than an isolated occurrence.
- Traditional Cultural Property (TCP): A location of an event (a ceremony, belief, prayer, sweat lodge, plant gathering areas, and others as defined within the Navajo Nation Policy to Protect Traditional Cultural Properties) where the location itself maintains historic or traditional cultural value regardless of the value of any existing structure. The Navajo Nation requires that a Traditional Cultural Property (TCP) **NOT** be recorded as a site. A burial is **NOT** a TCP and should be recorded as a "Burial" using the Jishchaa' Policy Guidelines in Section 7 of this permit package. However, if the burial is within a historic or prehistoric site, it should be recorded as a part of the site, not as a burial by itself.
- Isolated Occurrence (IO): Any non-structural remains of a single event: alternately, any non-structural assemblage of approximately 10 or fewer artifacts within an area of approximately 10 sq m or less, especially if it is of questionable human origin or if it appears to be the result of fortuitous causes. The number and/or composition of observed artifact classes are a useful rule of thumb for distinguishing between a site and an isolate. It seems unlikely, for example, that the presence of three artifact classes (e.g., lithic debitage, ground stone or sandstone fragments, and pottery) represents the remains of a single event. Similarly, it seems unlikely that two sherds from different vessels or two pieces of debitage from different parent materials, together with a small number of items from a second artifact class represent a single event.

¹U.S. Department of the Interior N.P.S. Cultural Resources, "How to Apply the National Register Criteria for Evaluation," National Register Bulletin. Washington, D.C. 1997. Pg. 5.

- All sites will be mapped to scale using a tape and compass or surveying instrument. UTM coordinates will be obtained using a GPS unit. "Eyeball" and "paced" maps will **NOT** be accepted.

REPORTS

1. All reports that are submitted will be one-sided and unbound (exceptions paper clips, binder clips and staples).
2. An *Archaeological Inventory Report Documentation Page* (AIRS form) is required for use on small projects. A copy of the form can be found at the end of this section. The form will be used on projects less than 30 acres in size and containing no more than 4 sites. Supplemental pages are expected for most of the categories, particularly items 14, 15 and 16. The minimum acceptable buffer for avoiding eligible historic property(ies) is 15 meters. Mistakes are not tolerated in the title and on section 13-location.
3. A narrative report must be submitted for projects over 30 acres and/or containing more than four sites. The AIRS form will be attached to the front of the narrative report. An example of AIRS form is provided at the end of this section. Each narrative report must be paginated and contain an abstract, table of contents and a list of references cited. Electronic copy (ies) of report(s) that contain more than 15 sites will accompany the hard copy (ies).
4. The following information **must** be included in all reports:
 - A. Description of the undertaking. Please give enough detailed information (i.e. widths of right-of-ways, lengths of lines, roads, etc) of the undertaking since Section 106 is driven by the undertaking. HPD needs ample description in order to complete our basic description on the compliance form.
 - B. For home sites, make sure name(s) are spelled correctly.
 - C. Chapter, Agency, County, State, land status (e.g., Tribal Trust [Canconcito Band Land, Alamo Band Land, Ramah Band Land], Allotment, Fee, PLO 2198, etc.). This information will be provided by the sponsor. If necessary, however, this information may be obtained while conducting the pre-field records check, from the BIA Real Property Management at (505)863-8427, or the Navajo Nation Land Administration Office at (928)-871-6523.
 - D. Additional land information required are legal description (including reference to prime meridians), Township and Range (even if unplatted, it must projected), and UTM coordinates. All coordinates should be in NAD 83. DO NOT USE NAVAJO BASELINE, except if project is within Canyon de Chelley National Monument.
 - E. UTM coordinates for linear projects are required for all beginning and ending points and major turn points. UTM coordinates are required for the corners of all block surveys greater than 5 acres. Center point UTM's are sufficient for block acres less than 5 acres in size. All UTM's are to be obtained through the use of a GPS unit.
 - F. If you have been contacted by HPD for more information, or a correction on a report, a cover letter or a statement on top of the report should read REVISION or CORRECTION.
 - G. **PROOFREAD and EDIT ALL REPORTS** before submitting them.
5. The nature of the undertaking and acreage to be affected **must** be described in detail. Acreage must include the area of the undertaking (i.e., the area of direct effect) and the area surveyed (i.e., the area of the undertaking, any buffer zone and any surveyed site areas that extend beyond the buffer). The description of the undertaking will be detailed and will include the length and width of project area and include the area of potential effect. See examples below:

Example 1-Telephone line: Description of undertaking: X Communications Company proposes to construct two segments of telephone lines that will serve the residents of the Round Rock Chapter, in Apache County, Arizona. The proposed telephone lines contain Location 1, an existing buried line to be upgraded. The second segment, Location 2 is a newly proposed buried telephone line extension. Upgrading and the line extension will involve trenching, laying of cable, and back-filling. Surface and subsurface disturbance will be intensive and extensive within the trenching area. Register eligible sites were encountered in Location 2. Aerial cables will need to be spanned over both sites in order to ensure avoidance of the two site s. The proposed spanned location A will measure a minimum 118 ft. in length, and spanned location B will measure a minimum of 65.6 ft. in length. The types of disturbance expected include trenching, drilling at designated pole locations with truck mounted

drilling equipment, and surface disturbance from rubber-tired vehicles used in stringing the cables with truck-mounted pulleys and/or hand carrying cables by construction personnel. In all, a total of 8,292 ft. of proposed telephone lines will be constructed. Location 1 segment measures approximately 2,175 ft. in length with a 30 ft. wide right-of-way, and Location 2 segment measures approximately 6,117 ft. in length with a 30 ft. wide right-of-way. A total area of effect is 5.71 acres. The federal lead agency for this undertaking is the Federal Communications Commission (FCC).

Example 2-Power Line: Description of undertaking: X Utility Company proposes to construct a power line and associated tap lines that will serve the residents of Rock Point and Mexican Water Chapters, Apache County, Arizona. The proposed project consists of two main power lines (Line A and Line B). Line A will have seven associated tap lines and Line B has no associated tap lines. Line A measures a total of 45,664.73 ft. in length with a 30 ft. wide right-of-way, and Line B measures 2,947.08 ft. in length with a 30 ft wide right-of-way. Thus, the total proposed line length measures 48,611.81 ft. In addition, 17 proposed guy anchor locations will be constructed along proposed power line rights-of-way and associated tap lines. Each guy anchor locations measure 50 ft. in length for a total length of 875 ft. In all, a total length of 49,486.81 ft. of power lines, tap lines, and guy anchor locations will be constructed. A total of 34.0 acres of land will be included in the area of effect. The types of disturbance expected include minimal surface blading, drilling at designated pole locations, and surface disturbance from rubber-tired vehicles used in stringing the power cables. Disturbance, both surface and subsurface, with heavy equipment will be extensive and intensive.

Example 3-Roadway: Description of undertaking: This project will involve the construction of 1.9 miles (3.1 km) of paved road with the installation of drainage culverts off of an existing dirt road. The right-of-way (r-o-w) will be 150 feet (45.72) meters) wide. Proposed construction and maintenance activities will include the following: grading and back-filling project length is 1.9 miles (3.1 km). Total area within the project r-o-w is 34.55 acres within the right-of-way, installation of drainage culverts, and paving of road surface. Total (13.99 ha.). The total area surveyed was 69.09 acres (27.96 ha.) within a 300 ft/91 km inventory right-of-way boundary. Ground disturbance with heavy equipment will be extensive and intensive.

6. The “previous research” section shall include sites previously identified within **100 meters** of the current project area. State records (Anthropology Lab, Arizona State Museum, etc.) and scholarly or CRM-related data bases (Museum of Northern Arizona, Highway Department, etc.) should be checked as appropriate to specific project locations/jurisdictions. Basic descriptive information must be provided about these sites, including, at a minimum, site number, cultural affiliation, development phase/date, site type, and the report reference. Be clear in the documentation if the report does not contain the afore-mentioned information. All information obtained can be briefly stated within a few sentences for minor reports. Large reports, with many previously identified sites, may require additional discussion. In extreme cases, where large numbers of known sites might overwhelm an otherwise small project effort, consult with the HPD about the appropriate action. The information may be presented within the text or in tabular form.
7. Site forms that are currently in use by the Navajo Nation Archeology Department (NNAD) will be utilized to document sites. Previously recorded sites will be updated using the NNAD’s site update form. Copies of these forms are provided.
8. Navajo Nation site numbers may be requested on a Navajo Nation Site Number Request Form. A request form is located at the end of this section.
9. Only Navajo Nation site numbers will be accepted.
10. Contractors will do a Traditional Cultural Property record search with the NNHPD TCP Program. A TCP Record Verification Form will be filled out and signed by the TCP Reviewer. Form will accompany report.
11. Enough descriptive information on each cultural resource (e.g. sites, including all constituent components); in-use sites/areas; traditional cultural/sacred places should be recorded; however, **burials/graves, in-use sites/areas and traditional cultural/sacred places should not be assigned a site number.** Cultural resource information must be provided in the text of the report to allow the report to stand alone and to permit independent review and evaluation without constant reference to other cultural resource documentation forms.

Traditional Cultural Properties and Burials need to be documented on an attached confidential appendix at the end of the report (see guidelines at the end of this section)

12. Project area maps must be 1:1 reproductions of USGS maps and **must not** be photocopied back-to-back with other maps or text pages. Report site planview maps must be drawn to scale and show the location of the project (including, if applicable, the existing and proposed right-of-way and any buffer zone) relative to the resource. All reproductions must be clear and legible.
13. Each resource (including each component comprising individual sites) must be evaluated for its eligibility for inclusion to the National Register of Historic Places (36 CFR Part 60.4). These evaluations must be specific with regard to the resource's integrity and elements of significance.
14. Each resource (including each component comprising individual sites) must be evaluated with respect to its eligibility for protection under the Archaeological Resources Protection Act (ARPA).
15. Each undertaking (project) must be evaluated for its effects on properties considered to be eligible for inclusion to the National Register of Historic Places (36 CFR Part 800.9). It must also be evaluated for its effects on identified Traditional Cultural Properties (TCP's). Adherence to the Navajo Nation Policy to Protect Traditional Cultural Properties, National Register Bulletin 38 and consultation with Navajo Nation Traditional Cultural Program (TCP) office will provide assistance in this area. Mitigation recommendations (i.e., avoidance/redesign, fencing, monitoring, testing, data recovery, and/or cancellation of all or part of the project) must be clear, specific, and consistent within the document.
16. Three factors govern report submissions: Either the sponsor submits the report to the HPD, or the contractor does. There are, however, two ramifications related to the first factor.
 - A. IF THE SPONSOR AND THE LEAD AGENCY ARE THE SAME (i.e. IHS and ONHIR): The sponsor/agency must submit the report to the HPD with a cover letter and/or a compliance form stating the evaluations regarding the National Register eligibility and ARPA status of the resources, the evaluation of the undertaking's effect on historic properties, and the proposed mitigative measures (e.g., avoidance/redesign, fencing, testing, and/or mitigation, or cancellation of the undertaking). The sponsor must provide HPD with one complete copy of the report (including site forms). In addition, a separate set of project area maps (one-sided) will be provided. It is the responsibility of the sponsor/agency to obtain from their contractor the number of report copies they require. Finally, it is the sponsor's/agency's responsibility to ensure that the contractor is kept informed of reviewer's comments, and that both the reviewer(s) and contractor are kept informed about the status of the undertaking.
 - B. IF THE SPONSOR SUBMITS THE REPORT AND THE SPONSOR AND THE LEAD AGENCY ARE NOT THE SAME: it is the sponsor's responsibility to provide the HPD with two copies of the report and two copies of site forms. In addition, a separate set of project area maps (one-sided) will be provided. These reports should be submitted with a cover letter in which the evaluations regarding the National Register eligibility and ARPA status of the resources, the evaluation of the undertaking's effect on historic and traditional cultural properties, and the mitigative measures (e.g., avoidance/redesign, fencing, testing and/or mitigation, or cancellation of the undertaking) are clearly stated.
 - C. IF THE CONTRACTOR SUBMITS THE REPORT (usually when the sponsor and lead agency are not the same), the contractor is acting as the sponsor's agent. As a result, it is the contractor's responsibility to have consulted with the sponsor prior to submission of the report. The evaluations and recommendations presented in the report will therefore indicate the sponsor's position on the National Register eligibility and ARPA status of the resources, the effect of the undertaking on historic and traditional cultural properties, and the mitigative measures to be invoked (e.g., avoidance/redesign, fencing, testing, and/or mitigation, or cancellation of the undertaking). In addition, a separate set of project area maps (one-sided) will be provided. HPD must be provided with two copies of the report and two copies of the site forms. *Copies of the report should be given to the sponsor(s).*

17. ~~Navajo Nation Reporting Guidelines to Protect Burials & TCPs~~ In order to protect confidential information and better integrate all cultural resource records, the Navajo Nation Historic Preservation Department (NNHPD), has instituted these reporting guidelines. The guidelines are to be utilized by all contractors permitted by the Navajo Nation Historic Preservation Department, Cultural Resource Compliance Section (CRCS).
- A. Information on burials (human remains & funerary objects) and confidential Traditional Cultural Properties (TCPs) shall be reported in the following manner:
 1. Summarized (with only general location information) in reports submitted for review to HPD/CRCS, and;
 2. Given full, detailed to the extent appropriate (including, at minimum, location, and contact data), information about the resource in a separate, and clearly labeled, confidential appendix.
 - B. As stated in the *Navajo Nation Policy for the Protection of Jischaa': Gravesites, Human Remains & Funerary Items* (NNPPJ), Treatment Plan, VII, C, 4 [upon finding human remains],

“The results of investigations at a burial site shall be incorporated in to a report as a detachable,] i.e., detached] confidential appendix.” and, “Locational information shall be proved to HPD in a confidential appendix. It shall not be retained by the sponsor, its agent, the cultural resource professional, or anyone else.”
 - C. Reports shall include one of the two completed forms for burials (*with or without* known lineal descendants) provided in NNPPJ in the appendix, to appear in the separate, confidential appendix.
 - D. HPD recognizes a wide range of TCPs; some are confidential and/or personal to individuals (example: personal offering places), while others are known to entire communities (example: named landscape features associated with origin stories), and would not necessarily be considered confidential. We also appreciate that the only people qualified to make this determination are those identifying and/or using the resource.
 - E. It is incumbent on the researcher to determine if their interviewee considers the information confidential.
 1. If the interviewee believes that the TCP information should be *treated as confidential*, then only general information about the place, its eligibility for the protection under appropriate laws, and effects and/or appropriate mitigation strategies should appear in the body of the report. Site forms and maps shall be placed in the confidential appendix.
 2. If the information is not to be treated as confidential (example: some herb gathering areas), then all information may appear in the body of the report.
 - F. Bulletin 38 of the *National Register of Historic Places States*, “...information on historic properties, including TCPs, may be kept confidential under the authority of Section 304 of the *National Historic Preservation Act*.”
18. HPD will not accept any reports that use the term “ancestral puebloan or puebloan” when referring to the Anasazi or Nihinaazázi. The Navajo Nation is cultural affiliated to the Anasazi people, and reports that make any reference to Navajos as newcomers to the southwest will be returned. It is the responsibility of the Navajo Nation to protect the information relevant to its life ways, history and origins of its People. Navajo ceremonial and oral histories establish that Navajos have been here since time immemorial. This relationship is confirmed in centuries of traditional history and more than 100 years of anthropological literature. This relationship is also confirmed by archaeological, genetic/biological, and linguistic evidence.
19. Reports that are not in accordance with these standards and guidelines will be returned at the sender’s expense.

ARCHAEOLOGICAL INVENTORY REPORT (AIRs) DOCUMENTATION PAGE

Navajo Nation Integrated Weed Management Plan

Bureau of Indian Affairs
Navajo Region

1. RECEIPIENTS ACCESSION NO.		2. (FOR HPD USE ONLY)	3. HPD REPORT NO.
4. TITLE OF REPORT:		5. FIELDWORK DATES	
AUTHOR:		6. REPORT DATE	
7. CONSULTANT NAME & ADDRESS General Charge: Org. Name: Org. Address: Phone No.		8. PERMIT NO.	
		9. CONSULTANT REPORT NO.	
10. SPONSOR NAME & ADDRESS: Ind. Responsible: Org. Name: Org. Address: Phone No.		11. SPONSOR PROJECT NO.	
		12. AREA OF EFFECT: ____ac AREA SURVEYED: ____ac	
13. LOCATION a. Chapter b. Agency: c. County d. State e. Land Status f. UTM Center: g. Area: T____ N/S, R____ E/W Sec.____ h. 7.5' Map Name(s): i. Lead Agency:			
14. REPORT OR SUMMARY (Attach additional pages if necessary) a. Description of Undertaking: b. Existing Data Review: c. Area of Environmental & Cultural Setting: d. Field Methods:			
15. CULTURAL RESOURCE FINDINGS (Attach additional pages if necessary) a. Location/Identification of each resource: b. Evaluation of Significance of each resource:			
16. MANAGEMENT SUMMARY/RECOMMENDATIONS (Attach additional pages if necessary)			
17. CERTIFICATION: Signature: _____ Date: _____ General Charge Name: _____ Date: _____ Signature: _____ Date: _____ Direct Charge Name: _____			

NAVAJO NATION ARCHAEOLOGY DEPARTMENT
Site Survey and Management Form

SITE NO: FIELD OR OTHER NAME:

DATE RECORDED:

PROJECT NUMBER AND NAME:

ORGANIZATION:

ARCHAEOLOGIST(S):

USGS MAP REFERENCE:

LEGAL LOCATION:

UTM: Zone 12;

STATE: COUNTY: CHAPTER:

LAND STATUS:

GROUND VISIBILITY: KIND AND EXTENT OF COVER?

TOPOGRAPHY:

DRAINAGE:

ELEVATION (ft/m): SLOPE AND DIRECTION:

SEDIMENT TYPE:

OTHER:

VEGETATION PRESENT:

CULTURAL AFFILIATION(S): SITE TYPE:

PERIOD(S) OF OCCUPATION (DATE, IF KNOWN):

HOW DATED?

DIMENSIONS OF SITE (L x W): TOTAL AREA (SQ M):

HOW DETERMINED:
ARCHITECTURE PRESENT? DESCRIBE:

ARTIFACTS OBSERVED/COUNTED:

COLLECTION MADE OF WHAT? METHOD:

PHOTO TAKEN? B/W ROLL: FRAME(S): COLOR ROLL: FRAME(S):

SITE DESCRIPTION:

CONDITION OF SITE:

CAUSES OF DISTURBANCE:

LOCATION OF SITE RELATIVE TO PROJECT AREA:

EXTENT OF INVESTIGATION TO DATE:

RESEARCH POTENTIAL:

RECOMMENDATIONS:

SITE ASSESSMENT UNDER 36 CFR 60.4 (NATIONAL REGISTER):

INTEGRITY:

CRITERIA a-d:

50 YEAR GUIDELINE:

EXCLUSIONS:

SITE ASSESSMENT UNDER 43 CFR 7.3 (ARPA):

SITE ASSESSMENT UNDER AMERICAN INDIAN RELIGIOUS FREEDOM ACT:

PROVIDE A SITE MAP (INCLUDING SITE DESIGNATION, NORTH ARROW, RECOGNIZABLE FEATURES, LANDMARKS, AND RELATIONSHIP TO PROJECT AREA).

HOW CAN SITE BE REACHED?

OTHER COMMENTS (ETHNOGRAPHIC DATA, ETC.):

**Navajo Nation Archaeology Department
Site Survey and Management Update Form**

Site Number:

Original Site Number:

Date:

Current Project Number and Name:

Update by:

New Location Information:

Legal Description:

UTM Coordinates:

Other:

Location of Site Relative to Current Project Area:

Additional Description (including current condition of site):

Site Assessment (indicate any changes from original evaluation):

36 CFR 60.4 (National Register of Historic Places):

Archaeological Resources Protection Act (ARPA):

American Indian Religious Freedom Act (AIRFA):

Recommendations:

THE NAVAJO NATION HISTORIC PRESERVATION DEPARTMENT Cultural Resource Compliance Section

GUIDELINES FOR THE TREATMENT OF HISTORIC, MODERN & CONTEMPORARY ABANDONED SITES

INTRODUCTION

Abandoned cultural sites of recent historic, modern or contemporary age are frequently encountered during cultural resource inventories on Navajo Nation lands. For the purposes of these guidelines, all such sites are referred to as “historic sites.” This document provides the Historic Preservation Officer’s (HPO) guidelines for recording, reporting and treatment of historic sites on lands of the Navajo Nation.

REPORTING AND RECORDING

For the purposes of reporting and recording, historic sites shall be treated as archeological sites. All historic sites must be fully recorded and reported, UNLESS they are still in use.

In-Use Sites/In-Use Areas

In-use sites require only summary documentation, sufficient to determine if potential historic properties are present and if they be affected by the proposed undertaking. In-use sites require only brief verbal description and, out of respect for the privacy of the occupants, shall not be photographed, recorded, mapped or assigned site numbers.

Archaeological Sites

The professional judgment of the archaeologist must be used to determine what constitutes a historic site. Historic sites are not restricted to those over 50 years old, and those under 50 years old are to be recorded as archaeological sites in the same manners as any other. Conversely, the information to be gained from recently scattered roadside trash, for example is so minimal as to preclude the necessity for recording. Again, the judgment of the archaeologist must be used in determining the level of recording necessary on a case by case basis. However, these decisions should be documented in the report to allow the reviewer an independent evaluation of the field decisions field.

At a minimum, recording and reporting of historic sites must satisfy the Secretary of the Interior’s Standards and Guidelines.¹ Recording and reporting must be sufficiently detailed to allow an independent evaluation of the archaeologist’s recommendations for National Register of Historic Places (NRHP) eligibility, determination of effect as specified in 36 CFR 800.9 (a) (b), and protection under the American Indian Religious Freedom Act (AIRFA). The information a historic site contains includes what knowledgeable people remember about the site and its constituent features, artifacts and other material remains. If the functions and dates of a historic site and its constituent features are not evident from material remains, the archaeologist must attempt to recover information through on-site interviews in order to evaluate the site’s NRHP eligibility and significance under AIRFA. Depending on the nature of the historic site, the information potential may not necessarily be exhausted by recording until ethno historic data are recorded.

Treatment

Two factors must be considered in evaluating historic sites as cultural resources and in making recommendations regarding their treatment. Each historic site must be evaluated:

1. As an archeological site and as a historic property. Can the site contribute archaeologically or historically significant data? Is it associated with important individuals, events or trends in local, regional or national history? If the site is considered archaeologically or historically significant, treatment should be proposed in terms of current, contemporary professional practice, including collection of ethnographic data through on-site interviews.
2. As a locus of traditional cultural practices that is protected by U.S. Constitution and Federal and Tribal law. Navajo home sites, for example, are the location of a variety of ceremonies and related practices that are "sacred." Hogans and sweathouses are usually blessed. Materials used in ceremonies and other items which should not be disturbed are often disposed of within a home site complex. Sites of ceremonial activity such as Enemy-way and other religious observances are also frequently encountered.

If the historic site is not considered NRHP eligible, treatment must still be considered in terms of its significance under AIRFA. If there is any reason to suspect that a project may affect aspect of traditional cultural practices a reasonable effort must be made to locate and interview former users of the historic site. Should it prove impossible to locate former users, knowledgeable local residents should be interviewed. The interviewees should be asked to identify any areas within the historic site that should not be disturbed. However, interviewees should not be pressured to justify their desire to exclude certain areas from construction impacts. Interviewees should be asked to identify any objections to project construction within a historic site due to its impacts on areas important in continuing traditional cultural practices.

If interviewees have no objections to a project proceeding within the boundaries of a historic site that is not considered eligible for nomination to the NRHP, this fact should be noted in the report and project impacts on traditional cultural practices at that location need not be further considered. If specific objections or concerns are expressed, these must be reported and every effort made to design the project in such a way as to avoid impacts to areas of the site about which concerns were expressed.

If interviews are not possible and there is reason to suspect that the site may contain values protected under AIRFA, prudent alternatives to routing the project through the site must be considered. If a feasible alternative project design can be identified that avoids impacts to the site, the alternative design should be utilized.

¹ "Archaeology and Historic Preservation; Secretary of the Interior's Standard Guidelines," Federal Register, 48(190):44716-44742 (Thursday, September 29, 1983).

THE NAVAJO NATION

HISTORIC PRESERVATION DEPARTMENT

Cultural Resource Compliance Section

POLICY TO PROTECT TRADITIONAL CULTURAL PROPERTIES

Introduction

As economic development proceeds in the Navajo Nation, a growing number of places of significance to the Navajo people may be damaged by the land disturbance that accompanies development. In June of 1999, the Navajo National Park Service issued National Register Bulletin 38, titled "Guidelines for Evaluating and Documenting Traditional Cultural Properties." The bulletin defines a "traditional cultural property" as a property that "is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community."

Most traditional cultural properties significant to Navajos are of the type commonly called "sacred places." Others are locations of other traditional activities, such as home sites and places where weavers gather plants for dyes.

We use the term "traditional cultural property" in this document to make apparent that we talking about the same kinds of places as Bulletin 38, and because this document is geared toward cultural resource managers and related professionals. The term, however, offends many Navajo traditionalists. One reason is that, by containing the word "property," it suggests that such places can be treated as mere commodities, like real estate. Another reason is that the term seems like a long and lackluster euphemism for "sacred places," which corresponds more closely to the Navajo term for such places (hodiyyin). "Traditional cultural property" is, indeed, partly a euphemism intended to obscure the "religious" qualities that these places have for people who do not separate the sacred from the secular. Within the present federal legal framework for historic and cultural preservation, such obscurantism seems necessary to keep such places from being found ineligible for protection under federal preservation law because of the doctrine of separation of church and state. We would prefer that, instead of avoiding the term "sacred places," all concerned recognize that the root of what makes a place sacred is its association with aspects of the past that people connect with their present concerns of living. We apologize to traditionalists for perpetuating the use of the term "traditional cultural properties," which we find a practical necessity in certain contexts.

Traditional Cultural Properties Covered by this Policy

This policy covers traditional cultural properties that lack the evidence of human use that qualify them as archaeological sites, historic properties ~~or graves~~. The main emphasis here is on traditional cultural properties significant to the Navajo people. The last section of this policy statement, in addition, addresses such properties significant to other Native American groups that may be located on lands of the Navajo Nation. This policy supersedes the "Draft Proposed Nation Policy to Protect Navajo Sacred Places" (1986). Existing federal, state and tribal laws and rules protect archaeological sites, historic properties and ~~graves~~. These laws and rules include the *Federal Antiquities Act of 1906* (P.L. 59-209); the *National Historic Preservation Act* (P.L. 89-665); the *National Environmental Protection Act of 1969 Executive Order 11953*; "Protection and Enhancement of the Cultural Environment," May 13, 1971 (36 C.F.R. 8921); the *Archaeological Resources Protection Act of 1978* (P.L. 95-96); the *American Indian Religious Freedom Act of 1978* (P.L. 95-341); the *Native American Graves Protection and Repatriation Act (NAGPRA)*; *New Mexico and Arizona laws protecting human remains on private lands*; the *Navajo Nation Policies and Procedures Concerning Protection of Cemeteries, Gravesites and Human Remains of 1986* (ACMA-39-86); and the *Navajo Nation Cultural Resources Protection Act (CMY-19-88)*, which supersedes all previously existing Navajo Nation cultural resource preservation legislation.

Cultural resource surveys required by these laws and policies are very likely to detect sites with material evidence of human use (mainly archaeological sites) so that they can be protected. Certain types of Navajo traditional cultural properties are likely to have such evidence. These types include, but are not limited to, sites that may have been blessed such as those with hogans, houses, sweathouses, game corrals (needzii'), eagle traps and so forth; and other sites where ceremonies may have occurred (if evidence of such use, such as the remains of ceremonial structures, is visible); trail shrines; rock art; and both marked and unmarked graves.

Because traditional cultural properties are considered eligible for inclusion in the National Register, such properties are protected by Section 106 of the National Historic Preservation Act, even when they lack clear evidence of human use. Such places are not likely to be detected by conventional surveys, however, and no other way of detecting such places has been used systematically up to now. Navajo traditional cultural properties without clear evidence of human use include, but are not limited to, the following types: places for gathering plants for use in ceremonies and other traditional purposes; places for gathering minerals for ceremonial and other traditional uses; places for gathering contents of sacred bundles; places for gathering other materials for ceremonial and other traditional purposes; ~~unmarked graves (contain material remains but these are not necessarily visible on the surface);~~ prayer offering places; places associated with the origin stories of particular ceremonials; places associated with the general Navajo origin story; places associated with origin stories of particular ceremonials; places associated with the origin of a clan; places associated with the origin of a Navajo custom; places identified as the home of a Holy Being such as Wind, Lightning, Big Snake; location of echoes (Talking Rocks, which convey human words to the Holy People); natural discoloration of rock that has some kind of supernatural power; places where an apparition or other supernatural event occurred; and places that have played a part in the life cycle rituals of individuals (such as the spot where a newborn baby's umbilical cord is placed. Many of these sorts of places are features of the natural landscape, such as mountains, hills, rocky outcrops, springs and individual trees.

This policy outlines procedures for identifying such places, for determining how concerned Navajo people think particular development projects will affect those places, and for learning about the protection measures that concerned Navajo people think should be used. This outline is intended to be used along with National Register Bulletin 38, which offers general guidelines to document and evaluate such properties.

Traditional cultural properties covered by this policy statement may be on land under Tribal, BIA, other Federal (public land) and State jurisdiction. With land owner consent and cooperation, this policy statement will apply to private lands as well.

Identification of Traditional Cultural Properties on Lands Administered by the Navajo Nation for the BIA in Trust for Navajos

To identify Navajo traditional cultural properties, the developer of a proposed project on tribally or BIA administered land must observe the following procedures:

- A. The developer shall employ an archaeological contractor or consulting anthropologist who meets the professional standards of the Navajo Nation (or the land manager). That contractor or consultant shall conduct a cultural resources literature search that will include at least the following references for information on places of traditional cultural significance.

SUGGESTED READING LIST

- Parker, Patricia L., and Thomas F. King
1990 Guidelines for Evaluating and Documenting Traditional Cultural Properties. National Register Bulletin 38. U.S. Department of the Interior, National Park Service, Interagency Resources Division, Washington, D.C.
- Van Valkenburgh, Richard F.
1974 Navajo Sacred Places, ed. Clyde Kluckhohn. In Navajo Indians III, pp. 9 -199. Garland Publishing, New York
- 1941 Dine Bikeyah. U.S. Department of the Interior, U.S. Indian Service, Navajo Agency, Window Rock, AZ

* this work may be hard to find. But we suggest using Linford, Navajo Places, History, Legend, Landscape

Kelley, Klara B.

1994 Navajo Sacred Places. Bloomington: Indiana University Press

Linford, Lawrence D.

2000 Navajo Places, History, Legend, Landscape. University of Utah Press

McPherson, Robert S.

1992 Sacred Land, Sacred View: Navajo Perceptions of the Four Corners. Signature Books

2009 Comb Ridge and Its People. The Ethnohistory of the Rock. United States University Press

****Also the following, if the proposed project is in the Eastern Navajo Nation:**

Carroll, Charles H.

1982 An Ethnographic Investigation of Sites and Locations of Cultural Significance to The Navajo People to be Affected by PNM's Four Corners to Ambrosia to Pajarito 500 kV Transmission Project. Public Service Company of New Mexico, Albuquerque

1983 The Ute Mountain Ethnographic Study. Public Service Company of New Mexico, Albuquerque

Fransted, Dennis

1979 An Introduction to the Navajo Oral History of Anasazi Sites in the San Juan Basin Area. Navajo Aging Services, Fort Defiance, AZ

Roessel, Robert, Jr.

1983 Dinetah: Navajo History. Rough Rock Demonstration School, Rough Rock, AZ

York, Frederick F.

1981 An Ethnographic Study of the Public Service Company of New Mexico's Proposed New Town Site and Its Environs. Human Environmental Resource Services Corporation, Anthropological Series 1, Albuquerque.

York, Frederick F., and Joseph C. Winter

1988 Report of an Ethnographic Study and Archeological Review of Proposed Coal Lease Tracts in Northwestern New Mexico. Office of Contract Archeology, University of New Mexico, Albuquerque

****In addition, the following background readings are strongly recommended for those consultants not thoroughly familiar with them:**

Downer, Alan S.

1989 Anthropology, Historic Preservation and the Navajo: A Case Study in Cultural Resource Management on Indian Lands. Ph.D. Dissertation, Department of Anthropology, University of Missouri, Columbia

Frisbie, Charlotte J.

1987 Navajo Medicine Bundles or Jish: Acquisition, Transmission and Disposition the Past and Present. University of New Mexico Press, Albuquerque.

Gill, Sam D.

1981 Sacred Words: A Study of Navajo Religion and Prayer. Greenwood Press, Westport, Conn

Kelley, Klara B.

1988 San Augustine Coal Area, Archaeological Investigations in West- Central New Mexico, Vol. 2, Historic Cultural Resources. Cultural Resources Series No. 4, U.S. Bureau of Land Management, New Mexico State Office, Santa Fe

Kelley, Roger I., R. W. Lang and Harry Walters.

1972 Navajo Figurines Called Dolls. Museum of Navajo Ceremonial Art, Inc., Santa Fe, NM

Kluckhohn, Clyde and Leland C. Wyman

1940 An Introduction to Navajo Chant Practice. *Memoirs of the American Anthropological Association* 53

Spencer, Katherine

1957 Mythology and Values, An Analysis of Navajo Chantway Myths. *Memoirs of the American Folklore Society* 48

Wyman, Leland C.

1970 Blessingway: With Three Versions of the Myth Recorded and Translated from the Navajo by Father Berard Haile, O.F.M. University of Arizona Press, Tucson.

- B. For all projects that require more than 1 acre, consultations with Navajo people are also required, (Projects of one acre or less are likely to include, but are not limited to, single home sites, single-business site leases, and isolated utilities installations for single home sites or single business sites.) In addition, consultations with Navajo people are also required for projects of 1 acre or less in certain localities and natural settings with a high probability of having traditional cultural properties. If the developer or anthropological consultant is in doubt about the need for such consultations, they should contact NNHPD. The project developer must demonstrate that a qualified professional anthropologist made a good-faith effort to consult:
1. Present surface user(s): grazing-permit holder(s) (individuals whose consents for right-of-way have been sought by developer); any other residents in or within view of the proposed project area.
 2. Chapter(s) within which the proposed project is located: chapter officers and/or delegate(s) to Navajo Nation Council; at the request of any of these individuals, the developer's consulting anthropologist will also make a presentation at a meeting of general chapter membership.
 3. Other knowledgeable people recommended by the present surface user(s), chapter officials, and chapter members.
- C. Documentation of the concerns of people consulted will normally take the form of a questionnaire or interview schedule administered by the developer's consulting anthropologist and his or her interpreter/field assistant, if any. Documentation of each consultation will normally include the following information (documentation shall include a detailed explanation as why any of this information was not provided):
1. Source of information on traditional cultural properties: names of interviewer and interpreter, date and location of interview, language or interview.
 2. Identification of each place by Navajo and English names (English translation of Navajo name if there is no English name) and USGS 1:24,000 or 1:62,500 scale map location;
 3. What type of place is it: description of its physical attributes or appearance and its traditional associations or functions (attributes that make it a traditional cultural property)?
 4. What impacts, if any does the interviewee expect the proposed project to have on each place?
 5. What modification or redesign of the proposed project would the interviewee recommend?
 6. If impacts cannot be avoided, what measures to mitigate adverse impacts would the interviewee recommend?

The Navajo Nation Historic Preservation Department Sacred and Traditional Places Documentation Form and guidelines for its use are appended to this policy statement and are recommended for this purpose.

Further documentation of concerns such as general chapter resolution or other written form that the chapter considers appropriate are required.

- D. Discoveries of Navajo traditional cultural properties during project development. The procedures set forth above in this section are likely to identify significant Navajo traditional cultural properties before development. No feasible procedure, however, can guarantee the identification of all such properties. There is always the possibility that during project development someone may report that the project area contains a previously unidentified property. This situation is considered analogous to an archaeological "emergency discovery situation" in which the developer encounters previously unreported subsurface archaeological remains. As soon as the developer learns

of the presence of a previously unreported traditional cultural property, the developer will cease operations and notify the NNHPD. Normally operations will not resume until the NNHPD has obtained, on its own or through the developer, information adequate to identify and evaluate the reported traditional cultural property and devise a plan for its subsequent treatment, and has notified the developer to resume operations.

Identification of Navajo Traditional Cultural Properties on Lands NOT Administered by the Navajo Nation or BIA in Trust for Navajos

- A. In general. If these lands are surrounded by or are near lands used by Navajos, the developer, through a consulting anthropologist who meets the professional requirements of the Navajo Nation and the land manager, must consult the neighboring Navajo chapters and any knowledgeable individuals recommended by the chapters, and document those consultations according to guidelines set forth in the preceding section. If the lands are used by Navajos (for example, BLM-administered lands in the eastern part of the Navajo country), the developer's consulting anthropologist must make a good-faith effort to consult these Navajo users according to the procedures in Section C. above.
- B. Dinetah. Dinetah is a special case involving land in eastern San Juan County and western Rio Arriba and Sandoval Counties, New Mexico, much of which is not now used by Navajos. It needs special consideration because it contains so many recorded (and therefore probably many unrecorded) Navajo archaeological sites, sacred places, and other traditional cultural properties; because parts of it are not near any Chapter area; and because parts of it are not near any Chapter area; and because so many of its traditional cultural properties are of potential concern to Navajos all over Navajo land. Most of this land is under BLM jurisdiction, and BLM is required in accordance with the American Religious Freedom Act and Section 106 of the National Historic Preservation Act (and its implementing regulations 36 CFR Part 800) to consult with interested Native American communities about management of cultural resources to be affected by its decisions. The developer's consulting anthropologist therefore must make a good-faith effort to consult neighboring chapters, any Navajo users, and document these consultations according to the guidelines set forth in Section C. above. In addition, the developer's consulting anthropologist must consult with NNHPD.
- C. Discoveries of Navajo traditional cultural properties during project development. Procedures set forth in Section C., Item 4. above will be applied here with the following modifications. The developer will normally notify the land manager as well as NNHPD, and the notification to the developer to continue operations will normally come from the land manager with NNHPD concurrence.

Possible Traditional Cultural Properties of Other Native American Groups on Lands Administered by the Navajo Nation or BIA in Trust for Navajos

The NNHPD is committed to protecting traditional cultural properties of other Native American groups on lands under its jurisdiction, with the expectation that other tribes on whose lands Navajo traditional cultural properties are located will make a reciprocal commitment. Therefore, the developer of a proposed project is responsible for consulting other Native American groups when such groups may have traditional cultural properties in the area affected by the developer's project. To determine which other groups, if any, are to be consulted, the developer's anthropological consultant normally will look at material showing the extent of the aboriginal land claims (and subsequent land claims, if appropriate) Before the Indian Claims Commission or U.S. Court of Claims made by those tribes nearest the part of Navajo land where the proposed project is to be located. The developer's consultant anthropologist will then make a good faith effort to consult any other groups in whose land claim(s) the proposed project area lies. NNHPD considers the land claims areas of other Native American groups to be the maximum areas within which traditional cultural properties of these groups may be identified.

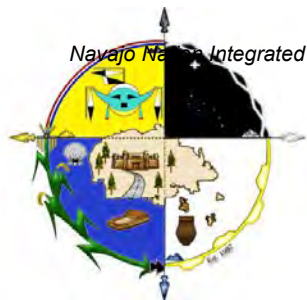
NNHPD does not believe that the land claims neither areas were necessarily used exclusively by these groups nor that they are covered by any particular types of property rights use rights, etc. Nothing in this policy shall be construed as a concession by the Navajo Nation as to the validity of any claim of any other tribe concerning Navajo land. The Navajo Nation is attempting to foster cooperation between tribes on matters of general concern, such as traditional cultural properties, but this spirit of cooperation must not be misinterpreted as any sort of legally binding statement by the Navajo Nation.

The developer's anthropological consultant will be required to contact the appropriate tribal government and/or

community representatives and proceed with identification efforts as directed by those entities. The developer's anthropological consultant should first contact NNHPD for referrals to appropriate contact people in the appropriate tribe or community.

Instructions for Using "Navajo Nation Historic Preservation Department's Sacred and Traditional Cultural Places Documentation Form"

This form is intended as a checklist of information required to document consultations with knowledgeable Navajo people about traditional cultural properties that may be impacted by a particular development undertaking. It is not intended to be administered as a questionnaire, although the interviewer may use it that way. The form should be used to present information gained in each interview, with continuation sheets attached for items where the form does not provide enough space. The interviewer will document each interview on a copy of the attached form. Interviewees are NOT to be asked to sign the form. For people contacted who refuse to be interviewed, the interviewer will fill out the top section of the form and indicate that the person refused to be interviewed. It is also important to make clear to the interviewee that the interviewee is under no obligation to be interviewed. If he or she refuses, however, any resources in the area may go unprotected since the people with the authority to protect them won't know about them. Also, during the interview, the interviewee may refuse to provide certain information such as name of a particular medicinal plant. The interviewer should not press the person to reveal such information, but should note on the form that the person did not want to reveal it. Because these inquiries are so sensitive, the staff of NNHPD will be available to help your staff get oriented to conducting these interviews. If you wish, they will meet with the members of your staff who may be conducting these interviews to go over the process and answer any questions. Please call (928)-871-7147 if you have any questions.



SACRED & TRADITIONAL PLACES DOCUMENTATION FORM

PROJECT NUMBER/NAME:

PROJECT LOCATION:

CHAPTER:

LEGAL DESCRIPTION (for large projects, give Township, Range, & Sections only):

UTM COORDINATES (for small project areas only center point):

DATE OF INTERVIEW:

NAME(S) OF INTERVIEWEES:

NAME OF INTERVIEWER:

NAME OF INTERPRETER (if any):

OTHERS PRESENT:

LOCATION OF INTERVIEW (interviewee's home, project area, other specify):

WAS INTERVIEW REFUSED?

1. How was project area identified to interviewee? (Visit to area, map location (specify map), other method (specify):

2. Which of the following types of sacred/traditional places, if any does the interviewee identify? Inside or immediately adjacent to the project area? (Attach continuation sheet with information if necessary.)

a. Place for gathering plants for use in ceremonies (specify plant and ceremony if interviewee is willing to supply that information:

b. Place for gathering plants for other purposes (specify plants and purposes):

c. Place for gathering contents of sacred bundles (specify material gathered and typed of bundle, for example, Dził leezh, Mountain Soil Bundle):

d. Place for gathering other materials for traditional purposes (specify materials and purposes):

e. Place where ceremony has been held (specify ceremony; also names of sponsors and dates, if possible):

f. Former home site location (specify former residents and dates of use, if possible):

g. Former sweathouse location (specify former users and dates of use if possible):

- h. Grave (specify name of deceased and relationship to interviewee, if possible; refer to Navajo Nation Policies and Procedures Concerning the Protection of cemeteries, Gravesites, and Human Remains for additional documentation and treatment required by Tribal law).**

- i. Prayer offering place (specify type of prayer ceremony associated with it, if any, and type of offering, if any):**

- j. Place associated with general Navajo origin (Emergence) story (indicate which part of the story the place is associated):**

- k. Place associated with the origin story of a ceremony (specify ceremonial and how place figures in its origin story):**

- l. Place associated with origin or home of a clan (specify clan and indicate nature of its association with the place):**

- m. Place identified as home of a Holy Being such as Wind (Nilch'i), Lightning (li'ni), Big Snake (Tl'iistosoh) (specify which Holy Being, indicate any associated story):**

- n. Location of Talking Rocks (Tse Yalti' i--rocks that convey human words to the Holy People):**

- o. Petroglyph, pictograph or natural discoloration of rock that has some kind of power (specify):**

- p. Place associated with other traditional story (give story and indicate how place is associated with it):**

q. Other type of sacred/traditional place (describe):

3. Indicate locations of all resources listed above on portions of USGS map and attach copy to this form.

4. Does the interviewee consider the proposed development a threat to any of the above types of places?

___ ☐ **NO**

___ ☐ **YES (specify nature of threat or perceived impact of proposed project on place):**

5. If yes, what modification or redesign of the proposed project would the interviewee recommend so as not to threaten the place?

a. Avoidance (specify how close redesigned project could come to place)

b. Alternative location (specify - attach portion of USGS map if possible showing location):

c. Other (specify):

6. Is there anyone else that the interviewee feels should be consulted (filled out a separate form for each of these interviewees, but list names and locations of homes here:

RCO-220-96

RESOLUTION
OF THE RESOURCES COMMITTEE
OF THE NAVAJO NATION COUNCIL

Repealing the Old Navajo Nation Policies and Procedures
Concerning the Protection of Cemeteries, Gravesites and Human
Remains, Approved by Resolution No. ACMA-39-86, and Approving
a New Navajo Nation Burial Policy

WHEREAS:

1. Pursuant to 2 N.N.C. § 691, the Resources Committee of the Navajo Nation Council is established and continued as a standing committee of the Navajo Nation Council; and
2. Pursuant to 2 N.N.C. § 695 (b) (13), the Resources Committee of the Navajo Nation Council is the oversight committee for the Division of Natural Resources, including the Historic Preservation Department; and
3. Pursuant to 2 N.N.C. § 695 (b) (12), the Resources Committee of the Navajo Nation Council is authorized to establish Navajo Nation policy with respect to the optimum utilization of all resources; and
4. The Historic Preservation Department within the Division of Natural Resources is established in accordance with the Plan of Operation approved by the Government Services Committee of the Navajo Nation Council on October 25, 1994, by Resolution No. GSCO-82-94; and
5. Pursuant to section IV (F) of said Plan of Operation, the Director of the Historic Preservation Department is authorized to develop and recommend policies, rules and regulations relating to Navajo land pertaining to the management of cultural, archaeological, historic and scientific resources; and
6. By Resolution No. ACMA-39-86, approved March 13, 1986, the former Advisory Committee of the Navajo Tribal Council approved the Navajo Nation Policies and Procedures Concerning the Protection of Cemeteries, Gravesites and Human Remains; and
7. The Director of the Historic Preservation Department has drafted a new proposed Navajo Nation Burial Policy, a copy of which is attached hereto as Exhibit "A" and incorporated herein, and has recommended to the Resources Committee of the Navajo Nation Council that the old Navajo Nation Policies and Procedures Concerning the Protection of Cemeteries, Gravesites and Human Remains be repealed and the new proposed Navajo Nation Burial Policy be approved in its place; and

8. The Resources Committee of the Navajo Nation Council finds that repealing the old Navajo Nation Policies and Procedures Concerning the Protection of Cemeteries, Gravesites and Human Remains and adopting a new Navajo Nation Burial Policy is in the best interest of the Navajo Nation and its people.

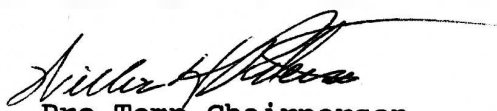
NOW THEREFORE BE IT RESOLVED THAT:

1. The Resources Committee of the Navajo Nation Council hereby repeals the Navajo Nation Policies and Procedures Concerning the Protection of Cemeteries, Gravesites and Human Remains, approved by the former Advisory Committee of the Navajo Tribal Council on March 31, 1986, by Resolution No. ACMA-39-86.

2. The Resources Committee of the Navajo Nation Council hereby approves the new Navajo Nation Burial Policy, a copy of which is attached hereto as Exhibit "A" and incorporated herein.

CERTIFICATION

I hereby certify that the foregoing resolution was duly considered by the Resources Committee of the Navajo Nation Council at a duly called meeting at Window Rock, Navajo Nation (Arizona), at which a quorum was present and that same was passed by a vote of 5 in favor, 0 opposed and 0 abstained, this 31st day of October, 1996.


Pro Temp Chairperson
Resources Committee

Motion: Jones Begay
Second: Harold Tunney

NAVAJO NATION POLICY FOR THE PROTECTION OF *JISHCHAA'*: GRAVESITES, HUMAN REMAINS, AND FUNERARY ITEMS

CONTENTS

I.	Policy Statement.....	1
II.	Authority	1
III.	Definitions	1
IV.	Traditional Concerns.....	3
V.	Encountering Gravesites, Human Remains, and Funerary Items	4
VI.	Identification of Gravesites, Human Remains, and Funerary Items.....	6
VII.	Procedures for Treatment of Human Remains and Funerary Items.....	6
	A. Burials with Lineal Descendants	7
	B. Diné Burials without Lineal Descendants.....	7
	C. Other Native American Burials without Lineal Descendants.....	8
	Treatment Plan.....	8
	1. Notification, Consultation, and Excavation.....	8
	2. Human Remains Identified in the Laboratory	9
	3. Reburial.....	9
	4. Reporting	9
	D. Non-Native American Burials without Lineal Descendants.....	9
VIII.	Dispute Resolution	10
IX.	Attachments/Forms	
	A. Identification of Gravesites, Human Remains, and Funerary Items <i>and</i> Statement of Wishes: Burials <i>with</i> Lineal Descendants	
	B. Identification of Gravesites, Human Remains, and Funerary Items: Burials <i>without</i> Lineal Descendants	

I. POLICY STATEMENT

Diné (Navajo) society is based on harmony and beauty. Issues related to death are treated with the utmost respect in our culture. In harmony with the Diné way of life, we do not talk about or discuss death. We avoid burial sites and do not handle materials belonging to one who is deceased. The Diné view is that human remains, associated funerary items, and unassociated funerary items all fit under *jishchaa'*, a term that refers to things that are associated with death as well as the burial itself.

Due to the circumstances of modern life, we find it necessary to establish rules and regulations concerning the protection of gravesites, human remains, and funerary items. We do this with complete and full awareness of the wide range of Diné values, beliefs, and practices. We apologize to those who have passed on for the intrusion. We apologize to the living for all the discomfort this subject causes.

This policy outlines procedures based on Diné cultural beliefs. The Navajo Nation is committed to protecting all gravesites, human remains, and funerary items under its jurisdiction. Human remains and funerary items, once interred, should not be disinterred. However, the Navajo Nation recognizes that under certain circumstances disinterment will occur. In these situations the human remains and funerary items must be reinterred as quickly as possible and as near to the original burial location as feasible. Except under extraordinary circumstances, analysis of human remains is restricted to in-field non-destructive visual determinations of age and sex for the purposes of locating lineal descendants. Records about human remains and funerary items or their location shall be maintained and safeguarded in the Cultural Resource Compliance Section (CRCS) at the Navajo Nation Historic Preservation Department for use in project planning and appropriate related activities.

In the absence of identified lineal descendants, all Native American human remains and funerary items identified on Diné lands are the responsibility of the Navajo Nation. The Historic Preservation Officer shall determine the treatment of human remains without identified lineal descendants and/or funerary items in consultation with other tribes, as appropriate. We expect that other tribes will make a reciprocal commitment. The Navajo Nation encourages the development of programmatic agreements with federal agencies and other tribes. The Navajo Nation expects all human remains and funerary items to be treated with the utmost respect from the time they are discovered until their final disposition.

II. AUTHORITY

This policy is implemented pursuant to the Navajo Nation Cultural Resources Protection Act (CRPA, CMY-19-88). It is intended to complement provisions set forth in the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA, P.L. 101-601), the Archaeological Resources Protection Act of 1979 (ARPA, P.L. 96-95), the National Historic Preservation Act of 1966 (NHPA, P.L. 89-665, as amended), and others.

III. DEFINITIONS

For the purpose of this policy, the following definitions apply.

Analysis of human remains - limited to non-destructive, in-field visual determinations of age at death, approximate date of interment (based on context), sex, and cultural affiliation of human remains. No other type of analysis will be allowed.

Analysis of funerary items - limited to non-destructive, in-field, visual determinations of cultural or temporal affiliation

Anaasázi - the Diné term for all ancient peoples who inhabited Diné customary lands, including all peoples whom archaeologists call "prehistoric."

Cultural Affiliation - a relationship of shared group identity which can be reasonably traced between the deceased and living people.

Cultural Property - any cultural resource deemed sufficiently important to warrant listing on the Navajo Nation Register of Cultural Resources.

Cultural Resource - any product of human activity, or any object or place given significance by human action or belief.

Cultural Resource Professional - any individual who is authorized by the Navajo Nation to conduct cultural resource investigations. Such individuals may include persons who work in archaeology, anthropology, ethnology, Navajo culture, and other related disciplines, including traditional healers

Diné - the Navajo people.

Federal Agency - any department, agency, or instrumentality of the United States

Funerary Items - items that are reasonably believed to have been associated with the deceased either at the time of death or later, whether or not they are found in direct association with human remains. For Navajo burials, such funerary items may include, but are not limited to, shovels, tinware, saddles, clothing, and jewelry.

Historic Preservation Department (HPD) - the Navajo Nation Historic Preservation Department as established by Section 20 of the CRPA.

Historic Preservation Officer - the Director of the Historic Preservation Department.

Human Remains - the physical remains of a human body, including but not limited to bone, teeth, hair, ashes, or mummified or otherwise preserved soft tissues of a person

Inadvertent Discovery - finding; locating; observing; uncovering; unearthing; learning about through conversation, discussion, or interview; or otherwise detecting human remains, funerary items, or site(s) in which human remains or funerary items are believed to exist when such discovery was not the original intent.

Intentional Excavations - the unearthing of sites, gravesites, human remains, or funerary items for an undertaking or any purpose authorized by the Historic Preservation Department pursuant to CRPA.

Jishchaa' - a location or item associated with death and burial of an individual.

Lineal Descendant - an individual tracing his or her ancestry directly and without interruption to a particular individual. The Diné traditional kinship system shall be used for Diné burials.

Navajo Nation lands (Diné lands) - all lands or interests in land owned or held by the Navajo Nation, whether held by original title, held in trust by the United States, held in fee simple or held under lease, easement, permit or otherwise, whether restricted or unrestricted, and whether within or outside the boundaries of the Navajo Nation.

Site - the location of human activity as indicated by physical or ethnographic evidence.

Sponsor - the agency official or the official in a private capacity who has decision-making authority over a particular undertaking.

Treatment - a thoughtfully developed and respectful plan for taking care of human remains or funerary items, accomplished through consultation with appropriate parties.

Unclaimed - human remains or funerary items for which no lineal descendants can be identified or located.

Undertaking - any project, activity, or program that can or does change the character or use of cultural properties or jishchaa'. The project, activity, or program must be under the direct or indirect supervision of a sponsor.

Unidentified - human remains or funerary items for which lineal descent or cultural affiliation cannot be determined through either consultation or analysis.

IV. TRADITIONAL CONCERNS

Diné traditional and spiritual values shall be observed in dealing with human remains, and associated funerary items, burials, and/or the relocation and transfer of gravesites. Diné teachings discourage the direct handling of human remains. Development projects, such as the construction and maintenance of roads, power lines, and water lines, often disturb burials. In such instances, the Navajo Nation must take steps to ensure the protection of human remains. It must also protect its people from association with human remains. The concerns listed below should therefore be taken into consideration in dealing with gravesites, human remains, and funerary items.

- A. All individuals involved in burial issues must be warned that handling human remains or funerary items, direct exposure to gravesites, or discussion of burial issues may affect their overall health in the immediate future or sometime during their lifetime. For example, the soil associated with a burial is considered contaminated by death. Procedures such as brushing bones or funerary items, taking soil samples, and disarticulating bones are therefore considered both offensive and dangerous. Knowledgeable Diné should be consulted regarding appropriate protective measures.
- B. Individuals involved with burial issues will come into contact with the Navajo public after they have been in contact with gravesites, human remains, or funerary items and that contact may affect the health of other individuals. They should take measures to protect the public and themselves when disinterring and/or reinterring human remains or when in contact with gravesites. If individuals, sponsors, or their agents need assistance or information regarding protective measures, they should contact the Navajo Nation Historic Preservation Department Traditional Culture Program.

- C. Pregnant women, or individuals in daily contact with them, should not be directly involved in the handling, removal, or intimate discussion of gravesites, human remains, or funerary items.
- D. Funerary items must be treated with respect. They have been placed with the human remains for essential reasons and should not be handled casually, collected, removed, or separated from the human remains.
- E. Traditional Diné avoid gravesites, human remains, and funerary items. They do not talk about someone who has passed on, and they do not carelessly mention or discuss death. Researchers need to be aware that the Diné may be extremely uncomfortable even talking about the topic, may not be willing to visit the gravesite, and should not be interviewed over and over regarding the same topic.
- F. Sponsors and others should limit the number of individuals who come into contact with gravesites, human remains, or funerary items.

V. ENCOUNTERING GRAVESITES, HUMAN REMAINS, AND FUNERARY ITEMS

- A. The Navajo Nation requires sponsors to make a good faith effort to locate gravesites, human remains, and funerary items within the area of potential effect prior to initiation of an undertaking. Such good faith effort shall include the following:
 - 1. file searches of existing information, including files maintained at HPD (contact CRCS), mission records, and other pertinent materials as appropriate.
 - 2. archaeological inventory and ethnographic interviews with residents of the local community and with other knowledgeable individuals. Navajo Nation permitting procedures require that investigators contact local chapters prior to initiating field activities (Navajo Nation Policy To Protect Traditional Cultural Properties, 1989). Continuing contact may be appropriate to ensure that local concerns are addressed.
 - 3. other approaches, such as traditional diagnostic techniques, as necessary or appropriate. Traditional practitioners may provide such information.
- B. When an inadvertent discovery occurs in the context of an undertaking but outside the context of intentional excavation, the sponsor shall adhere to the following procedures.
 - 1. All ground-disturbing activities shall immediately cease within a 50-foot (15.2-meter) radius, using the discovery as the center point.
 - 2. The sponsor or its agent *must* contact CRCS within one (1) business day to arrange for proper evaluation and consultation.
 - 3. The sponsor or its agent shall identify itself and its project and shall supply the following information:
 - a. a verbal description of what has been found and the context in which remains are located;
 - b. the general location of the gravesite, human remains, and/or funerary items; and
 - c. any other pertinent information.
 - 4. Verbal notification shall immediately be followed by written notification. HPD will attempt to respond promptly so as not to cause project delays.

5. Human remains and funerary items *must* be protected in place until treatment measures are implemented. Treatment measures shall be consistent with Part VII of this policy.
 6. The sponsor or its agent may resume ground-disturbing activities only after a proposed treatment plan has been agreed upon *and* implemented.
- C. When an inadvertent discovery occurs within the context of intentional excavation, the sponsor shall adhere to the following procedures.
1. All trenching, hand excavation, sampling, photography, etc., shall cease within a 10-foot (3-meter) radius of the discovery after the nature and extent of buried remains have been determined.
 2. The sponsor or its agent *must* contact CRCS within one (1) business day to arrange for proper evaluation and consultation.
 3. The sponsor or its agent shall identify itself and its project and shall supply the following information:
 - a. a verbal description of what has been found and the context in which remains are located;
 - b. the general location of the gravesite, human remains, and/or funerary items;
 - c. a preliminary assessment of the type of burial it is (Diné, Anaasází, other);
 - d. an assessment of the complexity of the burial(s) and the likelihood of disturbance if left in place;
 - e. a proposed location for reburial, if applicable; and
 - f. any other pertinent information.
 4. Verbal notification shall immediately be followed by written notification. HPD will attempt to respond promptly so as not to cause project delays.
 5. Human remains and funerary items *must* be protected in place until treatment measures are implemented. Treatment measures shall be consistent with Part VII of this policy.
 6. The sponsor or its agent may resume ground-disturbing activities only after a proposed treatment plan has been agreed upon *and* implemented.
- D. When CRCS is notified of an inadvertent discovery of human remains outside the context of an undertaking:
1. CRCS shall ask the notifying party to provide
 - a. a verbal description of what was found and the context in which remains are located;
 - b. the general location of the gravesite, human remains, and/or funerary items; and
 - c. any other pertinent information, including the name of a contact person.
 2. CRCS shall determine on a case-by-case basis whether HPD will assume responsibility for treatment.

VI. IDENTIFICATION OF GRAVESITES, HUMAN REMAINS, AND FUNERARY ITEMS

- A. Once gravesites, human remains, and/or funerary objects are located, a good faith effort shall be made to determine through contextual analysis, interviews, non-destructive visual inspection, and other appropriate means whether the remains represent:
1. a burial with lineal descendants;
 2. a Diné burial for which lineal descendants cannot be identified or located;
 3. a Native American burial for whom lineal descendants cannot be identified or located (including Anaasází burials, burials of individuals from other tribes, and unidentified burials); or
 4. a non-Native American burial for which lineal descendants cannot be identified.
- B. Non-destructive visual inspection of human remains shall be limited to determinations of age (of both the individual and the interment), sex, and cultural affiliation. To the greatest extent possible, such visual inspection shall be performed without handling, brushing off, or disarticulating the remains.
- C. Initial identification efforts may require consultation with Diné elders and other residents and non-residents who may have knowledge about the identity and/or cultural affiliation of the remains. When the remains are clearly Anaasází, such consultation is not necessary. Chapter officials must be notified prior to initiating local consultation. All identification efforts must respect the culturally sensitive nature of discussions regarding human remains.
- D. In cases where no lineal descendants have been identified, the sponsor (in the case of an undertaking) must use all information available, including physical evidence as well as word of mouth, to determine the probable age at death and of interment and the sex of the individual buried at this location. Specialists such as physical anthropologists may be required to collect and analyze this information. One should err in the direction of greater age estimates for the date of interment when no firm data are available. Following the provisions of ARPA and the Resolution of the Parks Commission, Navajo Tribal Council (April 8, 1980), remains shall be considered "archaeological resources" only if they are, or are suspected to be, 100 years of age or older.

VII. PROCEDURES FOR TREATMENT OF HUMAN REMAINS AND FUNERARY ITEMS

The policy of the Navajo Nation is that gravesites, human remains, and funerary items should not be disturbed. In cases where disturbance is unavoidable, treatment procedures will vary depending on the results of consultation with lineal descendants, culturally affiliated tribes, or appropriate entities. In the case of an undertaking, all costs related to treatment shall be borne by the sponsor.

In all cases, only non-destructive, in-field visual analysis to determine age and sex of individuals shall be allowed. At no time shall the remains or funerary items leave the project area. All analysis shall take place on site. No soil samples of any kind shall be taken from within one foot (0.3 m) of human remains. Human remains shall not be brushed unless absolutely necessary to make age and sex determinations. Depictions (sketches, drawings, etc.) of gravesites, human remains, and funerary items shall not appear in the body of any report; however, a map showing the orientation of the remains and associated funerary items shall be provided in a confidential appendix. Site maps in the body of the report should identify all features, including burials, but detailed illustrations are not allowed.

Photographs of gravesites and human remains are prohibited. In cases where funerary items are to be reinterred and may be susceptible to theft, photographs of the funerary items may be permitted in consultation with HPD. All photographs and negatives shall become the property of HPD; to be kept on file should ARPA investigations be necessary.

If circumstances require that human remains be disinterred, an ARPA permit is required if the burial is at least 100 years old. ARPA permits are issued through the Bureau of Indian Affairs with the consent of the Navajo Nation. A Class "C" Navajo Nation Cultural Resources Investigation Permit also is required. It may take up to 30 days to obtain ARPA and/or Class "C" permits. Navajo Nation employees engaged in Navajo Nation business and Navajo traditional healers are exempt from permit requirements.

A. Burials with Lineal Descendants

If the deceased has known lineal descendants, regardless of cultural affiliation, consultation shall be conducted directly with the lineal descendants. Cultural resource professionals should take traditional Diné kinship into account when they determine lineal descendants. If the deceased was a member of another tribe, consultation with lineal descendants shall proceed only after contacting HPD and only after HPD has initiated government-to-government relations with such other tribes.

In consultation with HPD, the sponsor or its agent shall document the concerns of lineal descendants regarding the burial and shall record their wishes regarding treatment of the human remains and/or funerary items on a Statement of Wishes form (see Attachments). This form *must* be used to record the wishes of lineal descendants regarding treatment of the burial.

Results of consultation with lineal descendants shall be held in confidence among the sponsor, cultural resource professional, HPD, and the lineal descendants. Sponsors and their agents shall not provide any information collected during consultation with lineal descendants to anyone other than HPD (and the lineal descendants, as requested). Upon completion of the project, sponsors and their agents shall turn over all records to HPD.

Documentation shall be provided to HPD that the decision made by the closest lineal descendant was made without any improper influence or pressure and was based upon full knowledge of all options available to them. This documentation must be initiated and performed by the sponsor or its agent, in the presence of or with the participation of a trained cultural resource professional approved by HPD. The cultural resource professional should work closely with any and all appropriate local residents, officials, elders, and traditional healers; should be familiar with policies related to the protection of human remains; should be knowledgeable regarding local history and customs; and must abide by professional standards and ethics. The cultural resource professional shall act as a witness to the documentation. Statement of Wishes forms is available from CRCS.

B. Diné Burials without Lineal Descendants

In cases where Diné burials are identified but where it is not possible to locate lineal descendants, the local chapter may serve as proxy for lineal descendants. In order to determine whether the Chapter wishes to serve as proxy, the sponsor or its agent, in consultation with HPD, shall consult with Chapter officials to determine procedures to be followed regarding presenting information to the Chapter as a whole.

Normally, this determination should be made within five (5) working days. If the Chapter determines that it wishes to serve as proxy, the sponsor shall follow the procedures delineated in Section VII.A. If the Chapter determines that it does not wish to serve as proxy, the sponsor or its agent shall consult with HPD, and HPD shall make decisions regarding treatment in accordance with procedures established in Section VII.C. All costs related to treatment shall be borne by the sponsor. Upon completion of the project, the sponsor and its agent shall turn over all records to HPD.

C. Other Native American Burials without Lineal Descendants

In the absence of lineal descendants, all Native American human remains identified on Diné lands are the responsibility of the Navajo Nation [NAGPRA, 1990: Sec. 3(a)(2)(A)]. Such human remains may include Anaasázi burials, non-Diné burials without lineal descendants but for whom cultural affiliation is known and unidentified Native American burials. In cases where consultation with other tribes is required, consultation shall occur in coordination with HPD and treatment shall remain consistent with this policy. ARPA and Class "C" permits must be in hand before initiating excavation. Navajo Nation employees engaged in Navajo Nation business and Navajo traditional healers are exempt from permit requirements.

Treatment Plan

Human remains and funerary items, once interred, should not be disinterred. If the burial is in no danger of impact, its location shall be documented and remains shall be protected as necessary. Documentation shall be provided to HPD. If the burial is in danger of impact, sponsors must exhaust all reasonable alternatives before disinterring. The following treatment plan shall be used in all cases where disinterment is necessary. The treatment plan shall insure the rapid reburial of human remains.

1. Notification, Consultation, and Excavation:

- a. Upon discovery of human remains or funerary items, the cultural resource professional shall immediately determine the nature and extent of the burial and/or funerary items, while leaving the remains in place and protected. All other activities must immediately cease within a 10-foot (3-meter) radius unless a previously approved data recovery plan is in place. When human remains or funerary items are encountered in the context of an approved data recovery plan, the cultural resource professional may continue investigations outside the immediate burial area.
- b. HPD must be notified immediately that human remains have been encountered.
- c. Remains must be kept in place on site until a determination is made by HPD regarding appropriate treatment. When security is a problem, the sponsor or its agent must consult with HPD regarding protective measures.
- d. Analysis shall proceed according to Section VI.B, above.
- e. The location of the remains shall be thoroughly documented. The location shall be described and recorded on the appropriate 7.5-minute USGS topographic map. Locational information shall be provided to HPD in a

confidential appendix. It shall not be retained by the sponsor, its agent, the cultural resource professional, or anyone else.

2. Human Remains Identified in the Laboratory. If human remains are discovered along with faunal remains or other samples during laboratory analysis, the sponsor or its agent must contact HPD and then shall rebury the remains consistent with the plan noted in Section 3, below.
3. Reburial
 - a. Reinterment should take place immediately following removal of remains, unless there are extenuating circumstances.
 - b. The reburial location shall be situated as close to the site of origin as possible, but far enough away from earth-disturbing and erosion activities so as to eliminate the likelihood of future impact. Selection of a reburial site will depend upon construction design plans, depth of soil, the security of the location, approval of land users (if needed), and other pertinent factors.
 - c. An identification number shall be assigned to the gravesite. To obtain a grave identification number, contact CRCS.
 - d. The new location shall be described and recorded on the appropriate 7.5-minute USGS topographic map. Recordation shall include a 50-foot (15.2-meter) radius buffer zone for the gravesite. Locational information shall be provided to HPD in a confidential appendix. HPD may provide to others on a need-to-know basis. It shall not be retained by the sponsor, its agent, the cultural resource professional, or anyone else.
 - e. The remains and funerary items shall be reburied in the same orientation and position as originally found. For relocation purposes, the location of the reburial and a sketch map depicting the position of the remains shall be prepared. Upon request, a skeletal illustration form is available from HPD to inventory the completeness of the human remains. This information shall immediately be turned over to, and shall become the property of, HPD.
 - f. The sponsor or its agent shall ensure that the reburial location is reclaimed to conform to the natural landscape and that protective measures are implemented, as necessary, to avoid future impacts to the reburial site (protective fencing, stabilization, reseeding, etc.).
4. Reporting. The results of investigations at a burial site shall be incorporated into a report as a detachable, confidential appendix. This report shall be submitted to the CRCS. None of the information regarding the location of burials shall be retained by the sponsor or its agent. Confidential appendices shall only be distributed to appropriate parties, as determined by HPD.

D. Non-Native American Burials without Lineal Descendants

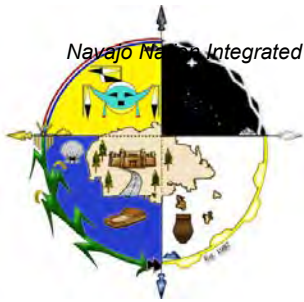
In the rare instance that non-native human remains without lineal descendants are encountered on Diné lands, HPD shall initiate consultation with the appropriate entities.

VIII. DISPUTE RESOLUTION

HPD shall consider disputes within or between families, within a community, between tribes, or with federal agencies related to the treatment of gravesites, human remains, and funerary items on a case-by-case basis. Disputes among lineal descendants may be referred to the Navajo Peacemaker Courts (*Hózhó'í Naa'táanii*), as appropriate.

IX. ATTACHMENTS/FORMS

- A. Identification of Gravesites, Human Remains, and Funerary Items *and* Statement of Wishes: Burials *with* Lineal Descendants
- B. Identification of Gravesites, Human Remains, and Funerary Items: Burials *without* Lineal Descendants



**Identification of Gravesites, Human Remains, and Funerary Items *and*
Statement of Wishes for
Burials *WITH* Lineal Descendants**

****CONFIDENTIAL****

(NOTE: Complete one form for each individual encountered)

DATE:

NAME OF DECEASED:

DESCRIPTION:

Clan (Maternal):	
Clan (Paternal):	
Sex:	
Age of Death:	
Date of Death (if known):	

REPORT NO.:

SITE NO.:

REPORT AUTHOR(S):

REPORT TITLE:

LOCATION OF BURIAL:

Chapter:	UTM Zone:	N	E
Agency:	Land Status:		
County:	Township/Range:		
State:	USGS 7.5 Minute Map:		

REINTERMENT LOCATION (if applicable):

Chapter:	UTM Zone: N E
Agency:	Land Status:
County:	Township/Range:
State:	USGS 7.5 Minute Map:

DESCRIPTION OF UNDERTAKING IN RELATION TO BURIAL:

NAME OF LINEAL DESCENDANT/RESPONSIBLE PARTY:

NAME OF LINEAL DESCENDANT/RESPONSIBLE PARTY:

RELATIONSHIP OF LINEAL DESCENDANT/RESPONSIBLE PARTY TO THE DECEASED:

CLANS OF RESPONSIBLE PARTY:

Maternal Clan	
Paternal Clan	

ADDRESS/LOCATION OF RESIDENCE FOR LINEAL DESCENDANT/RESPONSIBLE PARTY:

NAME/ORGANIZATION ADDRESS OF FIELD RECORDER:

LANGUAGE IN WHICH INTERVIEW WAS CONDUCTED:

NAME/ORGANIZATION/ADDRESS OF INTERPRETER (if any):

NAMES OF OTHERS PRESENT DURING INTERVIEW:

DESCRIPTION OF BURIAL (i.e. markers, headstone, funerary items, other):

ENVIRONMENTAL SETTING:

FIELD METHODS:

Add supplemental sheets if necessary.

STATEMENT OF LINEAL DESCENDANT/RESPONSIBLE PARTY

On, _____
(date)

I, _____
(name of lineal descendant/responsible party)

Was told by: _____
(name & address of field recorder)

That the burial was in danger of being disturbed by the following undertaking :

(title of report/description of undertaking)

I understand that the following treatment alternatives are available to me, according to the Navajo Nation Policy for the Protection of Jishchaa': Gravesites, Human Remains, and Funerary Items:

1. The human remains and funerary items may be left in place and shall be avoided forever, without stigma or other sanctions placed against the relatives. To this end, a 50-foot (15.2-meter) radius buffer zone measured horizontally shall be maintained, and the local environment shall be reclaimed and/or stabilized at the end of the disturbance activities. A larger or smaller buffer zone may be delineated with approval of the lineal descendants.
2. The human remains and funerary items may be relocated to a location of the lineal descendant's choice (and with the consent of the land-user at the location of reburial). The integrity of the human remains and funerary items shall be maintained, and they shall be treated with all due respect. Witnesses from the Navajo Nation Historic Preservation Office and/or others may be present, especially if desired by the lineal descendant(s), to ensure that the rights of the lineal descendant(s) are protected. The lineal descendant(s) also has the right to request who should participate in the process of disinterment and reburial. In the case of an undertaking, all costs related to treatment shall be borne by the sponsor.
3. The lineal descendant(s) may request that the grave not be protected from any disturbance. However, if the grave is more than 100 years old or is located within an archaeological site, the Navajo Nation has the responsibility to protect the grave from disturbance. Determination of eligibility for protection shall be made with reference to the Archaeological Resource Protection Act (ARPA), the National Historic Preservation Act (NHPA, as amended), the Native American Grave Protection and Repatriation Act (NAGPRA), the American Indian Religious Freedom Act (AIRFA), the Navajo Nation Cultural Resource Protection Act (CRPA; CMY-19-88), and other relevant tribal and federal policies.
4. The lineal descendant(s) may decline to specify wishes regarding treatment of the grave.

Recordation of Wishes:

(Note to field recorder: Record the concerns and wishes of the lineal descendants/responsible party fully. If reburial is chosen, the lineal descendants may specify location of the new burial site and any witnesses desired. They may also specify concerns regarding fencing, stabilization, and maintenance of the new burial site. Supplemental sheets may be added if necessary.)

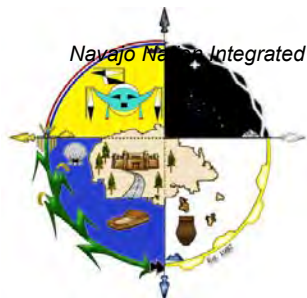
I understand that information on this form shall be held in confidence among the sponsor or its agent (in the case of an undertaking), HPD, and the lineal descendants. Neither the sponsor nor its agent shall provide any information collected during consultation with lineal descendants to anyone other than HPD. Upon completion of the project, sponsors shall turn over all records to HPD and to the lineal descendants, as requested.

Signature/Thumbprint:	Date
<hr/>	<hr/>
<hr/>	<hr/>

Witness(es):	Date
--------------	------

Signature of Interpreter	Date
--------------------------	------

Signature of Field Recorder:	Date:
------------------------------	-------



**Identification of Gravesites, Human Remains, and Funerary Items *and*
Statement of Wishes for
Burials WITHOUT Lineal Descendants**

****CONFIDENTIAL****

(NOTE: Complete one form for each individual encountered)

DATE:

REPORT NO.:

SITE NO.:

REPORT AUTHOR(S):

REPORT TITLE:

LOCATION OF BURIAL:

Chapter:	UTM Zone:	N	E
Agency:	Land Status:		
County:	Township/Range:		
State:	USGS 7.5 Minute Map:		

DATE OF DISCOVERY:

ADDRESS/LOCATION OF RESIDENCE FOR LINEAL DECENDANT/RESPONSIBLE PARTY:

NAME/ORGANIZATION ADDRESS OF FIELD RECORDER:

DESCRIPTION OF UNDERTAKING IN RELATION TO BURIAL:

SPONSOR OF PROJECT:

DESCRIPTION OF BURIAL (i.e. markers, headstone, funerary items, single or multiple burials, flex positioning, orientation, other):

ENVIRONMENTAL SETTING:

APPROXIMATE DATE OF INTERMENT (AD/BC):

AGE AND SEX OF INDIVIDUAL(S):

Individual:	1	2	3	4	5	6	7	8
Age of individual:								
Sex of Individual:								
Skeleton: Complete (C) or Partial (P) [chose one]								

IF PARTIAL SKELETONS ARE ENCOUNTERED, DESCRIBE BELOW. INCLUDE IDENTIFYING NUMBER FOR SKELETONS DESCRIBED. Use supplementary sheets if necessary.

TYPE OF BURIAL (e.g. cist, crevice, midden):

Photographs of funerary items are permitted only in situations where there is a risk of ARPA violations. Photographs require prior permission from NNHPD. All sketches, photographs, negatives, and photo logs must be attached to this form.

WERE PHOTOGRAPHS TAKEN OF FUNERARY ITEMS?
☐
☐

 † NO
 YES
NAME/TITLE OF INDIVIDUAL AT NNHPD WHO PROVIDED PERMISSION TO TAKE PHOTOGRAPHS:

FIELD METHODS:

DATE OF DISINTERMENT (if applicable):

DATE OF REINTERMENT (if applicable):

REINTERMENT LOCATION (if applicable):

Chapter:	UTM Zone: N E
Agency:	Land Status:
County:	Township/Range:
State:	USGS 7.5 Minute Map:

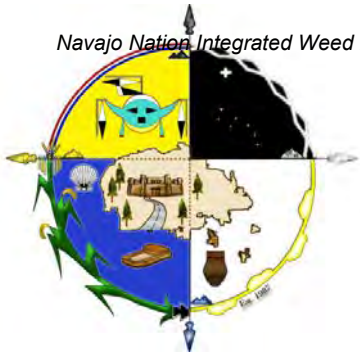
NOTE: Reburial location must be mapped on a USGS 7.5-minute topographic map (attached).**NAME/ORGANIZATION/ADDRESS OF INDIVIDUAL(S) WHO CONDUCTED THE DISINTERMENT:**

NAME/ORGANIZATION/ADDRESS OF INDIVIDUAL(S) WHO CONDUCTED THE REINTERMENT:

WITNESS(ES) TO REINTERMENT:

REASON FOR RELOCATION OF BURIAL:

Supplemental sheets may be added if necessary.



GUIDELINES FOR THE TREATMENT OF DISCOVERY SITUATIONS

INTRODUCTION

The Bureau of Indian Affairs, Navajo Area Office (BIA) and the Navajo Nation have entered into a contract pursuant to the Indian Self-determination and Education Act (P.L. 93-638, as amended) under which the Navajo Nation Historic Preservation Department (HPD) performs selected historic preservation functions as the agent of the BIA, including Section 106 consultations.

Pursuant to 36 CFR 800.11(a), these *Guidelines* will be complied with in the event of discovery of cultural and historic properties, and human remains; or unanticipated effects on identified cultural and historic properties, and human remains during the course of an undertaking or any other activity funded or permitted by the BIA within the boundaries of the Navajo Nation.

The BIA, through HPD, is responsible for ensuring identification of both previously recorded and unrecorded cultural and historic properties, and human remains, and evaluation of the effect(s) a project will have on such properties.

These *Guidelines* require adherence to the following policies, standards, and guidelines in addition to relevant cultural and historic preservation laws and regulations:

1. Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.
2. Advisory Council on Historic Preservation's Treatment of Archeological Properties: A Handbook.
3. Navajo Nation Interim Fieldwork and Report Standards and Guidelines.
4. Navajo Nation Policy and Procedures for the Protection of Cemeteries, Gravesites and Human Remains.
5. Navajo Nation Historic Preservation Department Guidelines for the Treatment of Historic, Modern, and Contemporary Abandoned Sites.
6. Navajo Nation Policy to Protect Traditional Cultural Properties.
7. Native American Graves Protection and Repatriation Act (NAGPRA).
8. National Register Bulletin 38.

The BIA is ultimately responsible for compliance with 36 CFR 800.

DEFINITIONS

1. The term "discovery" refers to finding; locating; observing; uncovering; unearthing; learning about through conversation, discussion, or interview; or otherwise detecting human remains or any kind of cultural or historic property, as defined below.
2. A "historic property" is defined in Section 301(5) of the National Historic Preservation Act, as amended (1992), as any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register, including artifacts, records, and material remains related to such a property or resource.

Pursuant to *National Register Bulletin 38* and Section 101(d) (6) (A) of the National Historic Preservation Act, as amended (1992), "historic property" includes properties of traditional religious and cultural importance to an Indian tribe.

3. "Cultural properties" as defined by Section 10(c) of the Navajo Nation Cultural Resources Protection Act (NNCRPA, CMY-19-88) will also be identified and protected. The types of properties and landmarks eligible for listing on the Navajo Nation Register of Cultural Properties and Cultural Landmarks are defined in Section 101(a-c) of the NNCRPA.
4. The term "contemporary" refers to sites, properties, places, or burials that are 50 years of age or less.
5. The term "historical" refers to sites, properties, places, or burials that post-date 1539.
6. The term "prehistoric" refers to sites, properties, places, or burials that pre-date 1539.
7. The term "scope-of-work" refers to a plan that includes one or more of the following procedures, which may be necessary to identify, evaluate, and mitigate adverse effects on cultural and historic properties.
 - A. Archaeological work may include:
 1. Identification and evaluation of archaeological properties, including recommendations of eligibility for nomination to the National Register of Historic Places;
 2. Testing of potentially eligible historic properties for a determination of significance and eligibility for nomination to the National Register of Historic Places;
 3. Testing of historic properties to determine the nature and extent of cultural deposits;
 4. Data recovery.
 - B. Ethnographic work may include
 1. Identification and evaluation of traditional cultural properties, other cultural properties, and burial sites, including, as applicable, recommendations of eligibility for nomination to the National Register of Historic Places;
 2. Treatment of the sites and properties;
 3. Conflict resolution.

PROTOCOL

These guidelines must be followed in any situation involving the discovery of any kind of cultural or historic property, including historical and prehistoric archaeological sites and traditional cultural properties, and human remains, whether previously identified or unknown.

In the event of a discovery, the project sponsor will inform the project contractor to temporarily cease work within 50 feet of the site. A 100-foot-radius avoidance zone will be maintained around discoveries containing human remains.

HPD will be contacted within one (1) working day at (928) 871-7198 or 7134 to arrange for proper evaluation of any discovery.

When a cultural or historic property is discovered:

1. HPD will make a determination of effect and significance of the cultural or historic property (ies) by the most efficient and expeditious means and notifies the BIA of these determinations.

2. HPD will consult with interested parties, including other Indian tribes, during development of a scope-of-work and will take into account comments from interested parties into the scope-of-work.
3. In the event of a dispute concerning the disposition of human remains discovered on the Navajo Nation, the Navajo Nation Historic Preservation Officer will make all final decisions regarding resolution of disputes in accordance with Navajo Nation policies.

ADMINISTRATIVE PROCEDURES

In the event of a declaration of a discovery, the following the actions will be taken.

1. For discovery situations where a scope-of-work has been approved:
 - A. HPD will define a 50-foot-radius avoidance zone around the discovery (100-foot-radius if the discovery contains human remains) to remain in effect for the duration of investigations at the site.
 - B. HPD will make recommendations regarding significance and eligibility for nomination to the National Register of Historic Places for each discovered property.
 - C. If the property is eligible, HPD will establish a schedule to complete treatment.
 - D. HPD will implement or direct its contractor to implement the scope-of-work at each discovery consistent with the approved scope-of-work for the undertaking.
 - E. The methods of excavation, recordation, conservation, analysis, preservation, storage, interviewing or consultation with knowledgeable individuals and interested parties, and reporting of discoveries shall be consistent with the scope-of-work, the general and specific methods of treatment outlined below, and stipulations of any existing memorandum of agreement or programmatic agreement applicable to the undertaking.
 - F. HPD will simultaneously notify the BIA and all declared interested parties upon the completion of treatment.
 - G. The BIA will wait three (3) working days after work is completed at the discovery before letting the project contractor continue work in the avoidance zone. This period will enable consulting and interested parties to submit comments.
 - H. The results of the investigations at a discovery will be incorporated into the draft technical report. Confidential data resulting from the ethnographic assessment and provenience data for all cultural and historic sites will be provided in one or more detachable appendices. Confidential appendices will only be distributed to appropriate parties.
 - I. The contractor will finalize the technical report, incorporating or addressing comments received from HPD.
2. For discoveries situations where a scope-of-work has not been approved:
 - A. HPD will define a 50-foot-radius avoidance zone around the discovery (100-foot-radius if the discovery contains human remains) to remain in effect for the duration of investigations at the discovery.
 - B. HPD will make recommendations regarding significance and eligibility for nomination to the National Register of Historic Places for each discovered property.
 - C. If the property is eligible, HPD will establish a schedule to complete treatment.

- D. HPD will prepare or direct a cultural resource management contractor to provide a scope-of-work within five (5) working days of the request.
- E. The methods of excavation, recordation, conservation, analysis, preservation, storage, consultation, and reporting of discoveries shall be consistent with the scope-of-work, the general and specific methods of treatment outlined below, and stipulations of any existing memorandum of agreement or programmatic agreement applicable to the undertaking.
- F. Upon approval of the scope-of-work by HPD, HPD will direct its contractor to implement the plan.
- G. HPD will simultaneously notify the BIA and all declared interested parties upon the completion of treatment.
- H. BIA will wait three (3) working days after work is completed at the discovery before letting the project contractor continue work in the avoidance zone.
- I. The results of investigations at a discovery will be incorporated into a draft technical report. Confidential data resulting from the ethnographic assessment and provenience data for all cultural and historic sites will be provided in one or more detachable appendices. Confidential appendices will only be distributed to appropriate parties.
- J. The contractor will finalize the technical report, incorporating or addressing comments received from HPD.

GENERAL METHODS OF TREATMENT

In all discovery situations the existing ground surface in the vicinity of the discovery will be mapped to show the relationship of the discovery to the project area, topographic features, cultural features, and surface artifacts. The map will be prepared using, at a minimum, a compass and measuring tape.

ARCHAEOLOGICAL METHODS: Assessment and treatment of cultural resources may be accomplished using archaeological methods. Data recovery strategies for historic properties may include in situ preservation, scientific testing and excavation, and documentation. This information will be used to develop a scope-of-work for treatment of affected properties. The plan will be implemented after approval of HPD.

The general process for treatment of archaeological components of historic properties is as follows:

1. Assessment of situation by a qualified archaeologist.
2. Development of a strategy to determine the significance of the property if significance is not explicit from visible evidence. Initiate a testing program if necessary.
3. Development of a strategy for data recovery and implementation of the plan for data recovery.

ETHNOGRAPHIC METHODS: Assessment and treatment of cultural resources and burials may be accomplished using ethnographic methods. Methods include conducting interviews with chapter officials, local and customary land users, and other knowledgeable individuals to elicit information regarding these surface features. This information will be used to develop a scope-of-work for treatment of affected properties. The plan will be implemented after approval of HPD.

The general process for treatment of traditional cultural properties, historical sites, and burials (not found in the context of a historic property) is as follows:

1. Assessment of situation by a qualified anthropologist and/or cultural specialist.

2. Consultation with chapter officials, local and customary land users, and other knowledgeable individuals.
3. In the case of unclaimed human remains, consultation with interested parties, including officials from other Indian tribes.
4. Development of a scope-of-work, in consultation with HPD.
5. Implementation of the scope-of-work upon approval by HPD.
6. Preparation of a technical report; confidentiality of information will be ensured.

Burials not found in the context of a historic property will be treated in accordance with the Navajo Nation Policies and Procedures Concerning the Protection of Cemeteries, Gravesites and Human Remains and the Native American Graves Protection and Repatriation Act.

SPECIFIC METHODS OF TREATMENT

The following methods of treatment are offered for situations in which a research design or scope-of-work has not been approved for the undertaking. If a research design or scope-of-work has been approved for a specific undertaking, discovered historic and cultural properties, and human remains, shall be treated in a manner consistent with the research design or scope-of-work, using the following treatment methods as a guideline.

ASH STAINS, HEARTHES, AND OTHER THERMAL FEATURES: The location will be mapped and the feature will be profiled and photographed. Excavated fill will be screened through quarter-inch or smaller mesh. If it appears that the feature can be dated through association of artifacts or stratigraphy, appropriate samples may be taken, including charcoal fragments for radiocarbon dating. Should the feature appear likely to yield botanical remains, pollen and flotation samples may be collected. HPD must be consulted before any samples are analyzed.

STORAGE PITS: The location will be mapped and the feature will be profiled and photographed. The feature will be fully excavated, and the fill must be screened through quarter-inch or smaller mesh screen. If it appears that the feature can be dated through association of artifacts or stratigraphy appropriate samples may be taken. Should the feature appear likely to yield botanical remains, pollen and flotation samples may be collected. All artifacts will be collected. HPD must be consulted before any samples are analyzed.

BURIED OR PARTIALLY BURIED STRUCTURES, MIDDENS, AND OTHER FEATURES: Examples of buried or partially buried features include pit structures, pothouses, and kivas. The location will be mapped and the feature will be profiled and photographed. Treatment of buried or partially buried features is a two-stage process involving (1) nature and extent testing within the area of effect to define the boundary of the feature and detect the presence of additional features and (2) data recovery within the area of effect. Systematic trenching in conjunction with 1 by 1 m test units, or other subsurface investigative techniques, may be used within the area of effect. Consultation with HPD is required after the initial recording has been completed for review of the data recovery plan.

Excavated fill will be screened through quarter-inch or smaller mesh. If it appears that the feature can be dated through association of artifacts or stratigraphy, or by radiographic or archeomagnetic dating, appropriate samples may be taken. Should the feature appear likely to yield botanical remains, pollen and flotation samples may be collected. HPD must be consulted before any samples are analyzed.

MISCELLANEOUS PREHISTORIC FEATURES: Examples of miscellaneous features include buried cultural horizons and agricultural features. The location will be mapped and the feature will be profiled and photographed. The strategy for treatment of miscellaneous prehistoric features is the same as that for buried or partially buried features.

SURFACE FEATURES: Examples of surface features include field houses, jacal structures, ramadas, masonry structures, historical, contemporary, and modern structures, and various types of historic landscapes. The location will be mapped and the feature(s) will be photographed. Treatment of surface features may be a multistage process involving (1) intensive and extensive documentation of the property to define the boundary of the feature and detect the presence of additional features, (2) consultation with local and customary users, and other knowledgeable individuals, in order to determine the nature of the site, place, property, or feature and recommend a treatment plan, and (3) implementation of data recovery or the treatment plan within the area of effect.

The strategy discussed above for treatment of buried or partially buried features may be the appropriate way to treat some surface features and should be used as a guideline for data recovery. Alternatively, the strategy espoused below for traditional cultural properties and historical sites may be more appropriate and should be used as a guideline for treatment.

TRADITIONAL CULTURAL PROPERTIES (TCPs) AND HISTORICAL SITES: Examples of traditional or historical features include named landscape features, mineral or herb gathering areas, offering areas, hogans, trail markers, cairns, sheep corrals, ceremonial sites (e.g., Enemy Way sites), sweathouses, and tepee grounds. If a TCP or historical site is encountered, or information about a possible site is provided to the project sponsor or their agent by any knowledgeable or concerned individual, the project sponsor must ensure that work is discontinued within a 50-foot-radius of the property and contact HPD within one (1) day of the discovery. Treatment of TCPs or historical sites is a two-stage process involving (1) consultation with HPD along with local and customary users, and other knowledgeable individuals, in order to determine the nature of the site, place, property, or feature and recommend a scope-of-work and (2) implementation of the scope-of-work. Examples of treatment include, but are not limited to, the following:

1. Avoiding the remaining portion of the property through use of protective fencing or redesign of the undertaking or project.
2. Monitoring the remaining portion of the property during construction and/or erection of protective fencing to ensure protection.
3. Moving material remains of the TCP. This activity may include participation of local medicine men or women for ceremonial blessings.
4. Restricting construction activities to certain seasons or times of the day.
5. Conducting ceremonies for the well-being of properties that have been affected.

HPD will recommend the best possible treatment as guided by interviews and consultation.

HUMAN REMAINS: If human remains (whether modern, contemporary, historical, or prehistoric) are encountered at any phase of work, the project sponsor shall immediately take steps to preserve and protect the remains in situ. Work must cease within a 100-foot-radius of the remains and HPD must be contacted within one (1) working day of the discovery. Treatment of the human remains shall be dependent upon consultation with HPD. *Under no circumstances* shall the project sponsor or the project contractor further disturb human remains except under the formal direction of HPD. All human remains must be treated in accordance with the laws of the Navajo Nation. Claimed human remains shall not be disturbed without the consent of the next-of-kin. Unclaimed human remains shall be treated according to the provisions of the Navajo Nation Policies and Procedures Concerning the Protection of Cemeteries, Gravesites and Human Remains and the Native American Graves Protection and Repatriation Act.

THE NAVAJO NATION

CULTURAL RESOURCES PROTECTION ACT

(NNCRPA)

TRIBAL COUNCIL RESOLUTION CMY-19-88

CONTENTS

I.	Section 1001: Findings.....	1
II.	Section 1002: Policy	1
III.	Section 1003: Definitions	2
IV.	Section 1004: Historic Preservation Department	3
V.	Section 1005: Archaeology Department.....	3
VI.	Section 1006: Navajo Tribal Museum	3
VII.	Section 1011: Navajo Nation Register of Cultural Properties & Cultural Landmarks.....	3
VIII.	Section 1021: Protection of Cultural Properties.....	4
IX.	Section 1031: Prohibited Activities	4
X.	Section 1032: Permits.	4
XI.	Section 1033: Exceptions	5
XII.	Section 1034: Permit Requirements.....	5
XIII.	Section 1035: Suspension of Permits.	5
XIV.	Section 1036: Revocation of Permits.....	5
XV.	Section 1037: Criminal Penalties.	6
XVI.	Section 1038: Civil Assessments.....	8
XVII.	Section 1041: Appeals	8
XVIII.	Section 1051: Regulations, Procedures Standards & Guidelines	8
XIX.	Section 1061: Severability	8

§ 1001. Findings

- A. This Act may be cited as the “Navajo Nation Cultural Resources Protection Act”.
- B. The Navajo Tribal Council finds and declares that:
 - 1. The spirit and direction of the Navajo Nation are founded upon and reflected in its cultural heritage;
 - 2. The cultural heritage of the Navajo Nation should be preserved as a living part of our community life and development in order to give a sense of orientation to the Navajo People;
 - 3. Cultural properties of the Navajo Nation are being lost or substantially altered, often inadvertently, with increasing frequency;
 - 4. The preservation of this irreplaceable cultural heritage is in the interest of the Navajo Nation and its people so that its vital legacy of cultural, educational, esthetic, inspirational, economic, and energy benefits will be maintained and enriched for future generations of Navajos;
 - 5. In the face of ever increasing energy development, economic development, sanitation and public health developments, the present Tribal governmental and non-Tribal governmental programs to preserve the Navajo Nation’s cultural resources are inadequate to ensure future generations a genuine opportunity to appreciate and enjoy the rich heritage of the Navajo Nation;
 - 6. Increased knowledge of our cultural resources, the establishment of better means of identifying and administering them, and fostering their preservation will improve the planning of federal, Tribal, state and other projects and will assist economic growth and development and expeditious project implementation; and
 - 7. Although the major role in cultural resource preservation has been borne by the federal and state governments, and both must continue to play a role, it is nevertheless essential that the Navajo Nation expand and accelerate its cultural resource preservation programs and activities.

§1002. Policy

It shall be the policy of the Navajo Nation, in cooperation with the states, federal government, other Indian Tribes, and private organizations and individuals to:

- A. Use appropriate measures to foster conditions under which our modern society and our cultural resources can coexist in productive harmony and fulfill the social, economic and other requirements of present and future generations;
- B. Provide leadership in the preservation of cultural resources of the Navajo Nation;
- C. Administer Navajo Nation-owned, administered or controlled cultural resources in a spirit of stewardship and for the inspiration of present and future generations;
- D. Contribute to the preservation of non-Navajo Nation-owned cultural resources and give maximum encouragement to organizations and individuals undertaking preservation by private means;
- E. Encourage the public and private preservation and utilization of usable elements of the Navajo Nation’s stock of historic buildings and structures.

§ 1003. Definitions

As used throughout this Act, the term:

- A. “Archaeology Department” means the Navajo Nation Archaeology Department.
- B. “Building” means any structure made by man primarily to provide shelter.
- C. “Cultural property” means any cultural resource deemed to be important enough to warrant listing in the Navajo Register.
- D. “Cultural resource” means any product of human activity, or any object or place given significance by human action or belief.
- E. “Department” means the Navajo Nation Historic Preservation Department.
- F. “District” means any discrete area comprising buildings, objects, sites or structures that form a recognizable, unified whole.
- G. “Indian” or “Indian person” mean any enrolled member of an Indian Tribe recognized by the Secretary of the Interior.
- H. “Lands in which the Navajo People have a historical interest” means all lands historically or traditionally used by the Navajo People.
- I. “Navajo Lands” means those lands held in Trust for the benefit of the Navajo Nation and those lands which the Navajo Nation holds in fee simple or in which it has a legal interest.
- J. “Navajo Landmarks” means those cultural properties that are of significance to the entire Navajo Nation.
- K. “Navajo Register” means the Navajo Nation Register of Cultural Properties.
- L. “Object” means a product of human activity or an item given significance or meaning by human activity or belief.
- M. “Place” refers to an identifiable location at which an event occurred or a location given significance by human action or belief.
- N. “Preservation Officer” means the Navajo Nation Historic Preservation Officer, who is the Director of the Navajo Nation Historic Preservation Department.
- O. “Site” means the location of the physical remains of human activity.
- P. “Sponsor” means the agency official or the official in a private capacity that has decision making authority over a particular undertaking.
- Q. “Structure” means construction resulting from human activity, the primary purpose of which is other than to provide shelter.
- R. “Tribal Archaeologist” means the Navajo Tribal Archaeologist, who is the director of the Archaeology Department.

- S. “Undertaking” means any project, activity, or program that can result in changes in the character or use of cultural properties, if any such cultural properties are located in the area of potential effects. The project, activity or program must be under the direct or indirect jurisdiction of a Sponsor. Undertakings include new and continuing projects, activities or programs not previously considered under the authority of this Act.

§ 1004. Historic Preservation Department

The Navajo Nation Historic Preservation Department (hereafter referred to as the “Department”) within the Division of Resources shall be the Navajo Nation’s agency responsible for the protection, preservation and management planning for the Navajo Nation’s cultural resources. The department shall be directed by the Navajo Nation Historic Preservation Officer (hereafter referred to as the “Preservation Officer”) who shall advise the President of the Navajo Nation, the Navajo Nation Tribal Council, the divisions, departments, programs, agencies, authorities, enterprises and any other instrumentalities of the Navajo Nation, the federal, state and local governments, private organizations and individuals on matters pertaining to cultural resource preservation to achieve the goals of this Act on Navajo lands, and on lands in which the Navajo people have a historical interest. The Department shall conduct such other activities authorized in accordance with the Department’s approved Plan of Operation.

§ 1005. Archaeology Department

The Navajo Nation Archaeology Department (hereafter referred to as the “Archaeology Department”) within the Division of Resources shall be the Navajo Nation’s agency for providing cultural resources services to project sponsors. The Archaeology Department shall be directed by the Navajo Tribal Archaeologist (hereafter referred to as the “Tribal Archaeologist”), who shall be responsible for organizing and providing cultural resource services to sponsors, including instrumentalities of the Navajo Nation, Navajo people, other agencies and industry in need of cultural resources services both on and off the Navajo Reservation. The Tribal Archaeologist shall also organize and implement, in consultation with the Preservation Officer, a program of archaeological and anthropological research designed to enhance and benefit the Navajo Nation’s cultural resources. The Archaeology Department shall conduct such other activities authorized in accordance with its approved Plan of Operation.

§ 1006. Navajo Nation Museum

The Navajo Tribal Museum shall be the repository for all cultural resources collected on Navajo Lands. The Navajo Tribal Museum shall conduct such other activities authorized in accordance with its approved Plan of Operation

§ 1011. Navajo Nation register of cultural properties and cultural landmarks

- A. The Preservation Officer shall create, expand, maintain and administer a Navajo Nation Register of Cultural Properties (hereafter referred to as the “Navajo Register”) comprising buildings, districts, objects, places, sites and structures significant in Navajo Nation history, architecture, archaeology, engineering, and culture.
- B. The Preservation Officer shall create, expand, maintain and administer a program for designation of Navajo Nation Cultural Landmarks (hereafter referred to as “Navajo Landmarks”), which shall include those cultural properties of significance to the entire Navajo Nation.
- C. Cultural properties on Navajo lands shall be deemed to be included in the Navajo Register if, as of the date of enactment of the Navajo Nation Cultural Resources Protection Act, they are

1. Historic properties listed in the National Register of Historic Places;
 2. Historic properties designated National Historic Landmarks;
 3. Natural areas designated National Natural Landmarks;
 4. Cultural properties included in the National Park System at Navajo National Monument, Canyon de Chelly National Monument, and Chaco Canyon National Historical Park; and
 5. Archaeological sites designated as Chaco Protection Sites pursuant to P.L. 96-550.
- D. The Preservation Officer shall establish a program to locate, inventory, and evaluate cultural resources on Navajo lands and to list all such resources as may be eligible in the Navajo Register and to designate such properties as may qualify as Navajo Landmarks.

§ 1021. Protection of Cultural Properties

In order to ensure the protection of the cultural properties of the Navajo Nation, the Sponsor of any undertaking must obtain the approval of the Preservation Officer prior to implementation or authorization of any undertaking by the Sponsor.

§ 1031: Prohibited Activities

No cultural property may be visited or investigated on Navajo Lands, except those cultural properties designated as open to the public within the boundaries of a Navajo Nation Park or a National Park or Monument; nor may any person alter, damage, excavate, deface, destroy or remove, any cultural properties on Navajo lands. No person may sell, purchase, exchange or transport cultural resources from Navajo lands. No person may engage in ethnographic research on Navajo lands: Except that such activities may be conducted under the authority of and in accordance with the stipulations of a valid Navajo Nation Cultural Resources Permit issued by the Preservation Officer under the authority of § 1032.

§ 1032. Permits

- A. There shall be three classes of Permits.
1. *Class A* permits shall be issued for activities involving casual visitation and inspection of cultural properties.
 2. *Class B* shall be issued for cultural resource inventory activities involving no collection or disturbance of cultural resources.
 3. *Class C* shall be issued for cultural resource investigations involving alteration, collection, excavation, removal or any disturbance of cultural resources or for ethnographic research.
- B. Permits shall be issued only on a case-by-case basis, except that organization qualifying for a Class 1 or 3 under Navajo preference pursuant to Navajo Nation Code may be granted blanket Class B permits. The Preservation Officer may waive this requirement whenever he or she finds that issuance of a blanket Class B permit is in the best interests of the Navajo Nation and its people.
- C. Permits shall not be issued for periods to exceed 12 months, except when necessary to cover the duration of a single project.

§ 1033. Exceptions

- A. The prohibition against visitation of cultural resources does not apply to enrolled members of the Navajo Nation or to Navajo Nation employees engaged in official activities.
- B. The prohibition against alteration, collection, disturbance, excavation or removal of cultural resources or collection of ethnographic data do not apply to:
 - 1. Navajo traditional practitioners engaging in activities directly relating to the practice of traditional Navajo religion; or
 - 2. To Navajo Nation employees engaged in official business, relating to cultural resources management activities approved in accordance with Departmental rules and procedures.

§ 1034. Permit requirements

Any person proposing to visit or inspect cultural resources, undertake cultural resources inventory, alter, collect, excavate or remove cultural resources or engage in ethnographic research, who is not exempted pursuant to § 1033 of this Act, shall apply to the Preservation Officer for a Navajo Cultural Resources Permit for the proposed activity. The Preservation Officer may issue a Permit to any qualified individual, subject to appropriate terms and conditions.

§ 1035. Suspension of permits

- A. The Preservation Officer may suspend a Permit without cause upon determining that continuation of activities under a permit would not be in the best interests of the Navajo Nation or its people. Such a suspension is made without liability to the Navajo Nation, its agents or employees. Such a suspension shall not prejudice the ability of the permit holder to hold or obtain other permits.
- B. The Preservation Officer may suspend a permit for cause upon determining that any term or condition of a permit is not being met by the permit holder.

§ 1036. Revocation of permits

- A. The Preservation Officer may revoke a permit without cause upon determining that continuation of a permit is not in the interests of the Navajo Nation or its People. Such a revocation is made without liability to the Navajo Nation, its agents and employees. Such revocations shall not prejudice the ability of the permit holder to hold or obtain other permits.
- B. The Preservation Officer may revoke a permit for cause upon finding that:
 - 1. Any of the terms or conditions of a permit has been willfully violated;
 - 2. A permit-holder has engaged in activities prohibited by this Act; and
 - 3. A permit-holder has engaged in activities that resulted in the prior suspension of a permit.

§ 1037. Criminal Penalties

Any Indian person violating the provisions of §1301 of this Act shall be subject to criminal penalties.

- A. Any Indian person who:
 - 1. Engages in cultural resource inventory activities except under the authority of a Class B permit, or
 - 2. Who alters, collects, damages, destroys, excavates or removes cultural resources except under the authority of Class C permit or under the exception provided by § 1033 of this Act, shall upon conviction, be guilty of a misdemeanor and subject to punishment of up to one year in jail and a fine of up to one thousand dollars (\$1000).

§ 1038. Civil assessments

Individuals violating the prohibitions in § 1031 or § 1037 of this Act shall be subject to civil assessments. Civil assessments shall be imposed by the Resources Committee of the Navajo Nation Council (hereafter referred to as the Resources Committee”), in accordance with procedures adopted by the Resources Committee expressly for this purpose. The Resources Committee shall adopt such procedures within 90 days of the adoption of this Act.

- A. Violation of the provisions of § 1031 or § 1037 of this Act by any person, who does business on the Navajo Nation, shall be grounds for withdrawal of the privilege of doing business on the Navajo Nation. The Resources Committee shall consider whether or not to recommend to the Navajo Nation Council that any individual found to have violated § 1031 or § 1037 shall lose the privilege of doing business on the Navajo Nation.
- B. Any non-Indian who visits or inspects cultural resources on Navajo lands without a valid Class A permit shall be committing trespass. Such individuals determined to be in trespass after a hearing before the Resources Committee of the Navajo Nation Council, shall be assessed a civil forfeiture of not more than one hundred dollars (\$100.00) for the first offense and not more than five hundred dollars (\$500.00) for each subsequent offense. For the purposes of this part, each visit to or inspection of a cultural resource on Navajo Lands shall be considered a separate offense. The Resources Committee may, at its discretion, recommend to the Navajo Nation Council that any person found to be in trespass be excluded from the Navajo Nation.
- C. Any non-Indian who engages in cultural resources inventory activities on Navajo lands, except under the authority of a valid Class B permit shall be committing trespass. Any individual determined to be in trespass after a hearing before the Resources Committee, shall be assessed a civil forfeiture of not more than one thousand dollars (\$1000) for each offense. For the purposes of this part, each inventory on Navajo lands shall be considered a separate offense. The Resources Committee shall consider whether or not to recommend to the Navajo Nation Council that any individual found to have violated this prohibition shall be excluded from the Navajo Nation.
- D. Any individual within Navajo lands who alters, collects, damages, defaces, destroys, excavates, removes or sells cultural resources or who collects ethnographic data without a valid Class C permit, or as permitted under the exceptions detailed in § 1033, or who engages in activities in violation of the terms and conditions of a valid permit shall be liable, after a hearing before the Resources Committee, to the Navajo Nation for civil damages as determined by the Resources Committee as follows:
 - 1. Assessment of Actual Damages. The Resources Committee shall impose the civil assessments based upon actual damages in accordance with “Standards for Assessing Damages to Cultural Properties” that the Resources Committee shall adopt expressly for this purpose. The “Standards for Assessing Damages to Cultural Resources” shall include, but need not necessarily limit consideration to:

- a. Full costs of restoration of the cultural resource;
 - b. Enforcement and administrative costs associated with the civil action;
 - c. Costs of disposition of cultural resources, including as appropriate, costs of curation in perpetuity;
 - d. Costs associated with documentation, testing and evaluation of the cultural resource in order to assess the characteristics of the cultural resource and plan for its restoration; and
 - e. Costs of any additional mitigation measures the Resources Committee deems appropriate to implement.
- 2. Assessment of Treble Damages. In addition to the actual damages, the Resources Committee may, at its discretion, assess damages of up to three (3) times the amount of the actual damages.
- 3. Seizure of Equipment and Cultural Resources. The citing officer shall seize all cultural resources in the possession of any individual cited under § 1031 of this Act, together with any other property used for or related to the violation in the possession of the individual cited, as the officer may deem necessary to obtain payment of any civil assessment.
- 4. Forfeiture of Cultural Resources and Property. After hearing before the Resources Committee:
 - a. Any cultural resources obtained in violation of this Act shall be forfeited to the Navajo Nation;
 - b. Any other property seized in accordance with § 1038(D) (3), shall be released to the owner upon timely payment of any related civil assessments;
 - c. Any seized property shall be forfeited to the Navajo Nation if the assessment has not been paid within 15 days of the hearing at which the civil assessment was levied or pursuant to this Act, whichever is later. Any such forfeiture shall be limited to the amount of the civil assessment. Any property remaining after forfeiture of property up to the value of the assessment shall be returned to the owner.
- E. Civil assessments imposed under this part shall be reserved solely for the purposes of restoring damaged cultural resources and for meeting the purposes of this Act and shall be deposited in the Historic Preservation Revolving Account for disbursement in accordance with Tribal budgetary procedures.
- F. Any individual assessed by the Resources Committee pursuant to § 1038 of this Act shall have the right to appeal the decision of the Resources Committee to the Navajo Nation District Court as follows:
 - 1. Any appeal must be filed in writing with the Navajo Nation District Court within thirty days of notification of the action of the Resources Committee;
 - 2. The review by the Navajo Nation District Court shall be limited to:
 - a. Ensuring that the appellant received due process of law; and
 - b. Ensuring that any rights the individual may have under the Navajo Nation Bill of Rights and the Indian Civil Rights Act (25 U.S.C. § 1301-1341) were observed; and
 - 3. Consideration by the Navajo Nation District Court shall be limited to review of the administrative record created before the Resources Committee during the hearing before it.

§ 1041. Appeals

- A. Any administrative action taken by the Preservation Officer pursuant to this Act which is a final action made on behalf of the Navajo Nation may be appealed by any party directly and adversely affected by such action. Notice of appeal must be filed within 30 days of notification of the Preservation Officer's action.
- B. Within 90 days of the adoption of this Act, the Preservation Officer shall establish regulations governing appeals of administrative decisions reached under the authority of this Act. The regulations shall specify

the

procedures governing appeals, identify who may appeal, detail notification requirements, establish time limits for action on the part of all parties, enumerate documentation requirements, and include any other elements necessary to carry out the purposes of this Section.

- C. Any appellant adversely affected by the outcome of an appeal under regulations promulgated pursuant to § 1041(B) of this Act shall be entitled to review of the action in Navajo Nation District Court as follows:
1. Notice of an appeal under the provisions of this part must be filed with the Navajo Nation District Court within 30 days of receipt of notice of a final action by the Division of Natural Resources;
 2. Judicial review by the Navajo Nation District Court shall be limited to:
 - a. Ensuring that the appellant received due process of law, and
 - b. Ensuring that all rights of the appellant under the Navajo Nation Bill of Rights and the Indian Civil Rights Act (25 U.S.C. 1301-1341) were observed.
 3. Judicial review by the Navajo Nation District Court shall be limited to review of the administrative record created during the administrative appeals process.

§ 1051. Regulations, procedures, standards and guidelines

The Preservation Officer shall develop, promulgate, publish and implement such regulations, procedures, standards and guidelines necessary to implement the requirements of or to achieve the purpose of this Act.

§ 1061. Severability

If any provision of this Act or the application thereof to any person, court or circumstances is held invalid by a Navajo Nation or federal court, the invalidity shall not affect other provisions of this Act which can be given effect without the invalid provision or application and to this end; the provisions of this Act are severable.

NAVAJO NATION

POLICY FOR THE DISPOSITION OF CULTURAL RESOURCES COLLECTIONS



NAVAJO NATION HISTORIC PRESERVATION DEPARTMENT

**Approved: 4/22/08
Effective date: 4/29/08**

Table of Contents

1.	INTRODUCTION.....	1
2.	POLICY STATEMENT	1
3.	AUTHORITY	1
4.	DEFINITIONS	2
5.	COMPONENTS OF COLLECTIONS	4
5.1.	Material Remains	5
5.2.	Associated Records/Archival Materials.....	5
6.	ACQUISITION OF COLLECTIONS	6
6.1.	Intentional Excavation and Inadvertent Discovery	6
6.2.	Ethnographic Acquisition	7
6.3.	Return of Pre-existing Collections.....	7
6.4.	Return of Confiscated Collections	8
7.	PROSCRIBED COLLECTIONS.....	8
8.	ITEMS OF CULTURAL PATRIMONY.....	9
9.	OBTAINING INFORMATION AND ASSISTANCE	10
10.	DISPOSITION OF CULTURAL RESOURCES COLLECTIONS.....	10
10.1.	Collection Disposition	10
10.2.	Collection Repository	10
10.3.	Accessioning Collections.....	10
10.4.	Collection Disposition Fee Schedule	11
10.5.	Disposition Process.....	11
10.6.	Disposition Within the Project Area.....	11
10.7.	Disposition Outside of Established Project Boundaries	12
11.	ACCESS TO COLLECTIONS	12

1. INTRODUCTION

This policy establishes definitions, standards, procedures and guidelines to be followed for the disposition of cultural resources collections recovered on Navajo Nation Lands.

2. POLICY STATEMENT

It is the policy of the Navajo Nation to protect all cultural resources that it owns or that are under its jurisdiction. Under its obligation to the *Diyin diné'é* (Holy People) and as an expression of its sovereignty, the Navajo Nation will treat its cultural resources in a manner consistent with *Diné* (Navajo) values.

Hózhó, a natural state of harmony, beauty, and balance, is the very heart of the *Diné* way of life. The disturbance and/or removal of cultural resources disrupts *hózhó*. In order to avoid unnecessary disturbance to *hózhó*, it is the policy of the Navajo Nation to strongly discourage the excavation, disturbance or removal of any cultural resources unless there is a compelling need. When such disturbance occurs either accidentally or out of necessity, it is Navajo Nation policy to implement all prudent and feasible measures to return its' cultural resources to the cultural landscape.

Accordingly, the excavation of cultural resources may be permitted only after all alternative treatment measures (e.g., avoidance, protective fencing, project redesign, etc.) have been exhausted. When excavation or disturbance of cultural resources can not be avoided, such activities shall be carried out in the least intrusive and most expeditious manner possible.

When removal of material remains is completed, all appropriate analysis approved by the Historic Preservation Officer has been completed, and the resulting technical report accepted by the Historic Preservation Officer or his designee, the remains are to be promptly returned to the cultural landscape in accordance with this Policy.

The Navajo Nation Historic Preservation Department shall act on behalf of the Navajo Nation to achieve these objectives through the implementation of this Policy.

3. AUTHORITY

In accordance with Navajo Nation law and federal laws, including but not limited to: the Treaty of June 1, 1868 between the Navajo Nation and the United States, 156 Stat. 667; various United States statutes and executive orders expanding the Navajo Indian reservation or otherwise confirming Navajo Nation ownership of Navajo Nation lands and all resources appurtenant thereto; the Archaeological Resources Protection Act of 1979, 16 U.S.C. 470aa-mm (ARPA); the National Historic Preservation Act of 1966, 16 U.S.C. 470. *et seq.* (NHPA); and the Native American Graves Protection and Repatriation Act, 25 U.S.C. 3001, *et seq.* (NAGPRA), the Navajo Nation owns all material remains located on, discovered on, excavated, collected or

removed from Navajo Nation Lands, except under limited circumstances where such law or laws expressly provide that such items are owned by private individuals.

Navajo Nation law and federal law further provide that the Navajo Nation controls the ultimate disposition of material remains owned by the Navajo Nation. Nothing in federal law severs the Navajo Nation's ownership and control of cultural resources from Navajo Nation lands, even when those items have been collected under properly approved federal permits issued under the Antiquities Act of 1906 or ARPA.

Where associated records/archival materials are or have been prepared and assembled pursuant to the Navajo Nation Cultural Resources Protection Act, 19 N.N.C. 1001 *et seq.* (CRPA) or in the absence of a valid permit under ARPA, the Antiquities Act or other applicable law, the Navajo Nation owns such associated records/archival materials. Where associated records/archival materials are or have been prepared and assembled pursuant to a valid Navajo Nation cultural resources permit (and where applicable, a federal permit), the Navajo Nation retains ownership both of those associated materials and any and all intellectual property rights relating to those items.

In accordance with these rights of ownership of material remains, associated records/archival materials, and the cultural heritage and intellectual property of the Navajo Nation this policy reflects Navajo Nation law concerning the disposition of material remains and associated records/archival materials in the possession of the United States, which nevertheless remain subject to the paramount rights of the Navajo Nation.

4. DEFINITIONS

For the purpose of this policy,

4.1. Associated Records/Archival Materials means original records (as well as any copies thereof) that were or are prepared, assembled, etc. to document efforts to locate, evaluate, document, study, preserve or recover cultural resources.

4.2. Collection means material remains that are excavated, collected or removed from a cultural resource, along with any associated records/archival materials. Some collections may consist of archival materials only.

4.3. Cultural Landscape (*Diné Bikéyah*) means the places that embody cultural meaning for the Diné, whether located within or outside the boundaries of the Navajo Nation. For the purpose of this policy, "cultural landscape" includes Diné individuals and communities.

4.4. Cultural Patrimony means objects having ongoing historical, traditional or cultural importance central to Diné traditional practitioners or clans (rather than property owned by an individual under the principles of Navajo common law) and which, therefore, cannot be alienated, appropriated or conveyed by any individual.

4.5. Cultural Property means any cultural resources deemed to be important enough to warrant listing in the Navajo Register, 19 N.N.C.1011.

4.6. Cultural Resource means any product of human activity or any object or place given significance by human action or belief, 19 N.N.C. 1003.D.

4.7. Curation/Curatorial Services means managing and preserving a collection according to professional museum and archival practices, including;

- (i) Inventorying, accessioning, labeling, and cataloging a collection;
- (ii) Identifying, evaluating, and documenting a collection;
- (iii) Storing and maintaining a collection using appropriate methods and containers, and under appropriate environmental conditions and physical security controls;
- (iv) Periodically inspecting a collection and taking such actions as may be necessary to preserve it;
- (v) Providing access to and facilities for study of a collection; and
- (vi) Handling, cleaning, stabilizing and conserving a collection in such a manner as may be necessary to preserve it.

4.8. Deaccession means to formally and permanently withdraw material remains from a collection.

4.9. Diné means the Navajo People.

4.10. Hataa_ii means a traditional Diné chanter/healer/practitioner recognized as such by his or her community.

4.11. Historic Preservation Department (HPD) means the Navajo Nation Historic Preservation Department as established by CRPA 19 N.N.C. 1004.

4.12. Historic Preservation Officer means the Department Manager of the Historic Preservation Department or his/her designee.

4.13. Inadvertent Discovery means finding, locating, observing, uncovering, unearthing, learning about through conversation, discussion or interview or otherwise detecting cultural resources when such discovery was not the original intent of the activity.

4.14. Intentional Excavation means the removal of material remains from their original context for any purpose authorized by the HPD pursuant to CRPA.

4.15. Material Remains means artifacts, objects, specimens, and other physical evidence that are excavated or removed in connection with efforts to locate, evaluate, document, study, preserve or recover a prehistoric or historic cultural resource.

4.16. Museum Director means the Director of the Navajo Nation Museum.

4.17. Navajo Nation Lands means all lands or interests in land owned by or held by the Navajo Nation, whether held by original title, held in fee simple or held in trust by the United States, whether restricted or unrestricted, and whether within or outside the boundaries of the Navajo Nation.

4.18. Navajo Nation Museum means the museum established within the Historic Preservation Department by the Navajo Nation Museum Plan of Operation approved November 14, 1995, by Resolution No. GSCN-92-95.

4.19. Offering means a gift made to Diyin diné'é (the Holy People) or at holy places including, but not limited to; precious gems, feathers, songs, prayers, carved items, incense/smoke, pollen, cornmeal, botanical items, water or minerals.

4.20. Repository means a facility such as a museum, archaeological center, laboratory or storage facility managed by a university; college, museum, other educational or scientific institution; a Federal, State, or local Government agency or Indian Tribe that can provide professional, systematic, and accountable curatorial services.

4.21. Sacred Objects means specific ceremonial objects that either have been offered to Diyin diné'é or are needed for the practice of healing ceremonies or traditional Native American religions by their present-day adherents.

4.22. Site means the location of the physical remains of human activity, 19 N.N.C. 1003.O.

4.23. Special Collection means any collection or portion of a collection that requires special disposition, such as sensitive information; confidential information; fragile items; items that should only be viewed/used by persons of a particular age or gender, and/or items that can only be viewed/used at certain seasons of the year.

4.24. Sponsor means the agency official or an individual in a private capacity who has decision-making authority over a particular undertaking, 19 N.N.C. 1003.

4.25. Tribal Archaeologist means the Department Manager of the Navajo Nation Archaeology Department, 19 N.N.C. 1005.

4.26. Undertaking means any project, activity or program that can result in changes in the character or use of cultural properties. The project, activity or program must be under the direct or indirect jurisdiction of a Sponsor, 19 N.N.C. 1003.S.

5. COMPONENTS OF COLLECTIONS

Collections include material remains that are excavated or removed from a prehistoric or historic cultural resource, along with associated records/archival materials that are prepared or assembled in connection with the survey, excavation, removal or other study. Some collections may consist of archival materials only.

5.1. Material Remains

Classes of material remains (and illustrative examples) that may be in a collection include, but are not limited to:

- (i) Components of structures and features (such as houses, pit structures, sweathouses, hornos, hearths, mills, fortifications, raceways, earthworks, and mound(s);
- (ii) Intact or fragmentary artifacts of human manufacture (such as tools, weapons, pottery, basketry, and textiles);
- (iii) Intact or fragmentary objects used by humans (such as rock crystals, feathers, and pigments);
- (iv) By-products, waste products or debris resulting from the manufacture or use of cultural or natural material (such as slag, dumps, fire-cracked rock, cores, and debitage);
- (v) Organic material (such as plant and animal remains);
- (vi) Components of petroglyphs, pictographs, intaglios or other works of artistic or symbolic representation;
- (vii) Environmental and chronometric specimens (such as pollen, seeds, wood, shell, bone, charcoal, tree core samples, soil, sediment cores, obsidian, volcanic ash, and baked clay); and
- (viii) Paleontological specimens that are found in direct physical relationship with a cultural resource.

5.2. Associated Records/Archival Materials

Depending on the type of project, the following classes of associated records/archival material are illustrative examples of the materials that may be in a collection:

- (i) Records relating to the identification, evaluation, documentation, study, preservation or recovery of a cultural resource, such as, site forms, field notes, drawings, maps, photographs, slides, negatives, films, video and audio tapes, oral histories, artifact inventories, laboratory reports, computer cards and tapes, computer disks and diskettes, information stored on other forms of electronic media, printouts of computerized data, manuscripts, reports, and accession, catalog, and inventory records;
- (ii) Records collected by ethnographic means, such as interview notes, genealogies, tape recordings, video recordings, oral histories, and photographs;
- (iii) Records relating to the identification of a cultural resource using remote sensing methods and equipment, such as, satellite or aerial photography and imagery, side scan sonar, magnetometers, and ground penetrating radar;

(iv) Public records essential to understanding the cultural resources, such as, deeds; survey plats; military and census records; birth, marriage, and death certificates; immigration and naturalization papers; tax forms and reports;

(v) Archival records necessary to understanding the cultural resources, such as historical maps, drawings and photographs; manuscripts; architectural and landscape plans; correspondence; diaries; ledgers; catalogs; and receipts; and

(vi) Administrative records relating to the survey, excavation or other study of the cultural resource, such as scopes of work, requests for proposals, research proposals, contracts, antiquities or ARPA permits, reports, popular summaries, documents relating to compliance with section 106 of the NHPA, and National Register of Historic Places nomination and determination of eligibility forms.

Oral history material forms a special class of associated records/archival materials. These materials include tape-recorded and/or video-recorded interviews or transcripts of interviews with individuals or group of individuals that provide information on Diné life stories or local community history.

6. ACQUISITION OF COLLECTIONS

The Navajo Nation assumes responsibility for cultural resource collections in a variety of ways. Such collections may be the result of intentional archaeological excavation, inadvertent discovery, and/or ethnographic investigation. Cultural resource collections may also be returned to the Navajo Nation by museums, libraries, researchers, federal and other agencies, private individuals, contractors, and others. Some collections may be obtained as a result of legal proceedings (e.g., the return of confiscated material).

6.1. Intentional Excavation and Inadvertent Discovery

(i) Intentional Excavation. (a) The excavation of cultural resources may only occur after all alternative treatment measures (e.g., avoidance, protective fencing, project redesign, etc.) have been considered and found to be infeasible. When mitigation is necessary, it shall be carried out in the least intrusive and most expeditious manner possible

(b) Sponsors and their agents shall consult with HPD and obtain the proper permits prior to collecting and/or conducting excavation and removal of cultural resources. To the extent feasible, research designs shall take into account the principles and traditional concerns inherent in this Policy. Sponsors and their agents shall utilize sampling and other strategies as appropriate and feasible in order to minimize disturbance of cultural resources and to minimize the size of collections. All mitigation measures for archaeological resources must be archaeologically justified, necessary and defensible, systematic, thorough, as well as culturally respectful.

(ii) Inadvertent Discovery. Sometimes cultural resources are discovered inadvertently, i.e., during the course of activities which are not otherwise intended identification, evaluate, and/or

treat cultural resources. When cultural resources are inadvertently discovered, (a) all work in the vicinity (within 50 feet/15 meters) of the resource shall be halted and the resource secured from further damage. (b) The Historic Preservation Officer shall be consulted regarding the importance of the resource and feasible means to avoid damage to it. (c) If the resource can not be avoided, damage to the resource shall be mitigated in accordance with the decision of the Historic Preservation Officer and under the terms of a permit issued, as necessary, in accordance with section 6.1(i)(b) above.

6.2. Ethnographic Acquisition

Sponsors and their agents shall consult with HPD and obtain the proper permits before initiating ethnographic activities. To the extent feasible, research designs shall take into account the principles and traditional concerns inherent in this Policy.

Sacred and ceremonial information is held in trust by individuals for the Navajo Nation as a whole. Information regarding sensitive cultural practices, the location of sacred or culturally significant places is transmitted orally and is not intended to be written down. Traditional Diné do not make permanent records or representations of sacred or ceremonial stories, songs and sandpaintings because such permanent records might fall into the hands of people without proper instruction or individuals who might misuse the knowledge and, in either instance, may consequently harm themselves or others. Similar concerns surround the collection of personal information in life histories. Some kinds of information should never be collected or disseminated. Other types of information can only be shared during particular seasons of the year or with persons of a particular age, maturity level or gender, etc. Individuals who are required to collect and to disseminate such culturally sensitive information through necessary technical reports shall consult with *and* obtain prior written consent from the Historic Preservation Officer

Personal information provided by an interviewee belongs to that individual. Such information shall only be collected *after* obtaining the informed written consent of the interviewee and with their full understanding of its intended use and, if applicable, the nature, type and degree to which that information may have to be disseminated.

Confidential information shall not be released by Sponsors, their agents or others without both the informed written consent of the individual who provided it *and* the prior written approval of the Historic Preservation Officer. Confidential and other sensitive information (including locational data) shall be included in reports only as removable, confidential appendices. Audio and/or video tapes of interviews, transcripts, field notes, and other records and materials directly derived from the project shall not be retained by the Sponsor, its agent or others but shall become the property of the Navajo Nation and shall be submitted to the Historic Preservation Officer for appropriate disposition. Interviewees shall be made aware that information they provide will become part of collections and may be maintained in perpetuity.

6.3. Return of Pre-existing Collections

There are numerous collections of both sacred and culturally significant Navajo Nation materials in the possession of universities and colleges, museums, libraries, federal agencies, other agencies, researchers, private individuals, contractors, and other individuals. Such collections are of interest and concern to the Navajo Nation. It is the intent of the Navajo Nation to return portions or all of these collections for appropriate disposition or curation by the Navajo Nation. The repatriation of human remains, associated funerary items, and sacred objects will be addressed in a separate Policy.

6.4. Return of Confiscated Collections

Disposition of collections obtained as a result of legal proceedings (e.g., confiscated items) shall be dealt with by the Historic Preservation Officer.

7. PROSCRIBED COLLECTIONS

In addition to general Diné prohibitions regarding disturbance of prehistoric remains, and a preference for leaving the cultural landscape intact, there are also traditional prohibitions regarding certain types of material that should *never, under any circumstances*, be collected; including items that (1) are sacred or of a ceremonial nature; (2) appear to be part of a ceremonial offering; or (3) are in any way related to human burial, including associated and isolated funerary remains such as ceramic vessels, ornaments, wash basins, eating utensils, broken shovels, etc. Sponsors, their agents, and others shall pay particular attention to locations and shall also avoid disturbance of remains that are or appear to be out of the ordinary, such as cairns, shrines or grouped pieces of precious stones.

To avoid inadvertent collection of sacred or ceremonial objects, Sponsors, their agents, and others shall conduct necessary surface collections with great care. As part of the research process, Sponsors, their agents, and others shall make a reasonable and good faith effort to gather appropriate and adequate contextual information (usually by way of ethnographic interviews) on locations which may be sacred, ceremonial or where other culturally sensitive materials might be thought to be present.

Sponsors, their agents, and others shall not collect the following:

1. *Hadaa_t'é ánídaalyaa'ígíí*, figurines typically constructed out of wood, cornmeal, gourd, clay, and/or other botanical materials. These figurines may be anthropomorphic forms or representations of quadrupedal, reptilian or amphibian beings, which have been created to heal ailments for a specific Navajo person. Such figurines are not to be touched, handled or removed. However, should removal appear to be absolutely necessary for the purposes of an undertaking, an *hataa_ii* must be consulted for advice regarding appropriate treatment, and the removal and disposition must be specially approved in writing by the

POLICY FOR THE DISPOSITION OF CULTURAL RESOURCES COLLECTION

Historic Preservation Officer. Evidence of the consultation, together with the *hataa_ii*'s advice or opinion must be provided to the Historic Preservation Officer.

2. Offerings of any kind; including; any grouping of *nt_iz* – pieces of shell, turquoise, and jet, which may be found in association other minerals and with botanicals; *k'eet'áán*-botanical stems or pegs noticeably cut, notched, and decorated in association with the ladder, feathers, and cotton, and beads. Such offerings are not to be touched, handled or removed. However, should removal appear to be absolutely necessary for the purposes of an undertaking, a *hataa_ii* must be consulted for advice regarding appropriate treatment. The removal and disposition must be specially approved in writing by the Historic Preservation Officer. Evidence of the consultation, together with the *hataa_ii*'s advice or opinion must be provided to the Historic Preservation Officer.
3. Retired *Jish* – sacred objects; examples include but are not limited to, items showing evidence of manufacture or human alteration, wood products, cut, carved, and/or shaped; pieces of prepared buckskin or leather-thongs, strips, pouches, bags, etc.; lithics; pottery; tobacco pipes; botanicals; gourds; animal and bird parts-hide, claws, horns, hooves, feathers, bone, etc.; shells; cotton string; yarn; etc. Such objects are not to be touched, handled or removed. However, should removal appear to be absolutely necessary for the purposes of an undertaking, a *hataa_ii* must be consulted for advice regarding appropriate treatment, and the removal and disposition must be specifically approved in writing by the Historic Preservation Officer. Evidence of the consultation, together with the *hataa_ii*'s advice or opinion must be provided to the Historic Preservation Officer.
4. Human remains in any context.
5. Funerary items, including items potentially associated with human burials such as shovel heads, broken shovels, dishware of all sorts, saddles or portions of saddles, burned or unburned clothing, wash basins, etc.
6. Collection of information through ethnographic interviews can occur only after obtaining the interviewee's informed, written consent.

Sacred objects and offerings shall not be photographed or sketched without the prior written permission of the Historic Preservation Officer. Should removal or relocation of sacred objects or offerings be unavoidable, the Sponsor or its agent shall consult with and obtain the prior written approval of the Historic Preservation Officer.

8. ITEMS OF CULTURAL PATRIMONY

In accordance with NAGPRA and upon notice and formal request of the governing council or properly authorized representative of another federally recognized Indian tribe, government-to-government negotiation shall be initiated to return to such tribe objects of cultural patrimony belonging to that tribe that are in the possession of the Navajo Nation. Sacred objects and objects

of cultural patrimony shall be expeditiously returned where (1) the requesting party is either the individual who originally owned the object or a direct lineal descendant of an individual who owned the object; or (2) the requesting Indian tribe can show that the object was owned or controlled by the tribe; or (3) the requesting Indian tribe can show that the object was owned or controlled by a member thereof, and that no identifiable lineal descendants have made a claim for the object. The place and manner of return of such objects shall be negotiated on a case-by-case basis. Each requesting Indian tribe shall afford the Navajo Nation reciprocity consistent with this policy.

9. OBTAINING INFORMATION AND ASSISTANCE

If Sponsors, their agents or others need assistance or information regarding sacred or culturally sensitive material, measures for protecting themselves or others against the potential ill effects of contact with sacred items (some of which are imbued with “power” that may be dangerous if inappropriately handled), traditional concern, interview methods, “culturally appropriate” activities or behavior, the role of Hataa_ii, and etc., they should contact the Historic Preservation Department.

10. DISPOSITION OF CULTURAL RESOURCES COLLECTIONS

10.1. Collection Disposition

Normally, collections of material remains will not be curated but will be returned to the cultural landscape. The Navajo Nation will curate or archive records. When the Navajo Nation accepts a collection for curation or archiving, it shall collect a fee to cover the expenses associated with that activity and the maintenance of the collection.

10.2 Collection Repository

The Navajo Nation Museum shall be the repository of cultural resources for those collections or parts of collections not returned to the cultural landscape that are obtained on Navajo Nation Lands. Records detailing disposition of collections shall be maintained and safeguarded by the Historic Preservation Officer or the Navajo Nation Museum.

10.3 Accessioning Collections

Sponsors, their agents, and others shall ensure that all parts of a collection to be accessioned by the Navajo Nation Museum are properly prepared for accessioning. Procedures for inventorying, identifying, evaluating, handling, cleaning, analyzing, labeling, cataloging, packaging, and storing collections shall be in accordance with standard professional practices. The Museum Director shall provide information including guidelines for preparing the collection for accessioning, as necessary. Collections deposited with the Navajo Nation shall include all information derived from the project that produced them.

Navajo Nation sacred and ceremonial objects shall only be dealt with in the context of repatriation activities. In the event that sacred or ceremonial objects are inadvertently collected, Sponsors, their agents, and others shall contact the Historic Preservation Officer and proceed as directed.

10.4 Collection Disposition Fee Schedule

The Museum Director shall develop and maintain a schedule of fees that shall assessed for collections accepted by the Navajo Nation Museum pursuant to this Policy. Fees shall be used to defray the cost of collection disposition. Fees may be waived by the Museum Director with the concurrence of the Historic Preservation Officer.

10.5 Disposition Process

Prior to making any decisions regarding disposition, the Museum Director shall ensure that the collection is properly assembled, inventoried, and accessioned. If material remains or associated records are missing, it shall be the project Sponsors', their agents or others responsibility to make a good faith effort to located the missing items and append them to the collection.

Some collections consist exclusively of original records (or copies thereof) that are prepared, assembled, and document efforts to locate, evaluate, document, study, preserve or recover a cultural resource; that is, of archival materials only (including audiovisual recordings). Such collections shall be curated in their entirety. The Museum Director shall insure that these collections are managed and preserved according to professional museum and archival practices. Collection management shall take into consideration traditional concerns, as appropriate.

Most cultural resource collections will include both material remains and associated records/archival materials. If the collection contains material remains that the Historic Preservation Officer determines should be held in perpetuity (e.g., items of exceptional historical or cultural significance, unusual items, museum quality items or representative samples from collections that may be important to maintain), the Museum Director shall ensure that these items are properly curated. All associated records shall be curated. Such collections (or portions thereof) shall be managed and preserved according to professional museum and archival practices. Collection management shall take into account appropriate Diné traditional concerns.

If the Historic Preservation Officer determines that certain material remains (e.g., sacred objects, ceremonial items, complete projectile points, complete tools, or complete ground stone implements) should be transferred to *Hataalii* or others for cultural reuse, the Historic Preservation Officer shall identify the appropriate recipient(s) and shall document the process by which the items are transferred. All documentation, including a Transfer of Caretaker Responsibility Form, shall be appended to the associated records for the collection and properly curated/archived.

10.6 Disposition Within the Project Area

To the greatest extent possible, material remains that are intentionally excavated as part of an undertaking shall be returned to the cultural landscape. Material remains should be replaced within the boundaries of the project area but outside the construction zone and in locations that are unlikely to be disturbed in the future. Material remains should be placed far enough below the surface of the earth so that items will neither be visible nor exposed by erosion or other disturbance.

They should not be placed in containers of any sort but should be allowed to continue to weather naturally. The items should be permanently marked in a manner approved by the Historic Preservation Officer to make it clear that they have been reburied. Sponsors or their agents are responsible for returning material remains to the cultural landscape unless the Historic Preservation Officer determines that the Navajo Nation will take responsibility for this activity. The Historic Preservation Officer shall ensure that the actual procedures used for reburial of materials remains are fully documented, including preparation of maps showing the locations of the reburied items. All documentation (including maps) shall be appended to the associated records for the collection and properly curated/archived.

To the greatest extent possible, material remains that were obtained through means other than intentional excavation (e.g., inadvertent discovery, return of pre-existing collections, or confiscation) shall also be returned to the cultural landscape. In such cases, the Historic Preservation Officer shall determine the appropriate location and process for disposition. The Historic Preservation Officer shall ensure appropriate involvement of individuals with surface use rights (if any); as well as the actual procedures used for return of the remains to the cultural landscape are fully documented (including maps, if appropriate.) All documentation (including maps) shall be appended to the associated records for the collection and properly curated/archived.

10.7 Disposition Outside of Established Project Boundaries

It is Navajo Nation policy to return remains to the cultural landscape as near as possible to the location from which they were removed. When it is not prudent or feasible to rebury within the approved project boundaries, the Sponsor or its agents must identify a suitable area for reburial. The location selected is subject to the approval of the Historic Preservation Officer.

The Sponsor or its agent must obtain the written consent of individuals (if any) with surface use rights recognized by the Navajo Nation when an area outside the project boundaries is proposed for reburial. The Sponsor or its agents must submit documentation of land user consent when requesting approval of the reburial location.

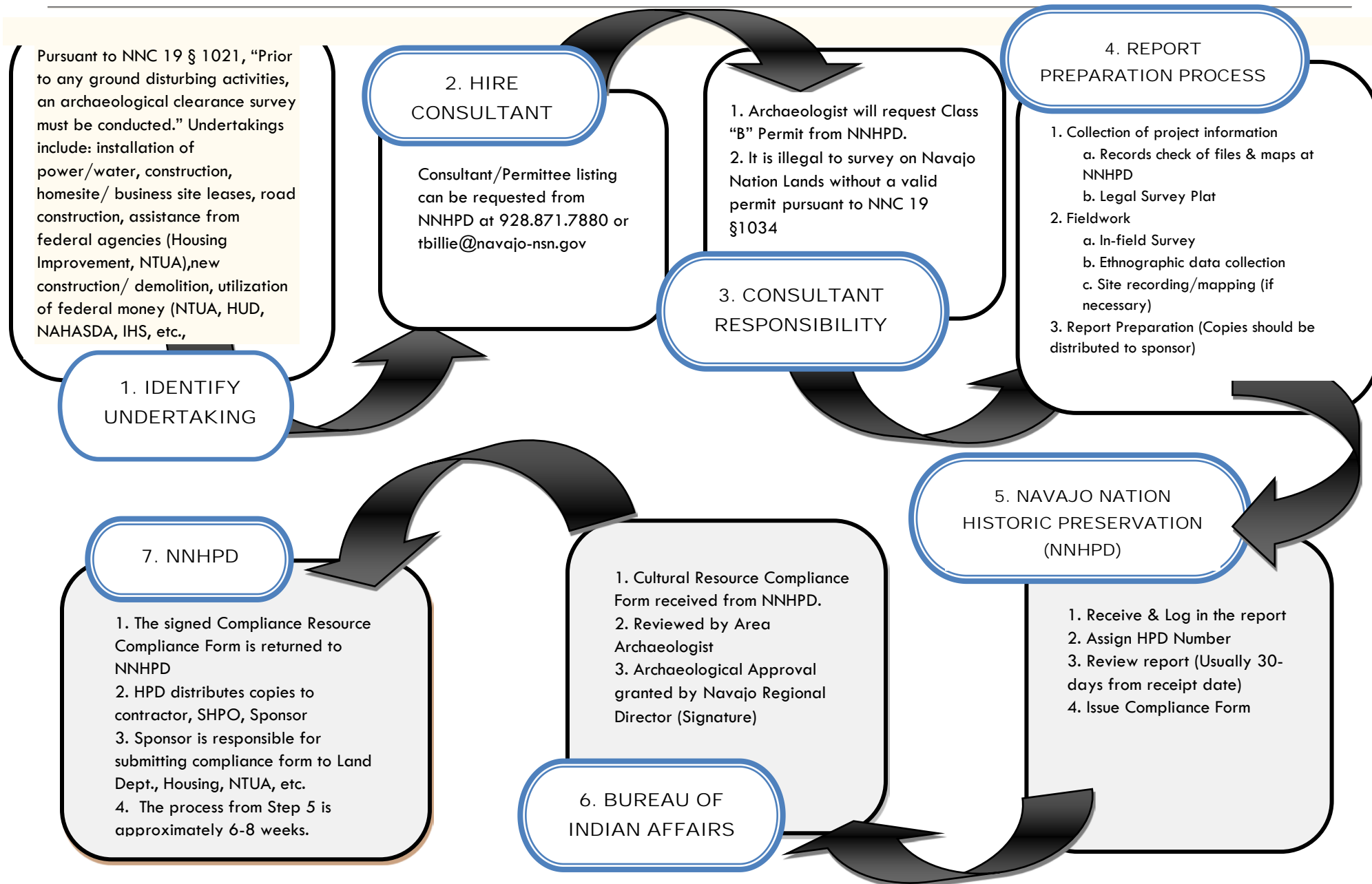
If there are no individuals with surface use rights legally recognized by the Navajo Nation, the Sponsor is responsible for obtaining the approval of the Chapter in which the proposed reburial is to be located.

11. ACCESS TO COLLECTIONS

The Historic Preservation Officer shall be responsible for establishing procedures and policies related to access to collections. Collections shall be made available for educational, scientific and traditional uses, subject to such terms and conditions as are necessary to protect and preserve the condition, research potential, religious or sacred importance, and uniqueness of the collection. Access to sacred, confidential, and other highly sensitive information may be limited on a seasonal or other basis. Access information shall be made available to individuals requesting access.

Collections (or portions thereof) may be loaned to other repositories, institutions or individuals for educational purposes, research, training, display, or other culturally appropriate purpose. Written loan agreements shall be prepared between the repository and the borrower that specify (a) the collection or item being loaned; (b) the purpose of the loan; (c) the length of the loan; (d) and restrictions on use of the collection or item; (e) the manner in which the collection or item must be handled; (f) requirements for insuring the collection or item being borrowed against loss, damage or destruction during transit or while the borrower's possession; and (g) any fees or charges associated with the loan and use of the collection or item.

In certain circumstances, the Historic Preservation Officer may decide to limit access to all or parts of the curated collection because it includes particularly sensitive information, confidential data, fragile items, items that should only be viewed or used during certain seasons of the year or by persons of a particular age or sex, and so forth. Such decisions shall be documented.



THE NAVAJO NATION
HISTORIC PRESERVATION DEPARTMENT
Cultural Resource Compliance Section

PO Box 4950, Window Rock, Arizona 86515
TEL: (928) 871-7198 / 7134 **FAX:** (928) 871-7886 **WEBSITE:** hpd.navajo-nsn.gov

To All Permittees and/or Contractors:

The Navajo Nation Historic Preservation Department, Cultural Resource Compliance Section is the caretaker of a unique collection of data for the Navajo Nation and the Navajo People. Due to the disappearance of cultural resource reports, archival maps, and in order to preserve this unique data, HPD is implementing the following copy policy:

1. There will be no Xerox copying of the USGS Quadrangle maps by archaeological contractors or researchers. **NO EXCEPTIONS.** Copying includes, scanning or any other electronic data collection or the use of personal copying machines.
2. Copying of the cultural resource reports will be limited to the following.
 - A. Small Reports (i.e. AIRS form reports)
 - a. The AIRs form
 - b. Site forms
 - c. Site maps
 - d. Compliance document
 - B. All other reports (narratives)
 - a. Title page
 - b. Site forms
 - c. Site maps
 - d. Compliance document

Failure to conform to these conditions may result in suspension or revocation of this privilege and may affect the permittee's ability to obtain annual and project specific-permits from the Historic Preservation Department.

If you have any concerns or questions, please do not hesitate to contact our office.

Sincerely,
HPD/CRES

Appendix H. Sample Monitoring Datasheets

Treatment Monitoring Report

[illegible]

Appendix H. Sample Monitoring Datasheets

[illegible]

A-251

Photo Monitoring Data Collection Sheet					
	Photo # 1	Photo #2	Photo #3	Photo #4	Photo #5
Date					
Time					
Weather					
Location					
Subject and Purpose of photo					
Camera					
Frame #'s					
Photo Label					
Tripod/Camera Height					
Marker					
Compass Bearing					
Latitude					
Longitude					
Error					
Photographer					
Note Taker					
Description of Location (How to find the spot)					
Reference Photos					

Appendix I. Federal, State and Navajo Contact Information

Arizona Invasive Species Advisory Council (AISAC)

<https://www.azgfd.com/wildlife/invasivespecies/>
invasivespecies@azgfd.gov

Arizona Department of Environmental Quality

1110 W. Washington St.
Phoenix, AZ 85007
(800)234-5677

Arizona Department of Transportation

1611 W. Jackson Street, EM02
Phoenix, AZ 85007
(602)712-8669

Bureau of Land Management – Farmington Field Office

<https://www.blm.gov/office/farmington-field-office>
6251 College Blvd. Suite A
Farmington, NM 87402
(505)564-7600

National Park Service

Flagstaff Area Parks (Wupatki NM, Walnut Canyon NM, Sunset Crater NM)
6400 N. Hwy. 89
Flagstaff, AZ 8600
(928)526-0502

Glen Canyon National Recreation Area
P.O. Box 1507
Page, AZ 86040-1507
(928)608-6205

Grand Canyon National Park
P.O. Box 129
Grand Canyon, AZ 86023
(928)638-7888

Canyon de Chelly National Monument
P.O. Box 588
Chinle, AZ 86503
(928)674-5500

El Morro National Monument
HC 61 Box 43

Ramah, NM 87321-9603

Hovenweep National Monument

McElmo Route

Cortez, CO 81321

Hubbell Trading Post National Historic Site

P.O. Box 150

Ganado, AZ 86505

(928)755-3475

Navajo National Monument

HC 71, Box 3

Tonalea, AZ 86044-9704

(928)672-2700

Petrified Forest National Park

P.O. Box 2217

Petrified Forest, AZ

(928)524-6228 ext. 225

Rainbow Bridge National Monument

P.O. Box 1507

Page, AZ 86040-1507

Navajo Nation Environmental Protection Agency

<https://www.navajoepa.org/main/>

Admin Building No. 2695 Window Rock Blvd.

P.O. Box 339

Window Rock, AZ 86515

Administration: (928)871-7692

Air and Toxics Office

Pesticide Program (928) 729-7810

Radon Program (928) 871-6813

Air Quality Control Program Office

Route 112 N. Bldg. #2427

Fort Defiance, AZ 86504

(928)729-4246

Operating Permit Program Office

Route 112 N. Bldg. #2837

Fort Defiance, AZ 86504

(928)729-4096

Surface and Groundwater Protection Department:

Water Quality/NPDES Program (928) 871-7715

Public Water System Supervision Program (928) 871-7755

Navajo Forestry Department

P.O. Box 230

Fort Defiance, AZ 86504

(928) 729-4007

Navajo Nation Historic Preservation Department

<http://www.hpd.navajo-nsn.gov/>

P.O. Box 4950

Window Rock, AZ 86515

(928)871-7198

Navajo Nation Department of Fish and Wildlife

<http://www.nndfw.org/>

P.O. Box 1480

(928)871-6450

Navajo Nation Parks and Recreation Department

<http://www.navajonationparks.org>

P.O. Box 2520

Window Rock, AZ 86515

(928)871-6647

Navajo Tribal Utility Authority

P.O. Box 170

Fort Defiance, AZ 86504

(800)528-5011

New Mexico Department of Transportation

1120 Cerrillos Road

Santa Fe, NM 87504

(505) 827-5161

New Mexico Environment Department

Gallup District Office

905 Metro Avenue

Gallup, NM 87301

(505)722-4160

Farmington District Office

3400 Messina Drive, Suite 5000

Farmington, NM 87402
(505)566-9741

New Mexico State University Cooperative Extension

Cibola County Extension Office
551 Washington Ave.
Grants, NM 87020
(505)287-9266

McKinley County Extension Office
2418 E Hwy 66
PMB 470
Gallup, NM 87301
(505)863-3432

San Juan County Extension office
213-A S. Oliver Drive
Aztec, NM 87410
(505)334-9496

University of Arizona – Cooperative Extension

Shiprock Office
East NM Highway 64
NNAPA Building
Shiprock, NM 87420
(505)368-1028

Tuba City Office
The Navajo Nation
P.O. Box 126
Tuba City, 86045-0126
(928)401-0925

Window Rock Office
Window Rock Fairgrounds
Dept. of Agriculture 121D
Window Rock, AZ 86515
(928)871-7686

U.S. Army Corps of Engineers – Albuquerque District (New Mexico)

<http://www.spa.usace.army.mil/>

4101 Jefferson Plaza NE
Albuquerque, NM 87109
(505) 342-3171 – Main Office

(505) 342-3355 – Tribal Liaison
Email: cespa-pa@usace.army.mil

U.S. Army Corps of Engineers – Los Angeles District (Arizona)
<http://www.spl.usace.army.mil/>

925 Wilshire Blvd.

Los Angeles, CA 90017

(213)452-3333 – Main Office

(602)230-6949 – Regulatory Arizona Branch

U.S. Army Corps of Engineers – Sacramento District (Utah)
<http://www.spk.usace.army.mil/>

1325 J Street – Room 1513

Sacramento, CA 95814

(916)557-5100 – Main Office

(970)243-1199 ext. 15 – Tribal Programs

U.S. Environmental Protection Agency

eNOI website: <https://cdx.epa.gov/>

EPA Tribal Program Portal: <https://www.epa.gov/tribal>

U.S. EPA Navajo Certified Applicators: <https://www.epa.gov/pesticide-worker-safety>

U.S. EPA Region 9 Tribal Consultant

(415) 947-3054

USDA Natural Resource Conservation Service

Chinle Field Office

P.O. Box 490

Chinle, AZ 86503-0490

(928) 647-3612

Crownpoint Field Office

Code Talker/Chaco St.

Bldg 222, Rm 213

Crownpoint, NM 87313-2048

(505) 786-7094

Gallup Field Office

2330 East Hwy 66

Gallup, NM 87301-4769

(505) 722-4357 ext 3

(928) 697-8482

St. Michaels Field Office

Highway 264

St. Michaels, AZ 86511-0499

(928) 871-4528

U.S. Forest Service

Coconino National Forest

www.fs.usda.gov/coconino

1824 S. Thompson St

Flagstaff, AZ 86001

(928)527-3600

Kaibab National Forest

<http://www.fs.usda.gov/kaibab>

800 S 6th St.

Williams, AZ 86046

(928)635-8200

U.S. Office of Surface Mining Reclamation and Enforcement

P.O Box 25065

One Denver Federal Center #41

Lakewood, CO 80225

(303) 293-500

Utah Department of Environmental Quality

195 North 1950 West

P.O. Box 144810

Salt Lake City, UT 84114-4810

(801) 536-4400

Utah Department of Transportation

Region 4 East

708 S. 100 W.

Richfield, UT 84701

(435) 636-1470

Appendix J. Funding Sources

1. Arizona Water Protection Fund (AWPF)
1110 W. Washington, Suite 310
Phoenix, AZ 85007
Phone: (602) 771-8528
<https://www.azwfp.gov/>
2. North American Wetlands Conservation Act (NAWCA)
<https://www.fws.gov/birds/grants/funding-sources-and-how-to-apply.php>
3. National Fish and Wildlife Federation (NFWF)
1133 Fifteenth St., N.W., Suite 1100
Washington, D.C. 20005
Phone: (202) 857-0166
<http://www.nfwf.org/>
4. Natural Resources Conservation Service (NRCS)
<https://www.nrcs.usda.gov/wps/portal/nrcs/az/programs/financial/>
5. Partners for Fish and Wildlife
U.S. Fish and Wildlife Service
2321 W. Royal Palm Rd., Suite 103
Phoenix, AZ 85021
(602) 242-0210 (x250)
<http://www.fws.gov/partners/>
6. USFWS Tribal Wildlife Grants
<https://www.fws.gov/southwest/NAL/grants.html>
7. EPA Wetland Program Development Grant
<https://www.epa.gov/wetlands/region-9-wetland-program-development-grant-request-applications>
8. American Indian Environmental Office Tribal Portal- U.S. EPA
<https://www.epa.gov/grants/specific-epa-grant-programs>

USDA Grant Programs
<https://www.usda.gov/topics/farming/grants-and-loans>

9. Arizona Invasive Species Advisory Council
<https://dffm.az.gov/grants/forest-health/invasive-plant-grant>
10. Arizona Heritage Fund
(623) 236-7530
<https://www.azgfd.com/wildlife/heritagefund/grantapply/>

Appendix K. Project Planning Forms (BIA only)

Bureau of Indian Affairs – Invasive Species/Noxious Weed, Funding Criteria and Application Process

Applicant Eligibility

Eligibility is limited to Bureau of Indian Affairs field Agencies, federally recognized Indian Tribal Governments and Native American Organizations authorized by Indian tribal governments (Tribes and inter-tribal organizations authorized under P.L. 93-638).

Proposal Eligibility

- Proposals must provide the contact information for the Tribal project manager overseeing the project.
- The proposal budget cannot include tribal indirect rate. *Tribal indirect rate comes from a separate account and should be requested at the time you develop the budget with BIA, contracting officials (if selected for funding).*

Project Eligibility

Successful applications will focus on the management/control of invasive species on tribal trust lands, individual Indian allotment lands, or in areas managed by tribes through treaties or agreements.

Instead of focusing on the definition of “*Invasive Species*,” this program will focus on the damage caused to Tribal Trust Resources and leave it to the discretion of the applicant to describe whether the species is “invasive” or represents an instance in which a native species is behaving as an invasive species due to altered environmental conditions. This funding can cover all invasive species constituting noxious weeds in agricultural settings.

Funding focus can include:

1. **Planning** funding would allow tribes to participate in local/regional/national forums and/or planning efforts.
1. **Prevention** funding would provide for the prevention of invasive species from impacting tribal trust resources where such species are not already established.
1. **Implementation** funding would assist tribes in implementing management or other established protocols aimed at the control, management, or prevention of Invasive Species.

Funding requests can range from \$500 to \$250,000 per application. An application can include several cumulative invasive species projects per tribe. Proposals addressing more than one focus area may be combined into one proposal.

Ranking Criteria

All projects should focus on alleviating or preventing invasive species impacts on tribal natural resources.

Eligible projects will be ranked according to the following criteria:

- The scope to which a proposal provides the means of controlling or managing invasive species;
- The scale to which a management attempts to eradicate the invasive species, reduce the invasive species to the lowest level possible, or prevent the invasion of invasive species;
- The character of benefit to native species and other tribal natural resources;
- Reference to which the proposal demonstrates an awareness and ability to achieve environmental compliance (NEPA, ESA) and other permitting requirements.

All projects must focus on the reduction of invasive species populations to the lowest levels practicable.

This funding source is non-recurring. Thus, the goals of any proposed project should not rely on future funding.

How to Apply

Submit your proposal to the Regional office of the Bureau of Indian Affairs that services your area.

Proposals are due to your Regional office (contact info below) by close of business on January 29, 2022.

The proposal should clearly address the ranking criteria listed above and be limited to six pages maximum (not including letters of support/contributions).

Please submit a proposal in the following format:

I. Introduction/Background – Name of applicant, project name, project location, a brief background and description of the issue. This section should conclude with a brief statement summarizing your request.

I. Methodology – How you plan on accomplishing the task.

I. Budget - Need a detailed line item expenditure breakdown. Do not include contract support cost (indirect cost).

BIA Regional Contact List for Invasive Species Program Funding

Great Plains	Southern Plains	Eastern	Midwest	Eastern Oklahoma	Rocky Mt
Wendy Wells, Rangeland Management Specialist Wendy.wells@bia.gov	David Anderson, RES david.anderson@bia.gov	Keith Bluecloud & Harold Peterson (615) 564-6838 first.last@bia.gov	Albany Jacobson Eckert (612- 725-4529) Albany.jacobson@bia.gov	Bradley Peak (918) 781-4642 bradley.peak@bia.gov	David Hopkins, Rangeland Management Specialist David Hopkins@bia.gov
Address: BIA, Great Plains Region, Division of Natural Resources, MC 301, 115 4 th Ave. SE, Suite 400, Aberdeen, SD 57401	Address: BIA, P.O. Box 368, Anadarko, OK 73005	Address: BIA, 545 Marriott Dr. Suite 700, Nashville TN 37214	Address: BIA, 5600 W. American Blvd, Suite 500, Bloomington, MN 55437	Address: BIA, 3100 W. Peak Blvd. Muskogee, OK 74401	Address: BIA, Rocky Mountain Region, Division of Natural Resources, 2021 4 th Ave. North, Billings, MT 59101

Navajo	Southwest	Western	Pacific	Northwest	Alaska
Leonard Notah, Range Management Specialist leonard.notah@bia.gov	Waylon Denny - Branch Chief DESCRM waylon.denny@bia.gov	Chip Lewis, Regional Environmental Compliance Officer chip.lewis@bia.gov	Tevis.underwood@bia.gov 907-654-4343	Robert Compton - Rangeland Mgt. Spec. robert.compton@bia.gov	Rosalie Debenham, Fish and Wildlife Biologist rosalie.debenham@bia.gov

Address: BIA Navajo Region 301 W. Hill St. PO Box 1060 Gallup, NM 87305	Address: BIA, Southwest Region, 1001 Indian School Road, NW, Albuquerque, NM 87104	Address: BIA, Western Region 2600 N. Central Ave, 4 th Floor Mailroom, Phoenix, AZ 85004	Address: BIA, Sacramento Region, 2800 Cottage Way Sacramento, CA 95825	Address: Bureau of Indian Affairs 911 NE 11th Avenue Portland Oregon 97232	Address: BIA, P.O. Box 21647 Juneau, AK 99802
--	---	--	--	---	--

UNITED STATES
DEPARTMENT OF THE INTERIOR
Bureau of Indian Affairs
TIMBER CUTTING PERMIT

☐ Indian Free Use ☐ Allotted
☐ Indian Paid ☐ Tribal
☐ Non-Indian Paid

Permit No. _____

Permit Name: _____ Indian Reservation _____

Permission is hereby granted to _____, herein called the

Permittee, whose address is, _____,
(Address) (City, State, Zip Code)

to cut and remove timber designated by the Approving Officer, on or before _____
from the following tract(s) on which authority to grant timber permits has been obtained:

Area	Legal Description - County, Meridian	Acres	Original Allottee

Designated timber consists of species, product, volume, and rates as follows:

Parcel	Species and Product	Estimated Volume	Unit	Rate Per Unit	Total Value
TOTAL					\$ 0.00

The volumes shown above are estimates only and are not guaranteed. Payment for timber shall be made as follows:

I accept this permit and agree to comply with the foregoing conditions and with the standard and/or special provisions of this permit.

SIGNED: _____

Permittee

_____ Date

AUTHORIZED: _____

Tribal Official or Allottee

_____ Date

APPROVED: _____

Approving Officer

_____ Date

Title

This permit is issued under the following Standard Provisions:

1.0 DEFINITIONS

- 1.1 "Approving Officer" means the officer who approves the contract or their authorized representative.
- 1.2 "Superintendent" means the Superintendent or other Bureau official representing the Agency having jurisdiction over the logging unit or, the authorized representative.
- 1.3 "Officer in Charge" means the forest officer of highest rank assigned to the supervision of forestry work at the Agency having jurisdiction over the logging unit, or his or her authorized representative.
- 1.4 "Permittee" means the Permittee, including employees, agents, or subcontractors.
- 1.5 "Permittee Operations" means all activities and use of equipment by the Permittee in the execution of the permit.

2.0 PERMIT OPERATIONS

- 2.1 The Permittee shall possess this Permit at all times when operating on, or hauling products from, the permit area.
- 2.2 Timber not designated for cutting and young growth will be protected from damage. Unnecessary damage by the Permittee shall be assessed by the Approving Officer, and paid for by the Permittee at double the permit stumpage rates.
- 2.3 Stumps will be cut low as practical so as to avoid waste. The mean height of any stump shall not exceed one-half its diameter, unless authorized by the Officer in Charge.
- 2.4 The slash resulting from Permittee Operations, including limbs, tops, damaged young growth and other material, will be treated as directed by the Officer in Charge. The slash will be cut into smaller pieces, scattered, or piled compactly away from the residual trees on the permit area, or a combination thereof. Roads and road rights-of-way and landings will be kept clear of slash.

3.0 SCALING AND MOVEMENT OF PRODUCTS

- 3.1 For sales of estimated volumes, logs or other products shall be decked, stacked, or otherwise held at scaling points designated by the Officer in Charge, and will not be moved therefrom until they have been scaled, stamped, numbered or otherwise released by the Officer in Charge. Products that are moved contrary to the instructions of the Officer in Charge shall be paid for by the Permittee at double the permit stumpage rates.
- 3.2 For estimated volume sales, waste from high stumps, improper bucking, breakage and partially sound logs, and all trees which are left felled, lodged or badly damaged by the Permittee Operations, will be scaled for their merchantable contents (as if they had not been damaged) and paid for by the Permittee at double the permit stumpage rates.

4.0 FIRE OPERATIONS

- 4.1 The Permittee will take all reasonable and practicable action to prevent fires resulting from permit activity, as required by a Fire Plan or the Superintendent. When no other fire prevention direction has been provided, the requirements will not be less than that required under the laws of the State in which the permit area is located.
- 4.2 The Permittee will immediately report any and all wildfires to the Officer in Charge.
- 4.3 When called upon by the Superintendent, the Permittee will make available any or all qualified personnel and equipment for use in suppressing wildfire on or threatening the sale area.
- 4.4 The Superintendent may require the Permittee to suspend any or all operations during high fire danger, or when fire is within or threatening the permit area.
- 4.5 It is understood and agreed that the Permittee shall be liable for all damages and suppression costs of fires caused by negligence on the part of the Permittee, in an amount to be determined by the Superintendent.

5.0 ENVIRONMENTAL

- 5.1 In the event that human remains or items of historical or archeological significance is discovered, the Permittee will immediately halt operations and inform the Officer in Charge.
- 5.2 Permittee Operations will be conducted in a manner that will minimize damage to the course, channel and sides of all streams, riparian areas, and wetlands whenever encountered. Streams include both flowing and intermittent watercourses.
- 5.3 The Permittee will take immediate action to contain any hazardous materials spills that have occurred as a part result of Permittee's operations. The Permittee must notify the Officer in Charge immediately of such spills. Hazardous materials will be disposed of as directed by the Officer in Charge. Hazardous materials include, but are not limited to, petroleum products such as fuel, oil, and hydraulic fluids, and contaminated soils, rock, and vegetative material. Permittee is responsible for environmental liabilities caused by Permittee Operations.
- 5.4 The Officer in Charge may suspend Permittee Operations during periods of wet weather when soil damages and road rutting could occur. The Officer in Charge may direct the Permittee to take reasonable soil erosion prevention measures to retain road surfaces and prevent the gullying of roads and skid trails, or to repair damages caused by Permittee Operations.

- 5.5 All equipment, rubbish, garbage, litter, and other refuse resulting from the Permittee Operations shall be removed and disposed of properly.

6.0 OTHER PROVISIONS

- 6.1 A performance bond may be required by the Approving Officer.
- 6.2 The Permittee will comply with all other laws and regulations governing the reservation within which the permit tracts are located.

Noxious Weed Coordinator Checklist

Reservation/Tribe/Agency name: _____

Project name: _____

Acres of target species: _____

Cost/acre: _____

- ☐ Map showing land-use, ownership, and infestation (polygons, points)
- ☐ Narrative proposal(s) addressing the 10 criteria
- ☐ Coordinator's scoring of proposal
- ☐ 3-tab spreadsheets (.xls)
- ☐ Biological Resource Clearance Form
- ☐ Cultural Resource Clearance Form
- ☐ Stand exam report (if removing noxious trees)
- ☐ Silvicultural prescription (if removing noxious trees in a Navajo Nation forestland)
- ☐ Approved PUP's for each chemical and each applicator
- ☐ Annual report of previous field season activities, if applicable.
 - ☐ Site History with previous treatment summary
- ☐ Integrated Weed Management Plan, Conservations Plans, etc., if available.
- ☐ Tribal resolutions
- ☐ NEPA documentation

Responsibility of the Noxious Weed Coordinator

1. Thoroughly review all project proposals and address issues that do not meet the criteria.
2. Verify and validate the 50% cost-share requirement
3. MUST bring checklist with project proposals to the weed meeting.

Branch of Natural Resource Work Plan

Prepared by:

Approved by:

Revision 1____2____3____4____

Agency:	Fiscal Year:	Target Completion Date:
Project:		Short Range: _____ Long Range: _____

This plan is a guide to initiate short and long range project planning. Quarterly reviews are necessary to maintain coordination and to make adjustments. Any changes in the plans require amendments to the original plan.

OBJECTIVE:

Activities	Responsibility	Target Dates		Remarks
		Start	End	
1. Submit project proposals				
2. National weed meeting				
3. Obtain State/tribal Pesticide Certification				
3. Prepare work plan <ul style="list-style-type: none"> Prepare scope of work & requisition submit to NRO 				
4. Submit PUP request				
5. Environmental Assessment, <ul style="list-style-type: none"> Biological assessment, Consult with Navajo Fish & Wildlife, HPD PUP submit (3) 				
6. Order Equipment (Safety equipment supplies, Spray Machine, etc.)				
7. Initiate meeting with cooperators <ul style="list-style-type: none"> Pre work meeting 				
8. Implement projects				
9. Submit final project report <ul style="list-style-type: none"> Schedule monitoring plan 				
10. Plan for retreatment				
11. Monitor project sites until weeds completely gone				



NOTES:


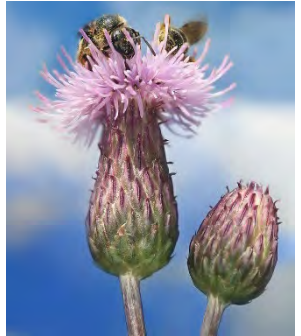

Appendix L. Noxious Weed Information




Priority Noxious Weed Species Descriptions




The following are description and characteristics of the noxious weeds in the project area that have been prioritized for management and control on the Navajo Nation. As defined in the Navajo Nation Integrated Weed Management Plan, weeds are exotic, invasive, aggressive, competitive, and persistent. Locations for known weed infestations are from recent BIA weed mapping efforts and the SWEMP. Names include common name, scientific name, USDA Plants Code, and Navajo name, if available. Navajo names are based on the [New Mexico State University Selected Plants of the Navajo Rangeland database](#).




Category A Species




Name	Origin	Description	Concerns	Photo
African Rue <i>(Peganum harmala)</i> PEHA	North Africa Mediterranean	Small, bright green succulent perennial forb with a bushy growth. Plants die back to the root in the winter and grows in late March and early April.	Contains four poisonous alkaloids toxic to cattle, sheep, and horses. Toxins can cause a loss of appetite, trembling, and loss of coordination. Severe poisoning can cause hemorrhaging in the heart and liver. The seeds are the most toxic part, while leaves are less so (USFS 2005). Invades disturbed or barren areas with moist soils. Populations found near Navajo Bridge at business site leases in Western Navajo.	 National Park Service
Blue mustard <i>(Chorispora tenella)</i> CHTE2	Eurasia	Winter annual grows in late fall to early winter. Plants overwinter as a rosette and resumes growth in the spring. Flowers grow in pink to purple flowers with petals that extend outwards and twist. Plants have a distinct musky odor. Leaves are sinuate to dentate and plants are covered in glandular hairs.	Plants spread via seeds on disturbed sites. If eaten by cattle, can produce an off flavor in milk. In agricultural fields, blue mustard can reduce yields of several grain crops (Lyons et al. 2006). Detected outside of Chinle, AZ	 EnviroPlan Partners 2018




Name	Origin	Description	Concerns	Photo
Bull thistle <i>(Cirsium vulgare)</i> CIVU	Eurasia	Typically, biennial but can be perennial and grow up to 7 ft. in height. Leaves deeply lobed with coarse prickly hairs on top and woolly hairs underneath. Leaves have sharp spines on the midrib and tips, resembling a spear. Flowers in pink-magenta heads at the end of each stem, with spiny bracts surrounding each seed head (DiTomaso et al. 2013).	Invades disturbed sites along slash piles, old log desks, and roadsides. Regeneration solely from short lived seeds. However, each flower can produce between 100 – 300 seeds per flower. Can outcompete native vegetation and reduce site productivity and stocking rates (USFS 2005). Has been detected in numerous locations on the Navajo Nation, mostly along roads and highways.	
Canada thistle <i>(Cirsium arvense)</i> CIAR4 Azéé hakani yázhí	Southeastern Europe and eastern Mediterranean	Colony-forming perennial thistle grows up to 3 to 5 ft tall. Has an extensive creeping root system that can reach depths of 5 to 15 ft. Leaves spiny lobed, alternate, and oblong or lance shaped. Plants are dioecious and flowers are white to purple in clusters of 1 to 5 per branch. Flowerheads are glabrous with white woolly hairs. Can produce 1,000-5,000 seeds per stem (DiTomaso et al. 2013)	Underground roots can produce new plants, which makes eradication difficult. Can reduce forage consumption in rangelands and crop yields on agricultural lands (USFS 2005). Competes aggressively with native plants and is a host plant for several agricultural insects and diseases (DiTomaso et al. 2013). Has been detected on some rangelands and along roads near Window Rock and Leupp.	 <p>Richard Bartz, 2007</p>
Common Mediterranean grass <i>(Schismus barbatus)</i> SCBA	Africa and Mediterranean	Cool season annual grass grows erect to semi-prostrate up to 8 in tall. Forms large dense mats. Fine, narrow leaf blades with small dense panicles. Flowers appear in spring and are self-pollinating. Spikelets are small and lack awns with 3-8 florets per spikelet. Plants reproduce only by seed. (DiTomaso et al. 2013)	Found on dry slopes, bajadas, desert mesas, river bottoms, or valley bottoms and locally abundant in mountain ranges between 100 and 4,000 ft in elevation. Forms dense mats during years of favorable winter precipitation, outcompeting native species. Is a primary species fueling desert wildfires in the Mojave Desert and threatens species diversity in ecosystems that have not evolved to more frequent fire intervals (USFS 2005)	 <p>Max Licher</p>



Name	Origin	Description	Concerns	Photo
Dalmatian toadflax <i>(Linaria dalmatica)</i> LIDA	Eastern Europe	Ornamental perennial forb grows up to 3 ft tall. Stems rough and woody at the base, and waxy and smooth at the top. Leaves waxy and bluish-green, ovate to heart-shaped with smooth margins. Leaves alternate and clasping at the upper portion of the stem. Has deep taproots with adventitious buds that form new plants. Flowers resemble yellow to orange snapdragons (DiTomaso et al. 2013)	Plants reproduce from both seed and underground root stalks. One plant can produce up to on half million seeds, as well as lateral roots up to 10 feet from the plant (King County 2011). Can crowd out native plants and reduce forage of rangelands. Commonly occurs along roadsides in the southwestern United States and has been detected in Western and Fort Defiance Agency jurisdictions.	 Renee Benally, BIA
Fountaingrass <i>(Pennisetum setaceum)</i> PESE3	Northeastern Africa and western Asia	An attractive perennial grass grows in dense clumps with erect stems up to 4 ft high. Florets grow in bushy clusters of pink or purple and appear bristly in inflorescences 6-15 in. long.	Highly aggressive and fire-adapted. Outcompetes native plants after burns. Seeds are long-lived and disperse easily by wind or water, allowing them to travel great distances (USFS 2005).	 Eric Guinter, 2005
Leafy Spurge <i>(Euphorbia esula)</i> EUES Chi'il abci tsoh	Eurasia	Perennial forb with greenish-yellow flower bracts. Flowers in May and June. Leaves are simple and opposite with a blue-grey hue. Plant can reach a maximum height of 4 ft.	Can reproduce by seeds and root buds. Roots can grow up to 30 ft from plants and seeds, which are forcefully expelled, can land up to 15 ft. from the original plant. Plant produces latex, which can cause lesions around the eyes and mouth of cattle (USFS 2005). Invades grasslands and can invade riparian areas, shrublands, and savannas. No populations documented but known near Mormon Lake in Flagstaff.	 John Randall, The Nature Conservancy

Name	Origin	Description	Concerns	Photo
Musk thistle <i>(Carduus nutans)</i> CANU4 Azee'okani'whooshi Azee'okani'denini	Eurasia	Biennial forb can grow up to 5 ft. tall. Prickly leaves and stems with prickly wings. Forms deep taproots and germinates in the winter to early spring, forming a rosette and developing flowering stems in the spring and summer the next year. Purple to pink flowers form in summer in hemispherical thistles, that nod on long stalks. Reproduces only by seed (DiTomaso et al. 2013)	In one growing season, a single plant can produce over 100,000 seeds. Can increase from a single plant to a large infestation within 2 to 3 years. Seeds remain viable for around 15 years, requiring intensive monitoring of infested and treated sites (USFS 2017). Can crowded out native species and valuable forage plants and spines discourage animals from entering infested areas. Found throughout the Navajo Nation along roadsides, farm fields, and rangelands.	
Perennial pepperweed <i>(Lepidum latifolium)</i> LELA2 Os si tsóh	Eurasia	Long-lived perennial forb can grow from 2 to 4 ft tall from seeds or roots. Prefers moist or seasonally wet sites. Leaves are alternate and can be wider at the base and narrower along the stems, margins entire to slightly toothed. Flowers form in small white clusters at end of the stems.	Grows in a variety of areas, including floodplains, pastures, riparian areas, and near residential structures. Forms dense thickets that crowd out other plants. Seeds and plant fragments can spread easily and make dispersion difficult to control. Has been detected in Marble Canyon and at NAPI-NIIP lands (DiTomaso et al. 2013).	 Joseph DiTomaso
Ravenna grass <i>(Saccharum ravennae)</i> SARA3	Mediterranean	Perennial bunch grass with long-flowering cane-like stalks that can reach over 12 ft in tall and a basal area several feet in diameter. Flowers in summer with large plume like inflorescence. Distinguished from pampas grass by the dense villous hairs that grow along the lower leaf blades (Thomsen and Meyer 2007)	Planted often as an ornamental, can easily escape due to its lightweight seeds that disperse in wind and water. Establishes quickly in disturbed areas and is highly competitive in riparian areas. Can form dense monocultures, growing out from beneath established vegetation. Established stands can increase fire risk along riparian zones and anchor soils normally subject to shifting (PDCNR 2013). Populations detected on the Hopi Reservation and in Grand Canyon National Park.	 Daderot


Name	Origin	Description	Concerns	Photo
Sahara mustard <i>(Brassica tournefortii)</i> BRTO Oostse'	Mediterranean	Erect winter annual that forms a basal rosette with a span of around 3 feet and a height of 2 ft. Basal leaves are deeply pinnate-lobed and lower stems have dense, stiff white hairs. Produces small yellow flowers that produce long linear fruits. Mature fruits open from the base to release the seeds. Reproduce solely by seed (DiTomaso et al. 2013)	Fast-growing and drought tolerant, these plants grow best in disturbed and sandy soils. Flowers are self-pollinating and create thousands of seeds. Dried plants can break off and form tumbleweeds, increasing seed spread. Can increase fire risk, lower biodiversity, and lower forage value of rangelands (USFS 2017c).	 <i>Mike Lewis, UCR</i>
Scotch thistle <i>(Onopordum acanthium)</i> ONAC Zéé hókanííł béeí Whosh Waa'	Europe	Broad spiny stems with vertical rib. Large spiny leaves with dense hairs. Violet to reddish flowers in spherical to hemispherical shape. Plants grow in tall erect. Reproduces solely by seed (DiTomaso et al. 2013).	Plants can create an impenetrable thicket, with seeds viable for 6 years. Grows in disturbed areas along roadsides and in waste areas (USFS 2017). Produces large numbers of seeds that contain a water-soluble germination inhibitor that can delay maturation (DiTomaso et al. 2013). Found throughout the Navajo Nation along roadsides and in some riparian washes and farms.	 <i>CSU Extension</i>
Spotted knapweed <i>(Centaurea maculosa, C. stoebe)</i> CESTM Ch'it Bilat'a dootlizhigí	Central Europe	Biennial or short-lived perennial forb growing 1 to 3 feet tall with a long, sturdy taproot. Forms basal rosettes in winter and early spring and then develops erect, highly branched flowering stems in late spring to summer. Leaves are alternate, pinnately lobed and dotted with resin ducts. Each flowerhead forms 30 -40 disk flowers with white, pink, or purple flowers. Phyllaries have dark colored tips, giving them a spotted appearance (DiTomaso et al. 2013).	Forms monocultures that reduce native plant populations. Can inhibit growth of other nearby plants (USFS 2005). Can reproduce both vegetatively and from seed. Seeds can remain dormant in soils for 8 years and can germinate without sun exposure. Can hybridize with diffuse knapweed (DiTomaso et al. 2013). Population common along roads and near the Shonto Boarding School.	 <i>BIA</i>




Name	Origin	Description	Concerns	Photo
Squarrose knapweed <i>(Centaurea virgata)</i> CEVI	Western Asia	Long-lived perennial forb grows to 12-18 inches tall with small pink to purple flowers. Remain a rosette for several years under poor conditions before growing into a flowering stem. Grows in a bushy habit, with deep taproot. Leaves alternate and covered in short to medium grayish hairs. Upper leaves are entire and linear while lower leaves are 4-8 in. long and deeply pinnately lobed.	Invades rangelands with shallow soils and is adapted to harsh climates. Flowerheads have burs that allow them to cling easily to passing animals, vehicles, and clothing. Favors opens disturbed sites (USFS 2005)	 <p>Gerald-Carr 2013</p>
Sulphur cinquefoil <i>(Potentilla recta L.)</i> PORE5 Azee tsoxíí Chil di tsoxíí	Mediterranean and Eurasia	Perennial forb grows up to 3 ft tall. Flowers pale yellow with 5 heart-shaped petals and 5 enclosing green sepals. Leaves are palmate with serrate margins with narrow oblanceolate leaflets. Stems, underside of leaves, petioles, and calyx have long perpendicular hairs. Discern from natives by green underside and appressed hairs on the stem. Produces numerous seeds that can last for up to 4 years in soil (CDA 2019)	Can reproduce by seed or new root shoots. Commonly invades grasslands and shrub-dominated areas, especially disturbed sites or waste areas. Plants are unpalatable and avoided by animals due to high tannin content. Can quickly dominate grazing areas and out-compete native forage grasses (CDA 2019)	 <p>Robert Flogaus-Faust 2006</p>
Tall whitetop <i>(Cardaria draba)</i> <i>(Lepidium draba)</i> CADR Os si tsóh	Russia/Eurasia	Deep-rooted perennial that grows up to 2 ft tall with deep roots, growing 12-30 ft deep. Can produce 50 sheets in a square yard. Leaves alternate, gray green in color, and vary in shape. Lower blade surface is covered in short white hairs. Basal leaves are short-stalked and upper leaves are clasping. Numerous small, white fragrant flowers in spring to summer. Prolific seed production. (DiTomaso et al. 2013)	One plant can spread 12 feet in its first year. Plants are toxic to cattle. Can reproduce by seed or root segments. One plant can produce 1,200 to 4,800 seeds, which are short lived. Extensive and fast-growing root system are the main method of spread (DiTomaso et al. 2013). Found in alkaline, disturbed soils and is highly competitive once established (USFS 2005). Has been detected on the Navajo Nation along roadsides and washes in the eastern Chuska mountains.	 <p>Steve Dewey, USU</p>




Name	Origin	Description	Concerns	Photo
Tamarisk <i>(Tamarix spp.)</i> TAMAR K'eilichii'its'óóz	Eurasia	Trees originally planted as ornamentals and for erosion control. Has deciduous tiny scale- or awl-like leaves, although athel varieties are evergreen. Deep, efficient root system with high evapotranspiration rates during warm seasons. Flowers are in racemes with simple, but occasionally compound panicle-like flowers. Different species can be identified by the nectar base at the flower. Flowers are small and white to dark pink. (DiTomaso et al. 2013)	Category A species are found in more isolated populations but can hybridize with similar species. Hybridization is not well understood but can increase spread and utilization of uninhabitable ecosystems. Deep roots extract salts from deeper soils and excrete it from the leaves, increasing salinity of surface soils. Can replace more desirable native species and displace native wildlife species, including the endangered Southwestern willow flycatcher.	 <i>Russ Kleinman & Rich Felger</i>
Tree of Heaven <i>(Ailanthus altissima)</i> AIAL T'iis Nattóí	China	Deciduous tree can grow up to 90 feet tall with gray bark. Branches have a large pitch and heart-shaped leaf scars. Discerned from similar native trees by the leaves, which have a circular gland on each leaflet near the petiole. Flowers are small greenish clusters becoming straw-colored to reddish brown fruits in a pod-like structure.	Can reproduce from seed or roots which form extensive networks in dense colonies that out-compete native trees. Produces chemicals that prevent other trees from establishing. Roots can damage sewers and foundations of nearby structures (PCA 2009). Invades disturbed areas and can grow in forest openings and common areas. Does not establish well in wetlands or shaded areas. Populations in Shiprock.	 <i>Russ Kleinman, NMSU</i>
Uruguyan pampas grass <i>(Cortaderia selloana)</i> COSE4	South America, mainly in low elevation subtropical grasslands and riparian areas.	Fast-growing bunch grass forms densely tufted bunches with long basal leaves and tall-showy plumelike inflorescences, which are 1 – 3 ft long. Leaves sharply serrated. Inflorescences have fountain-like appearance. Forms dense fibrous roots that grow in shallow, short lateral rhizomes. Plants are dioecious and can only develop seeds if male or female plants are within pollination range. (DiTomaso et al. 2013).	A single plant can produce millions of seeds that can travel via wind for several miles. Can grow along roadsides, steep cliffs, streambanks, and open disturbed areas. Tolerant of intense sunlight, drought, and frost and can live for over a decade. Displaces native species, lowering biodiversity and reducing habitat quality. Leaves are extremely sharp and can harm wildlife, livestock, and humans (DiTomaso et al. 2013)	 <i>Joseph DiTomaso, UCD</i>


Name	Origin	Description	Concerns	Photo
Yellow nutsedge <i>(Cyperus esculentus)</i> CYES Tłohi'gai	Europe	Warm season perennial grass growing between 6 to 30 in tall. Leaves originate from the base of the stem and are grass-like, smooth, and glossy. Stems are triangular. Flowers are umbrella shaped spikelets with long, leaf-like bracts that are yellowish. Roots form prolific hard, round brown to black tubers that facilitate vegetative spread (CDA 2015)	Reproduces by seed and tubers, which make it difficult to control. Tubers develop rapidly and can persist in the soil for years, forming dense colonies and crowding out native vegetation. Can be damaging to crops with onions, potatoes, beans, and corn. Can grow in a variety of soils, and prefers wet or moist soils, but is drought-tolerant once established (CDA 2015).	 Patrick Alexander
Yellow starthistle <i>(Centaurea solstitialis)</i> CESO3 C'it Bilat'a dootlzhigí	Europe	Annual forb that grows 2-3 feet tall with wiry stems. Roots can grow at least 3 ft into a deep taproot. Flower heads are spiny and grow singly at the stem tips with narrow yellow petals. Plants starts as a low rosette with white hairs. Leaves and stems are gray to bluish green with fine white cottony hairs.	Horses grazing large quantities are susceptible to "chewing disease," a neurological disorder preventing the horse from swallowing. There is no cure of chewing disease and it is fatal (USFS 2005). Populations have been detected along roadsides on BIA-27 north of Ganado Lake and on I-40 outside of Window Rock.	 Peggy Greb, USDA

Category B Species



Name	Origin	Description	Concerns	Photo
Camelthorn <i>(Alhagi camelorum, A.maurorum)</i> ALMA12 Ch'ilhoshí	Eurasia	Aggressive perennial shrub with thick rhizomes that grow out 36 ft or more from the parent plant. Plants have greenish, ridged, hairless stems that are highly branched with thorny branches. Leaves alternate, sparse, and simple, thick, and leathery, and oval shaped. Flowers appear in summer and are two to six magenta pea-like flowers on short stalks. Fruits are reddish-brown pods with beaked tip in late summer.	Extensive root systems make this species difficult to eradicate. Seed also facilitate spread as they can be dispersed by water, animals, and winds, but reproduction is mostly vegetative. Can grow through pavement and thorns can flatten tires (USFS 2005). On the Navajo Nation, it grows quickly along roadsides, washes, and streams, and near communities. Heavy infestations documented near Shiprock, Tuba City, Chinle Wash, the San Juan River Basin, and along the Little Colorado River.	 Susan Holiday


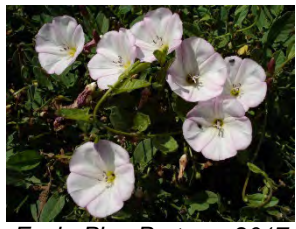


Name	Origin	Description	Concerns	Photo
Diffuse knapweed <i>(Centaurea diffusa)</i> CEDI3 Ch'il lat'á dei nínigí	Mediterranean	Biennial or short-lived perennial forb forming 1 to 2 ft tall with a long single taproot. Leaves alternate and covered in short interwoven gray hairs. Upper leaves are entire and linear and lower leaves are longer and deeply pinnate-lobed. Flowers heads are spiny with comb-like phyllaries and white, pink, or pale purple flowers. Plants reproduce by seed only. (DiTomaso et al. 2013)	Seeds can remain viable for 12 years. Dead plants break off at ground level and form tumbleweeds that spread seeds. Can increase erosion and sedimentation while decreasing habitat and forage quality. Produces chemical compounds that inhibit growth of other species (USFS 2005). Can also hybridize with spotted knapweed. Widespread on Navajo Nation and found along roadsides, mining areas, and community areas.	 <p>Matt Lavin</p>
Halogeton <i>(Halogeton glomeratus)</i> HAGL Chil'bit'ááh t'ó	Eurasia	Erect winter and summer annual with small fleshy leaves. Stems are tinged reddish or purple and leaves are alternative, sessile, dull green to bluish-green, and end in a needle-like spike. Flowers are numbers and dense on the leaf axils and lack petals. Reproduces mostly by seed. (DiTomaso et al. 2013)	Not extremely competitive but invades disturbed and overgrazed areas. Produces oxalates that are toxic to livestock (NRCS 2002). Found in heavy populations along roads and disturbed areas such as on Black Mesa near coal mine operations. Is widespread on the Navajo Nation.	 <p>Renee Benally, BIA</p>
Johnsongrass <i>(Sorghum halepense)</i> SOHA Akál	Mediterranean	Erect perennial grass that grows to 2 - 8 ft tall. Base of stalks are reddish pink, leaves are 0.5 – in wide and 6 to 20 in long. Blades are flat with a distinctive white midvein. Inflorescence is a large open panicle, reddish to purple in color. Plants also have thick, fibrous rhizomes. (CDA 2009)	Spreads rapidly through seeds and rhizomes. Poses problems on disturbed sites and agricultural lands where it can hybridize with crops, such as sorghum. Leaves can produce a toxin that is poisonous to livestock if ingested (CDA 2009)	 <p>Harry Rose, 2005</p>




Name	Origin	Description	Concerns	Photo
Russian knapweed <i>(Acroptilon repens)</i> ACRE3 Ch'ildích'l'ilibáhí	Central Asia	Deep-rooted perennial forb grows to 3 ft tall. Stems erect, branched, and covered with gray hairs. Leaves alternate and entire. Basal leaves are mostly oblong and longer than stem leaves, which are narrower. Old flower stems can persist for extended periods after senescence, forming thatch. Flowerheads hemispherical, in clusters, color white to lavender-blue. (DiTomaso et al. 2013)	Plants develop adventitious roots that enable the species to colonize areas quickly. Produces compounds that suppress the growth of native plants, allowing it to form dense monocultures. In two years, roots can grow 10 ft deep and 10 to 12 feet in diameter (USFS 2005). Found throughout the Navajo Nation on farms, rangeland, near waterways, and along roadsides.	 <i>Patrick Alexander</i>
Russian olive <i>(Elaeagnus angustifolia)</i> ELAN Tsin łibáhá	Asia	Large shrub to medium-sized tree with silvery foliage. Leaves alternate, simply, narrowly lanceolate to elliptical with smooth margins. Upper surface of leaf is grey-green and underside is silvery grey and covered in scales. Flowers are umbel-like clusters with small highly fragrant flowers. Plants mainly reproduce by seed.	Originally used as windbreaks and for erosion control, it was planted extensively throughout the southwestern United States. Invades riparian areas where it replaces native trees (USFS 2005). Has invaded several major washes and riparian areas on the Navajo Nation, including Long Canyon, Shonto Wash, Colorado Pueblo Wash, Fruitland, and streams and tributaries around Shiprock.	 <i>John Randall, The Nature Conservancy</i>
Siberian elm <i>(Ulmus pumila)</i> ULPU Naasts'ósí bit'iis	China, Siberia, Manchuria, and Korea	Fast growing trees, from 50 to 70 ft tall. Leaves alternate, oblong in shape with serrate margins. Flowers greenish and clustered in short pedicels that appear before leaves in March and April. Bark light gray brown with irregular furrows. Fruits are samaras with a dry, compressed nutlet.	Widely grown in the southwestern United States as a shade tree, it can outcompete native species in riparian zones and other sensitive areas. Winged seeds can travel long distances by wind or vehicles. Trees produce abundant seeds that make it difficult to control (USFS 2005). In isolated populations on the Navajo Nation along roadsides, homesite leases, and business site lease areas.	 <i>Russ Kleinman</i>




Name	Origin	Description	Concerns	Photo
Tamarisk/Saltcedar <i>(Tamarix ramossisima)</i> TARA K'eilichii'its'óóz	Eurasia	Trees can grow to 20 ft tall with deciduous awl-like twig leaves that overlap with acute tips. Foliage is usually bluish-green with small flowers. Flowers are small and white to dark pink. Prolific seeders and able to reproduce vegetatively. (DiTomaso et al. 2013)	Outcompetes native riparian trees by forming deep root systems that access underground water not available to other species. Species can increase fire risk in riparian system by increasing flammable fuels (USFS 2005). Widespread on the Navajo Nation in riparian areas and washes where it alters stream flow, decreased habitat quality, and increased fire risk. Some populations have been impacted by the tamarisk leaf beetle (<i>Diorhabda</i> spp.), which defoliates large stands and increases fuel loads. Common along washes, roadsides, homesite leases, and business site lease areas.	 Steve Dewey, USU



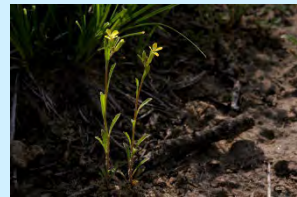
Category C Species

Name	Origin	Description	Concerns	Photo
Bald brome <i>(Bromus racemosus)</i> BRRA2	Eurasia	Annual grass with upright stem in clusters or tufts. Seeds are awn-less. Florets attached to main stem instead of axis of inflorescence.	Grows in agricultural fields, pastures, and disturbed areas. Can be grazed by livestock when young but dries up as it matures. Increases fire risk. Has been detected in Canyon de Chelly.	 Rutger Barendse, Saxifraga
California burclover <i>(Medicago polymorpha)</i> MEPO3 T'oh azee	Southern Europe	Forb grows as an annual or perennial in disturbed sites. Plants grow to 2 ft tall and likely prostrate. Leaves divide into 3 leaflets with reddish hue and serrated edges. Flowers small bright yellow clusters. Fruits tightly coiled pods with two to three rows of prickles.	While it can be used as forage, the prickly fruits can get caught in wool and animal fur. Tendency to spread quickly in poor and disturbed soils where it can outcompete native vegetation (UC IPM 2014). Detected in Canyon de Chelly in Canyon del Muerto.	 Forest & Kim Starr, 2006

Name	Origin	Description	Concerns	Photo
Cheatgrass <i>(Bromus tectorum)</i> BRTE Shíyínáldzidí	Europe	Erect winter and spring annual grass growing around 2 ft tall, that typically droop to one side. Leaves covered in short, soft hairs. Florets have long awns. Flowers in spring and then become reddish purple.	Prolific seeder that increases in density with bare soil for germination. Increases fire frequency in areas where it invades, often in forests, near residential sites, and in open fields (USFS 2005). A widespread problem in southwestern United States with populations throughout the Navajo Nation. Known to invade rangelands and hiking and horse trails	 <i>EnviroPlan Partners, 2017</i>
Field bindweed <i>(Convolvulus arvensis)</i> COAR4 Ch'il nat'oi lígaí	Eurasia	Hardy perennial creeping vine. Leaves are ovate to heart-shaped and green. Flowers are bell or trumpet-shaped and white to pink in color. Plants reproduce vegetatively and by seeds.	Spreads quickly with extensive rhizomes and rootstocks. Seeds have long dormancy period, lasting up to 60 years. Drought-tolerant and can outcompete native and desirable vegetation. Roots can penetrate fabric, plastic, and other barriers (UC IPM 2011). Widespread on the Navajo Nation, affecting rangeland, farmlands, and roadsides.	 <i>EnviroPlan Partners 2017</i>
Field brome <i>(Bromus arvensis B. japonicus)</i> BRAR5	Eurasia	Winter annual grass that produces a dense, low leafy growth in the fall. Tillers profusely and produces seed heads in late spring and early summer. Seed stalks are 2 -3 ft tall. Extensive fibrous root system with short top growth. (NRCS 2002a)	Commonly planted as a winter cover crop, but can become invasive, displacing more desirable vegetation. Does well on medium textured soils that are moderately to well-drained. Sometimes identified as Japanese brome.	 <i>Daderot</i>
Horehound <i>(Marrubium vulgare)</i> MAVU	Eurasia	Cool season perennial forb about 2 ft tall. Stems are densely hairy, thick, and square in cross-section. Leaves are aromatic, opposite, ovate to nearly round with round toothed margins. Upper and lower leaf surfaces are hairy. Flowers white to deep magenta grown in head-like whorls. Reproduces only by seed.	Colonizes fields and other open/disturbed areas. Establishes in infertile soils and often a primary colonizer on in eroded areas. Considered naturalized in much of the U.S. Can outcompete native vegetation and form dense stands in annual grasslands. Populations near Ganado, east of Lukachukai on BIA-13, and east of South Sheba Crater.	 <i>Amy Smith Muise, NMSU</i>

Name	Origin	Description	Concerns	Photo
Jointed goatgrass <i>(Aegilops cylindrica)</i> AECY Cl'oh althe ni'li	Eurasia	Tall winter annual grass grows up to 20 in tall. Foliage looks like to winter wheat but blades, auricles, ligules, and leaf sheaths have evenly spaced fine hairs along the margins. Seedheads have spikelets arranged alternately along a zigzag rachis with seeds 1 to 5 in long. Seed heads turn red to purple at maturity. Seeds break apart at joints. (DiTomaso et al. 2013)	Causes serious problems in agricultural fields, especially for grains, as it is very similar visually and genetically to winter wheat. Can hybridize with winter wheat and reduce overall crop yields (USFS 2017a). Has high silica content which accumulates into thatch that suppresses other species. Tough seedheads have long barbed awns that can injure livestock and survive field burns. (DiTomaso et al. 2013)	 <i>Patrick Alexander</i>
Kochia <i>(Bassia scoparia, Kochia scoparia)</i> BASC5 Ch'il nilt'qli	Eurasia	Annual forb grows up to 7 ft tall. Foliage gray-green and covered in soft hairs. Leaves are mostly alternate, flat, linear-lanceolate turning reddish-brown as it matures. Has a deep taproot with several branched fibrous lateral roots. Flowers are inconspicuous and fruits have five thickened lobes and short horizontal wings.	Drought tolerant. Common in grasslands, pastures, prairies, roadsides, floodplains, riparian areas, and agricultural fields. Reduces crop yields, contaminates crops, and outcompetes native vegetation by releasing allelopathic chemicals into soils. If consumed in large quantities, can be toxic to livestock. Produces thousands of seeds and can become tumbleweeds, spreading seeds across the landscape.	 <i>EnviroPlan Partners, 2016</i>
Puncturevine <i>(Tribulus terrestris)</i> TRTE Ch'ilhoshiq Naakaibihosh	Southern Europe	Broadleaf summer annual that forms ground covering dense mats 2 to 3 ft in diameter. Green to reddish-brown stems that spread radially. Leaves are evenly pinnately compound with 3 to 7 pairs of leaflets per leaf. Small solitary yellow flowers that develop 5-sided burs with two stout spines. Reproduces only by seed. (DiTomaso et al. 2013)	Burs can stick to passing animals, tires, and people. A prolific seeder, a single plant can produce thousands of seeds that persist for up to 20 years. Has a deep taproot, allowing it to outcompete other plants for water and nutrients. Harmful to animals both from injury and from toxins. Toxins are harmful to sheep and contributes to nitrate poisoning in sheep and cattle (DiTomaso et al. 2013). Widespread on the Navajo Nation along roadsides, fields, disturbed sites, and near watering holes and windmills.	 <i>Steve Dewey, USU</i>

Name	Origin	Description	Concerns	Photo
Red Brome <i>(Bromus rubens)</i> BRRU2 Bi'zé yilwo' lichi'i	Mediterranean	Short-lived cool season annual grass with sharp florets and straight awns. Leaves and leaf sheaths covered in short, soft hairs. Red brome is shorter than cheatgrass, growing 1.5 ft tall with narrower leaf blades. Panicles are compact and dense and dark red. Becomes dark red when dried and mature.	Prefers open spaces in shrub and grassland communities. Creates fine fuels that decompose slowly and increase fire risk, intensity, and spread. Sharp awns injure wildlife and livestock, reduce available forage, recreational opportunity, wildlife diversity and habitat, and land values. Seed can adhere to clothing and fur and as well as wind, water (USFS 2017b). Detected on the Utah side of Lake Powell, near Antelope Pass, along Highway 160 outside Tuba City, and in western part of Canyon de Chelly.	 <p>Ken Gishi, NRCS</p>
Rescuegrass <i>(Bromus catharticus)</i> BRCA6	South America	Cool-season annual bunchgrass that grow up to 3 ft tall. Openly branched seed heads with nodding appearance. Seed heads have many flattened flower spikelets, yellow in color. Stems robust, glabrous, and unbranched.	Used as forage in the southern U.S. but considered weedy in the U.S. and Mexico. Well adapted to warm climates and resistant to extreme cold. Found along roadsides, ditch banks, lawns, gardens, and small grained winter drops. Outcompete native vegetation, particularly in riparian areas. Seeds have barbed awns that adhere to clothing and animal fur and can be carried by wind, water, (Halvorson and Guertin 2003)	 <p>Patrick Alexander</p>
Ripgut brome <i>(Bromus diandrus)</i> BRDI3 Ti'oh da a gighi	Eurasia and Africa	Cool season annual grass with sharp florets and straight awns. Leaves and leaf sheaths are covered in short, soft hairs. Florets have long awns with open, loose, nodding panicles.	Found along roadsides, field borders, disturbed areas, and native rangelands. Threat to wildlife where it replaces native bunchgrasses. Seeds have barbed awns that adhere to clothing and fur. Currently detected east of Chinle near Canyon de Chelly	 <p>Joseph DiTomaso, UCD</p>

Name	Origin	Description	Concerns	Photo
Russian thistle <i>(Salsola kali, S. collina, S. paulsenii, S. tragus)</i> SATR12 Chi'ildeeníní	Eurasia	Warm-season annual forb growing between 0.5 to 4 ft tall. Densely branched, with globe-shaped habit and a deep taproot. Plants appear bluish-green with reduced, stiff, prickly upper stem leaves. Flowers are small and inconspicuous without petals and solitary on leaf axils.	Common in disturbed grasslands and desert communities, roadsides, railroad ROWs, trails, along streams and lakes, dry plains, agricultural fields, abandoned fields, waste lands, and overgrazed rangeland. When mature, can become tumbleweeds, spreading seeds across the landscape, persisting for years, collecting along waterways and fence lines, and creating a fire hazard. Ignited tumbleweeds carry fire across fire breaks to unburned areas. Produces oxalates and are toxic to livestock.	 <i>National Park Service</i>
Smooth brome <i>(Bromus inermis)</i> BRIN2 Bijih t'óh	Eurasia	Sod-forming perennial cool-season grass that spreads by rhizomes. Can vary in height from 2 to 4 ft. Leaves frequently marked by a transverse wrinkle resembling a "W" a few inches from the tip. Flower heads are purplish-brown and produce semi-compact panicles that spread out with maturity. Flat compressed seeds are awn-less and 1/3 in long.	Plants spread by rhizomes and are best adapted to cooler climates but are drought tolerant and cold resistant. Can be used for forage and hay production but can become highly invasive, outcompeting more desirable native plants. Populations have been detected in the Chuska Mountains north of Long Lake and along Highway 134.	 <i>Christian Fischer, 2011</i>
Spreading wallflower <i>(Erysimum repandum)</i> ERRE4 Bist'á azée tsoh	Eurasia	Winter annual forb with stout stems 1-2 ft tall, square in cross-section. Grows in a single stem, with narrow linear leaves along the stems that wither when flowering. Flowers are an elongated cluster with four green sepals and four yellow petals. Petals are clawed with a white patch at the base. Fruits are green narrow pod about 3 in long and spreading. Deep stout taproot.	Commonly found among winter annual crops, along roadsides, and in disturbed sites (Hilty 2012). Some varieties can be herbicide resistant. Detected in Canyon de Chelly.	 <i>Patrick Alexander</i>