Fuels Management Plan

Bureau of Indian Affairs, Salt River Agency
Salt River Pima-Maricopa Indian Community
Fort McDowell Yavapai Nation
Pascua Yaqui Tribe

Completed by Wildland Fire Associates, Sept. 2012

Photo by Jorn Napp

United States Department of the Interior
Bureau of Indian Affairs
Salt River Agency

Executive Summary

The fuels management plan was prepared for the Bureau of Indian Affairs Salt River Agency by Wildland Fire Associates, in 2012. The Fuels Management Plans (FuelsMP) is a supplement to the Wildland Fire Management Plan (WFMP) that was prepared in 2012. An environmental assessment (EA) was prepared for the WFMP in 2011.

The three Tribes that are included in this plan are listed below. For the purposes of this Fuels Management Plan an acronym has been assigned to the three individual Tribes and BIA Salt River Agency (see below). These acronyms are used throughout the FuelsMP.

Tribe or Agency Name	Acronym
Bureau of Indian Affairs, Salt River Agency	AZSRA
Salt River Pima-Maricopa Indian Community	SRPMIC
Fort McDowell Yavapai Nation	FMYN
Pascua Yaqui Tribe	PYT

National fire policy requires that all federally managed lands with burnable vegetation have an approved wildland Fire Management Plan (FMP). The term Wildland Fire Management Plan (WFMP) is used throughout this document, which is the same as an FMP. The FuelsMP is a supplemental document that tiers directly to the WFMP.

This fuels management plan doesn't authorize any on the ground projects. A separate project plan must be completed for all planned fuels treatments. Each project may require a separate NEPA analysis and must be reviewed and approved by the appropriate Tribe. Surveys of archeological, cultural and other natural resources may be required.

Direction for the FuelsMP is derived from several sources including:

- Wildland Fire Management Plan, BIA Salt River Agency, 2012
- Fire Management Plan, BIA Salt River Agency, July 2009
- Fire Management Plan, BIA Salt River Agency, 2004
- Environmental Assessment for the BIA Salt River Agency Wildland Fire Management Plan, May 2011.
- Salt River Pima-Maricopa Indian Community General Land Use Plan, 2006

- Maricopa County, Community Wildfire Protection Plan, 2010 (Includes SRPMIC and FMYN)
- Pima County Community Wildfire Protection Plan (currently under development)
- Various meetings and correspondence with the BIA,PYT, FMYN and SRPMIC.

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1. Introduction

1.1 Purpose

The Departmental Manual, Indian Affairs Manual (IAM) Part 90 and Federal Wildland Fire Management Policy require a Fire Management Plan for all areas with burnable vegetation. Direction for preparation of Fire Management Plans is contained in IAM Part 90 Chapter 2 Section 2.1, which stipulates that Fire Management Plans will, "within the framework of Tribal land use objectives, document management strategies based on resource values to be protected or enhanced, while implementing hazardous fuels reduction treatments. Hazardous fuels management may be addressed within the context of a Fire Management Plan, Land Management Plan that incorporates elements of a Fire Management Plan, or alternately, through a stand-alone Fuels Management Plan tiered to the Fire Management Plan. Because hazardous fuels management falls within the category of actions to be addressed in a Fire Management Plan, all policies pertaining to fire management planning apply equally to fuels management planning.

This fuels management plan has been developed for the Bureau of Indian Affairs Salt River Agency (AZSRA), the Salt River Pima-Maricopa Indian Community (SRPMIC), Fort McDowell Yavapai Nation (FMYN), and the Pascua Yaqui Tribe (PYT). This plan tiers to the BIA Salt River Agency Wildland Fire Management Plan (WFMP) which is the same format as a standard Fire Management Plan (FMP).

1.2 The Current Situation

As with most other land management agencies in the west, wildland fires have grown in size, intensity and frequency over the last 20 to 30 years on SRPMIC, FMYN and PYT lands. Fire exclusion, which has led to uncharacteristically high fuel loadings, is one of the primary factors responsible for this change. This increased size, intensity and frequency has resulted in greater threats to human life, property and natural resources. More people are building homes adjacent to Tribal communities with increased exposure for those homes and developments as well as an increased risk of human caused ignitions.

The fuels management plan (FuelsMP) tiers directly to the wildland fire management plan (WFMP) that was developed for the BIA Salt River Agency (AZSRA). The reason this fuels plan was developed was to comply with policy and standards set by the BIA and Interagency groups. Having an approved FuelsMP will allow AZSRA and Tribes to apply for fuels management funding for specific projects.

Fire is recognized as having a critical role in the maintenance of healthy wildland ecosystems. AZSRA, SRPMIC, FMYN, and PYT acknowledge that other means of fuels treatment (mechanical, biological, chemical) will be an important component of the program. The purpose

of this management plan is to document the processes, alternatives and rationale behind the fuels management strategies.

The use of wildland fire for resource benefit, prescribed fire and other fuels management alternatives will enable the fire program to achieve hazard fuels reduction and Tribal natural resource management objectives. The development of prescribed fire and fuels treatment plans, preplanning for potential wildland fires for resource benefit, operational implementation of selected fuels treatments, the evaluation of their effects, archiving fuels treatment data and responsible fiscal reporting are all necessary components of a fire program.

2. Management Requirements and Constraints

2.1 National/Interagency policy

The National Wildfire Coordinating Group (NWCG) provides policy and direction for wildland fire including the management of fuels and prescribed fire. The guides listed below provide direction at the national level.

- Interagency Prescribed Fire Planning and Implementation Procedures Guide (IPFP)
- NWCG Smoke Management Guide for Wildland Fire for Prescribed and Wildland Fire, NFES 1279 (SMG)

2.2 Departmental Policy

The United States Department of Interior policy for wildland fires is contained in the below document.

- DM Part 620 Chapter , Wildland Fire Management, General Policies and Procedures

2.3 Bureau of Indian Affairs Policy

BIA guidance for fuels management is found in the following documents;

- Bureau of Indian Affairs, Fuels Management Program, Supplement to the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide (BIA Fuels Management Guide)
- Bureau of Indian Affairs, Fuels Management Program, Business Rules Handbook
- Bureau of Indian Affairs Wildland Fire and Aviation Program Management Operations Guide (Blue Book)

2.4 Local Policy and Guidance

Local policy for managing wildland fire on SRPMIC, FMYN, and PYT lands are contained in the BIA Salt River Agency Wildland Fire Management Plan (2012) and the associated Environmental Assessment (EA), approved in 2011.

2.5 Authorities

Authorities are outlined in the Salt River Agency Wildland Fire Management Plan (WFMP). The authorities for the development of this plan are listed in the Department of the Interior Manual Part 620.

3. Local Standards or Guidelines

3.1 Land Management Policy

Direction and policy for land management can be referenced in the AZSRA WFMP and in the Salt River Pima-Maricopa Indian Community General Plan.

3.1.1 Land Management Constraints

The following are land management constraints and associated mitigations that have the potential to impact fuels management activities, as identified from the WFMP and its associated EA.

3.1.2 Mitigation as Part of the Preferred Alternative B from the EA (Applies to all three Tribes)

During suppression operations, prescribed fires, and thinning/fuel reduction operations under Alternative B, which is the preferred alternative in the Environmental Assessment (EA). The following mitigation would be applied in addition to, or in conjunction with, applicable mitigation actions listed in the section entitled "Mitigation Common to all Alternatives" to provide for resource protection.

Geology and Soils.

- Prescribed fire planning would involve prescriptions where low-severity, short-duration fire is desirable. The burn plan would include locating control lines that ensure minimum soil exposure.
- Pile burns would be avoided where geological features or soils may be vulnerable to sterilization. Soil moisture would be high enough to ensure that an organic layer would remain following burning.

Vegetation and Wildlife. Mitigation of impacts on the Indian Communities' native vegetation and wildlife species and habitats consists of, but is not limited to, the following:

- Consultation with natural resource specialists on proposed locations of management actions that may remove or disturb native vegetation/habitat
- Minimization of ground disturbance wherever possible
- Selection of a time of year for actions that least affect breeding and/or nesting animals
- Planned protection of specified habitats for cavity and ground nesters and other wildlife
- Whenever consistent with safe, effective suppression techniques, the use of natural barriers, such as sparsely vegetated areas, would be used as extensively as possible.
- Fire retardant, if used, must be on the approved list of retardants used by the U.S. Forest Service and USDI Bureau of Indian Affairs.

To prevent the introduction of noxious weeds and non-native plant species, the following mitigation measures would be considered:

- Consultation with a Tribal or Agency vegetation management specialist is advised when considering fire effects on existing weed species or potential for weed introductions from the use of fire or any tracked or wheeled equipment use.
- Before any native ecosystems are disturbed (such as with prescribed burning), identify the exotic species likely to invade the disturbed areas and measures to prevent such invasion. Where feasible, control exotics on neighboring lands before they become established on Indian Community lands.

Special Status Species. Any potential disturbance to listed species or habitats would be identified in the planning process generally through informal consultation with the USFWS Ecological Services under Section 7 of the Endangered Species Act (ESA).

Air Quality. The BIA or Tribe should notify local agencies (e.g., fire department, law enforcement, Forest Service, etc.), offices, and individuals before commencing prescribed burning under an approved burn plan. Other mitigation actions would include the following:

- Reduce fuels available for combustion where feasible, and use head-fire ignition with the wind wherever practical to produce flaming versus smoldering combustion.
- Burn at higher fuel moisture of the large (e.g., logs) fuels. Combine this technique with burning at lower fine fuel moisture.
- Reduce particulate emissions for the fuel consumed by reducing the time period of the smoldering phase.
- Avoid smoke-sensitive areas, such as highways during heavier traffic periods (e.g., weekends, holidays), hospitals, extended care facilities, casinos, etc.
- Avoid burning near smoke-sensitive areas when there are strong inversions or very stable high-pressure systems in place.

Water Quality. Mitigation of fire impacts to water quality and aquatic habitat is largely dependent upon the level of wildland fire severity and time of year. Planning to minimize direct impingement of any prescribed fire use on riparian habitats by ensuring the use of ignition techniques that produce low-severity fire and monitoring impacts in key locations are mitigating considerations.

Cultural Resources. Because of the nature and sensitivity of cultural resource site locations, site maps, National Register documentation, photographic records, and drawings are not included in this document. If previously unknown archeological and/or historic resources are discovered during project planning, the resources will be identified and documented and an appropriate mitigation strategy will be developed, if necessary, in accordance with pertinent federal and Tribal laws and regulations. Moreover, the following action shall be implemented for the Salt River Pima Maricopa Indian Community lands:

> *If any human remains or cultural resources are observed on the ground surface or sub-surface during implementation of the plan within the noted area of effect, all work must stop immediately and you must notify the SRPMIC, Cultural Preservation Program immediately. CDD-EPNR hotline number (480-362-7500,* (SRPMIC Policy Statement Letter; dated March 4, 2011).

Human Health and Safety. Mitigation consists of adequate and timely notifications of planned actions and on-site protective measures to ensure that the public (e.g., Community Members) is not exposed to risk posed by fire management activities. This may include closure or restrictions, traffic control to prevent smoke-related incidents on public roadways, and distribution of appropriately-worded flyers and handouts.

3.2 SRPMIC Goals and Objectives Impacting Fuels Management Planning

General

Natural resources and their preservation: are given high priority in the Community. This includes management, restoration, enhancement (where necessary), maintenance and operations. The Red Mountain area, for example, will provide a full range of visitor amenities, management activity, and preservation projects. Exemplary programs of habitat preservation are expected.

Smoke Management

- Regulate the burning of refuse within the Community to limit the emission of harmful pollutants.
- Ensure that industrial operations and other potential stationary sources of air pollutants in the Community adhere to best practices for control of emissions.
- Develop an ambient air quality regulatory program.
- Develop and impose restrictions on burning refuse.

Historic and Archeological Resources

Goal 5.1 To balance land development with protection of historic properties and archaeological sites.

- Identify, evaluate, preserve, and protect significant historic properties and archaeological sites within the Community.
- Require environmental, archaeological, and cultural review and clearance for all development projects.
- Avoid or mitigate impacts to historic properties or archaeological sites when development occurs.
- Require anyone involved in ground-disturbing activities within the Community to be trained in the cultural values of the Community.

3.3 Allotted Trust Lands

The allotted trust lands on SRPMIC pose several challenges to the fuels management program. Permission must be gained from the owners (allottees) of the land prior to any fuels management treatments. This will involve obtaining a long term commitment from the owners due to the nature of fuels treatments and the need for long term follow up over many years.

Allotted lands are often referred to as “trust” lands because the titles to those parcels are held in trust by the United States Government on behalf of individual Indian owners or, less frequently, a Tribe. Within this context, the trust parcels assigned to individuals are referred to as individually owned Indian allotments (hereafter, simply “allotments”), and the individuals are referred to as the landowners of their particular allotments.

As trustee of these lands, the United States Government must ensure that these lands and their resources are maintained in perpetuity for the benefit of their Indian owners. An obvious element of the trust responsibility is the protection of the land and resources from damaging wildland fires.

There are generally two types of allotments; those with leases and those without.

Allotments without Leases or Permits:

In their efforts to fulfill the goals and objectives of the Indian landowners while upholding their trust protection for the allotments, the Agencies must consult with the landowners for all management proposals, excluding emergency treatments. With each allotment commonly having multiple landowners, seeking this guidance and consent can be a real challenge. Despite this difficulty, non-emergency fire and fuels management treatment proposed for any allotment will require a majority interest consensus of its landowners.

Particular care should be taken when ownership is shared with non-trust interests. While the BIA has limited authority to act on behalf of the trust-interest owners, this does not extend to the non-trust owners. Conceivably, the objections of a non-trust owner with only a minor share interest could derail an otherwise popular management effort. In such cases, the BIA and trust interest landowners would be wise to limit fuels treatment projects to standard practices with obvious benefits. Of course, good public relations and education efforts should be promoted as a means to minimize disagreements between the landowners regarding fire and fuels management direction.

Allotments With Leases and Permits

Permits and leases issued for allotments bind the landowners in a contractual obligation to provide certain resources (e.g. forage or timber) and/or allow certain practices (e.g. grazing or farming). With this, the operators (permitees and lessees) also have an interest in the fire and fuels treatment practices on the allotment.

This is especially true with respect to leases, since, in effect, the lessee has some entitlement to all resources on the land (excluding those specifically reserved in the lease agreement). In addition, a lessee has a relatively long-term investment in the land (typically, five years for farm

and grazing leases). As a result, some sort of fuels management may be expected as a condition of the lease. Indeed, standard language in a farming and grazing lease that authorizes operations conducted in accordance with recognized principle of good practice and prudent management. Accordingly, prescribed burning, herbicide applications, or mechanical means (e.g. mowing, plowing, or disking) are commonly employed by the lessee to control weeds, keep invader species in check, and promote forage growth.

In approving a lease, the landowners have thus consented to allow prudent management practices for the land and its resources. This consent shall be assumed to extend to any BIA-administered treatments implemented protect and enhance the trust resources. Given the meager income resulting from lease revenues after they are distributed to the multiple owners of the typical allotment, these conservation and management efforts, whether done by the operator or BIA, are often the primary benefit.

Permitees generally have less at stake, since their entitlements are limited to a specific resource or practice and for a period of time not exceeding one year. Further, fuels treatments are not inherently included in the permit authority, so they must be specifically authorized as a terms of the permit. This applies to both parties. For example, a permittee would certainly raise objections if a prescribed burn implemented by the landowners damaged the timber he had been authorized to harvest. Alternately, a permittee would be acting beyond the scope of practices authorized in the permit if the prescribed fire he ignites to treat his logging slash subsequently consumes the forage in use by the landowners.

4. Smoke Management

4.1 Smoke Management References and Guides

Smoke management guidelines are found in the following documents:

- Interagency Prescribed Fire Planning and Implementation Procedures Guide (IPFP)
- NWCG Smoke Management Guide for Wildland Fire for Prescribed and Wildland Fire, NFES 1279 (SMG)
- Bureau of Indian Affairs, Fuels Management Program, Supplement to the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide

4.2 General Policy

Individual prescribed fire plans need to meet BIA Regional standards, BIA National level standards and interagency standards.

A smoke management program should be developed to guide prescribed fire implementation. The purposes of smoke management programs, within the Clean Air Act, are to mitigate the nuisance and public safety hazards posed by smoke intrusions into populated areas; to prevent deterioration of air quality and National Ambient Air Quality Standards (NAAQS) violations; and to address visibility impacts in mandatory Class I Federal areas in accordance with regional haze rules. The smoke management program should establish a basic framework of procedures and requirements for managing smoke from prescribed fires.

Tribes meeting "treatment in the same manner as a state" criteria (refer to section 301(d) of the Clean Air Act) should be encouraged to develop Tribal Implementation Plans (TIP) to meet the intent of the Clean Air Act and develop Tribal Smoke Management Programs to monitor and manage emissions. Tribes and the Bureau should collaborate with interagency partners (other Tribes, Federal, State, local governments) on air quality and smoke management issues, including monitoring, airshed management, and funding. This collaboration should occur at various levels, such as the Zone, Geographic Area Coordination Center (GACC), and region. The Tribes, Bureau, and their interagency partners should develop protocols for notifications and monitoring to mitigate smoke impacts.

4.3 Implementation

Smoke sensitive receptors will be identified in each prescribed burn and fire for resource benefit plan. Mitigation strategies for avoidance, emission reductions or dilution will be discussed. Air quality compliance must be managed in accordance with Tribal, and Federal mandates. The individual/position responsible for ensuring compliance, obtaining permits when necessary and conducting smoke and air quality monitoring will also be identified and their time frame for completion and reporting outlined. Emissions production and dispersion will be modeled using

the most current, appropriate and available software. These outputs will be included in the appendices of the prescribed fire and fire use plans

4.4 Air Quality

Air quality concerns involve both visibility and respiratory health issues. Salt River Agency, SRPMIC and FMYN are concerned with air quality standards in Maricopa County air shed. Maricopa County is the most heavily populated location in Arizona. Maricopa County is currently nonattainment for particulate matter (PM10).

4.5 Smoke Management Program Considerations

The following is a list of guidelines and topics to consider when managing smoke. For additional information reference the NWCG Smoke Management Guide for Wildland Fire for Prescribed and Wildland Fire, (SMG).

- Public health and exposure
- Visibility
- Problem and nuisance smoke
- Smoke exposure amongst fireline personnel
- Regulations for smoke management
- State smoke management programs
- Federal land management-special requirements
- Smoke source characteristics
- Fire use planning
- Smoke management meteorology
- Techniques to reduce or redistribute emissions
- Smoke dispersion prediction systems
- Air quality monitoring for smoke
- Emission inventories
- Smoke management program administration and evaluation

Three principle strategies should be used to manage smoke from prescribed fire are: avoidance, dilution and emission reduction.

Avoidance is the strategy of considering meteorological conditions when scheduling prescribed fire or allowing fire use in order to avoid an incursion of smoke into smoke-sensitive areas. It will be emphasized with consideration of wind direction and speed. Other factors to consider might include burn size, timing, firing techniques, and reduction of burn area by use of mechanical and other non-fire techniques.

Dilution is controlling the rate of emissions for dispersion to assure tolerable concentrations of smoke in designated areas. This is generally accomplished by burning in unstable weather systems on optimal days with smoke ventilation. This is usually carried out when meteorological conditions are fair or better for dispersion of smoke.

Emissions reduction is minimizing smoke output per unit area treated. It shall be done by burning at lower fuel moisture, reducing pre-burn fuel loading through increased utilization, and lowering the emission factor with backing. Nighttime burning is particularly undesirable because smoke may drift and settle in low valleys creating an inversion that will remain in place until the next day.

4.6 Prescribed Fire Project Guidelines for Smoke Management

- NWCG Smoke Management Guide for Wildland Fire for Prescribed and Wildland Fire, NFES 1279 (SMG)
- Bureau of Indian Affairs, Fuels Management Program, Supplement to the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide

4.7 Responsibilities and Coordination

The responsibilities and coordination of smoke management for prescribed burns and wildland fire use are:

- The FMO will provide coordination for all smoke management on trust lands
- The Prescribed Fire Manager (RXFM) and Prescribed Burn Boss (RXBB) will provide technical, state of the art guidelines in preparing smoke management plans for prescribed fires

4.8 Goals and Objectives

- Avoidance of smoke impairment on communities near prescribed burns
- Avoidance of smoke impairment along major roads
- Avoidance of smoke impairment to adjacent lands under other jurisdictions.

4.9 Smoke Modeling

Modeling may be used to identify potential problems and develop mitigation strategies. There are several ways to model smoke, ranging from complex to simple. In the planning process, the burn boss needs to quickly estimate possible visibility and particulate violations, as well as select an appropriate model that is simple but produces results. To accomplish this, it requires an understanding of the limitations of the models. With sensitive or critical targets, the Simple Approach Smoke Estimation Model (SASEM) should be used as a minimum. This model has its limitations with rough terrain, but does provide a starting point for estimating smoke production, trajectory, dispersion, and air pollutant levels. Emission prediction in itself can be done by a simple formula. If there are no sensitive or critical targets, the minimum monitoring acceptable is

visual with written documentation on a smoke data sheet. Follow BIA Regional or National level guidelines for smoke modeling.

5. Existing Condition

5.1 Fuel Models

Fuel models are discussed in detail in the BIA Salt River Agency WFMP. Tables 1-8 outline the vegetation types, fuel types and fuel models for each Tribe. Figures 1-6 are maps for each individual Tribe showing the above mentioned information.

Table 1. PASCUA YAQUI TRIBE, FUEL MODELS

DESCRIPTION	ACRES
FBFM1: Surface fires that burn fine herbaceous fuels	1,198
FBFM2: Burns fine, herbaceous fuels	35
FBFM5: Low intensity fires, young, green shrubs	242
FBFM8: Slow, ground burning fires, closed canopy stands	132
NB1: Urban	260
TOTAL	**1,867**

Table 2. FORT MCDOWELL YAVAPAI NATION, FUEL MODELS

DESCRIPTION	ACRES
FBFM1: Surface fires that burn fine herbaceous fuels	8,844
FBFM2: Burns fine, herbaceous fuels	9,302
FBFM5: Low intensity fires, young, green shrubs	5,360
FBFM6: Broad range of shrubs	4
FBFM8: Slow, ground burning fires, closed canopy stands	149
NB1: Urban	2
NB3: Agriculture	938
NB8: Water	314
NB9: Barren	36
TOTAL	**24,949**

Table 3. SALT RIVER PIMA MARICOPA INDIAN COMMUNITY, FUEL MODELS

DESCRIPTION	ACRES
FBFM1: Surface fires that burn fine herbaceous fuels	24,568
FBFM2: Burns fine, herbaceous fuels	11,794
FBFM5: Low intensity fires, young, green shrubs	3,998
FBFM6: Broad range of shrubs	0.4
FBFM8: Slow, ground burning fires, closed canopy stands	2,660
NB1: Urban	1,115
NB3: Agriculture	10,183
NB8: Water	236
NB9: Barren	23
TOTAL	**54,577**

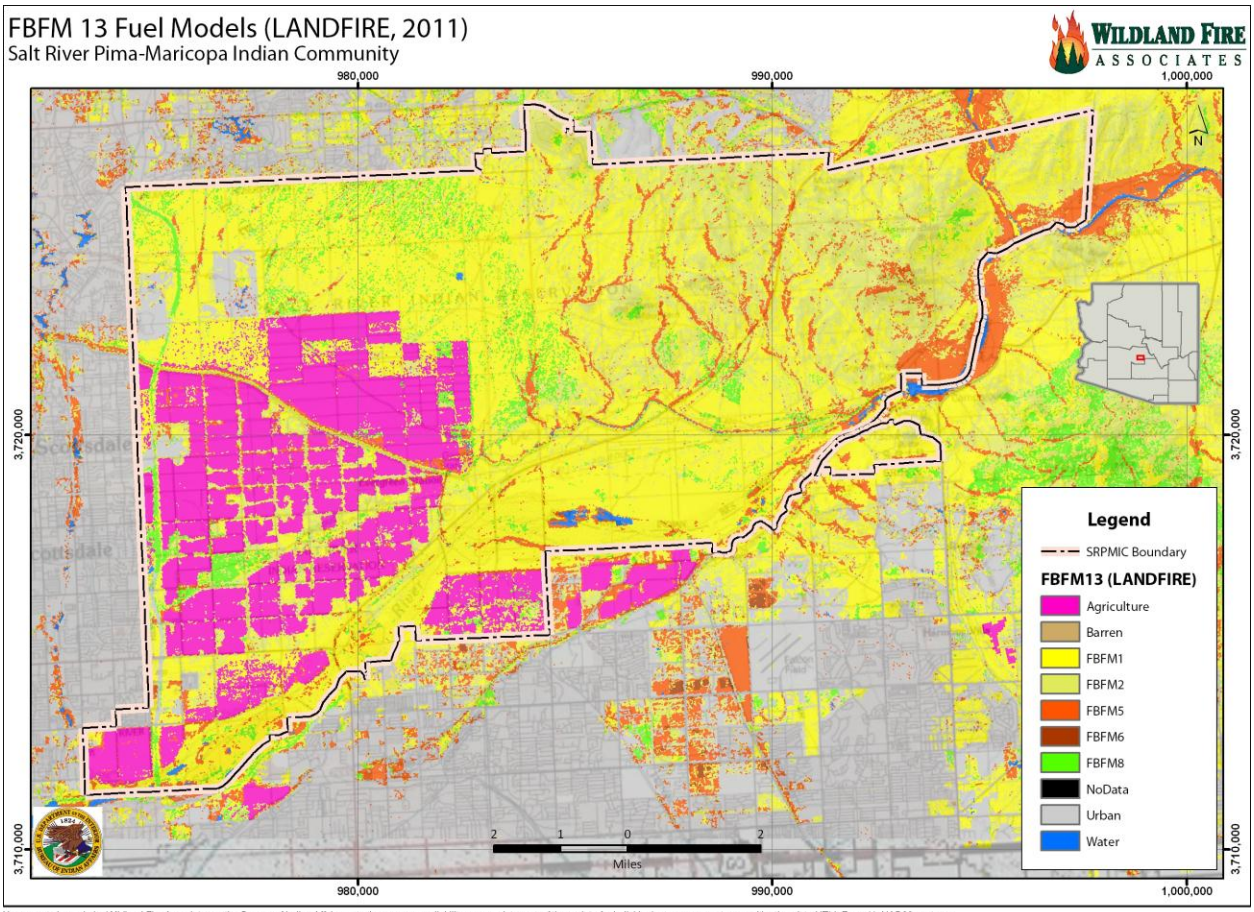
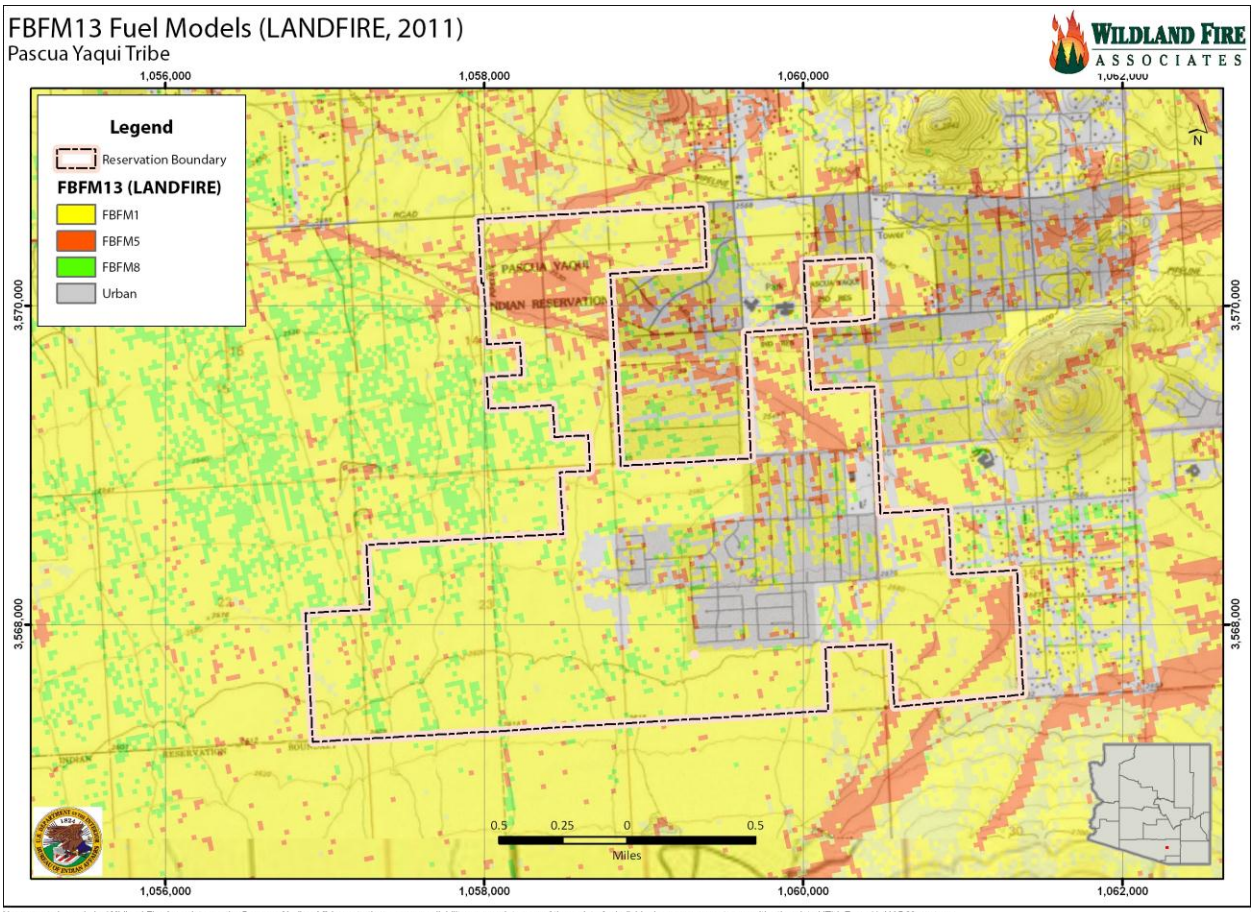


Figure 1, SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY, FUEL MODELS



No warranty is made by Wildland Fire Associates or the Bureau of Indian Affairs as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.UTM, Zone 11, NAD83, meters.

Figure 2. PASCUA YAQUI TRIBE, FUEL MODELS

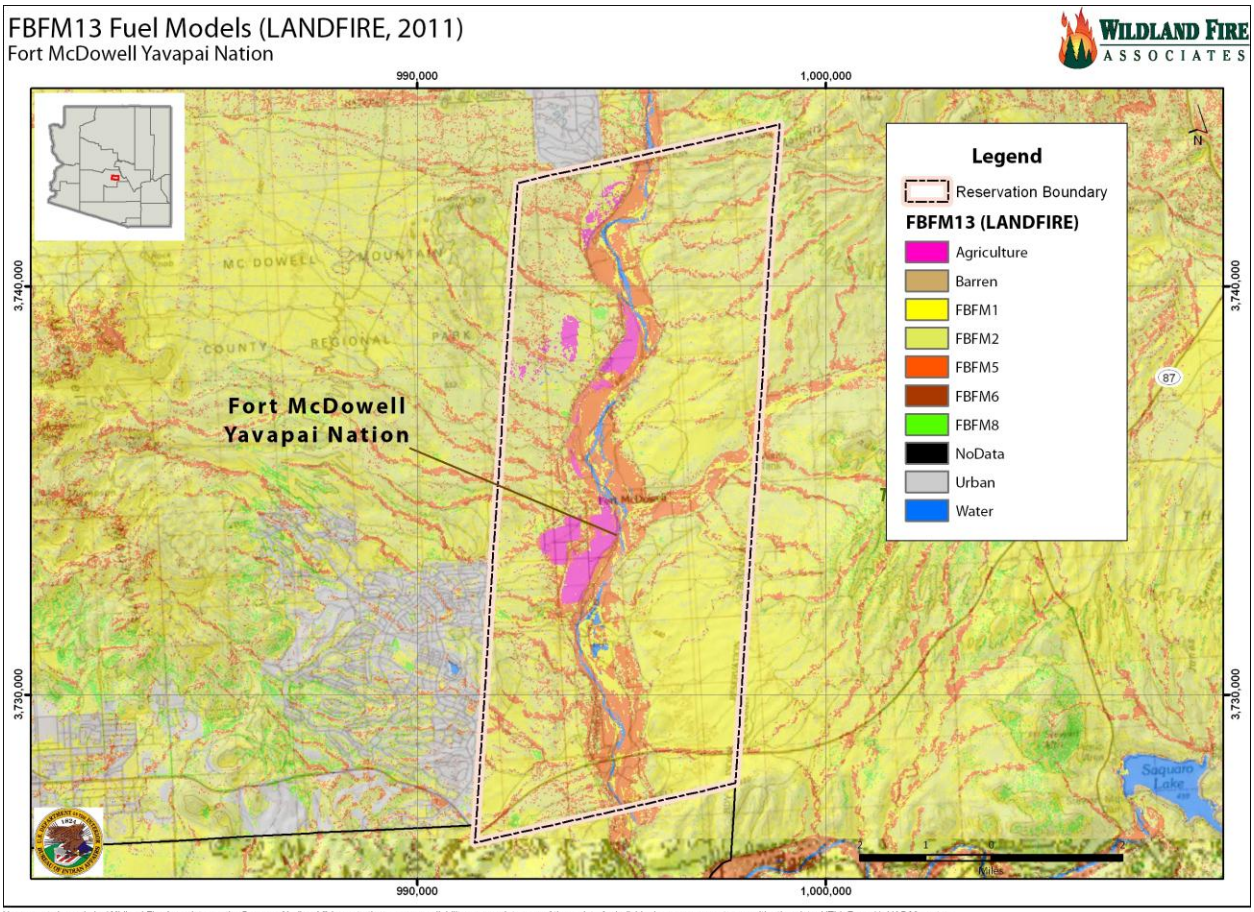


Figure 3. FORT MCDOWELL YAVAPAI NATION, FUEL MODELS

5.2 Existing Vegetation Types

Table 4. PASCUA YAQUI TRIBE, EXISTING VEGETATION

DESCRIPTION	ACRES
Developed - Open Space	260
Sonora-Mojave Creosotebush-Whole Bursage Desert Scrub	1
Sonoran Mid-Elevation Desert Scrub	40
Apacherian-Chihuahuan Mesquite Upladn Scrub	66
Sonoran Paloverde-Mixed Cacti Desert Scrub	1,303
Inter-Mountain Basins Semi-Desert Grassland	0
North American Warm Desert Riparian Systems	190
Introduced Upland Vegetation-Annual and Biennial Forbland	8
TOTAL	**1,868**

Table 5. FORT MCDOWELL YAVAPAI NATION, EXISTING VEGETATION

DESCRIPTION	ACRES
Open Water	109
Developed - Open Space	2
Argiculture-Pasture/Hay	938
Southern Rocky Mountain Ponderosa Pine Woodland	0.2
Sonora-Mojave Creosotebush-Whole Bursage Desert Scrub	1,508
Sonora-Mojave Mixed Salt Desert Scrub	18
Sonoran Granite Outcrop Desert Scrub	61
Apacherian-Chihuahuan Mesquite Upladn Scrub	264
Mogollon Chaparral	5
Sonoran Paloverde-Mixed Cacti Desert Scrub	18,041
North American Warm Desert Riparian Systems	3,996
Introduced Upland Vegetation-Annual and Biennial Forbland	7
TOTAL	**24,949**

Table 6. SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY, EXISTING VEGETATION

DESCRIPTION	ACRES
Open Water	93
Developed - Open Space	1,115
Agriculture-Pasture/Hay	10,183
Sonora-Mojave Creosotebush-Whole Bursage Desert Scrub	7,355
Sonora-Mojave Mixed Salt Desert Scrub	15
Sonoran Granite Outcrop Desert Scrub	413
Apacherian-Chihuahuan Mesquite Upladn Scrub	539
Mogollon Chaparral	11
Sonoran Paloverde-Mixed Cacti Desert Scrub	31,878
North American Warm Desert Riparian Systems	2,926
Introduced Upland Vegetation-Annual and Biennial Forbland	47
TOTAL	**54,575**

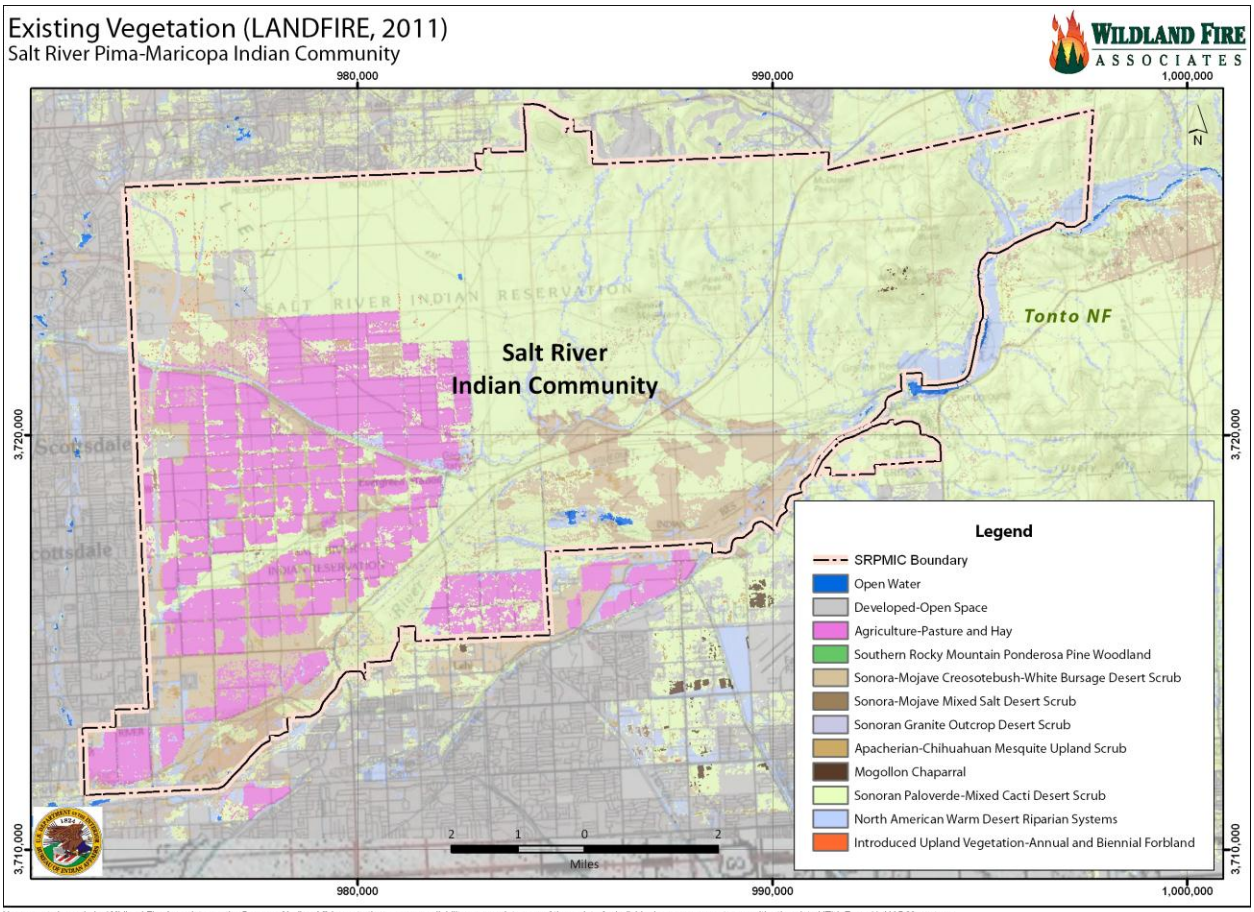


Figure 4. SALT RIVER PIMA-MARICOPA INDIAN COMMUNITY, EXISTING VEGETATION

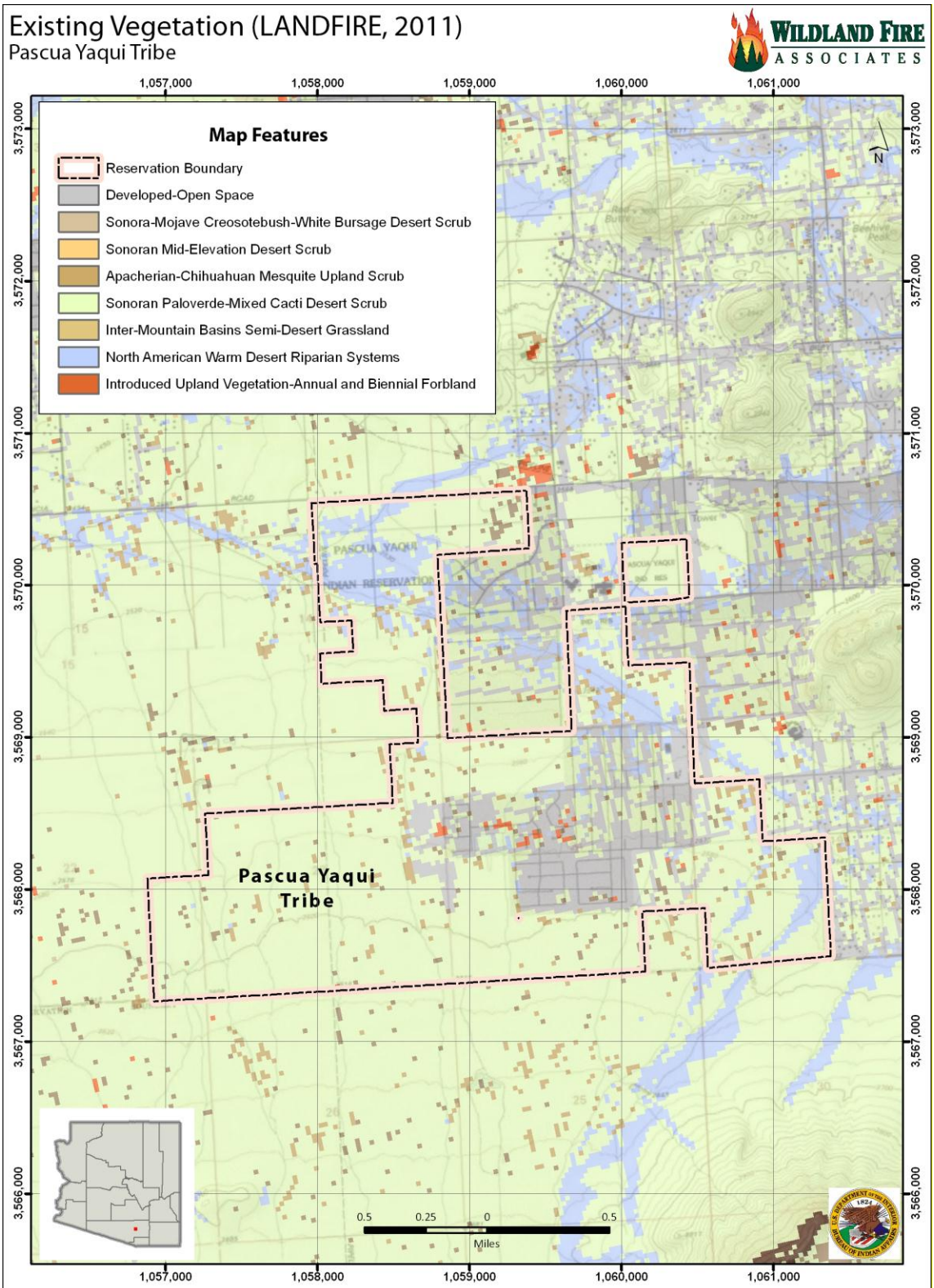


Figure 5. PASCUA YAQUI TRIBE, EXISTING VEGETATION

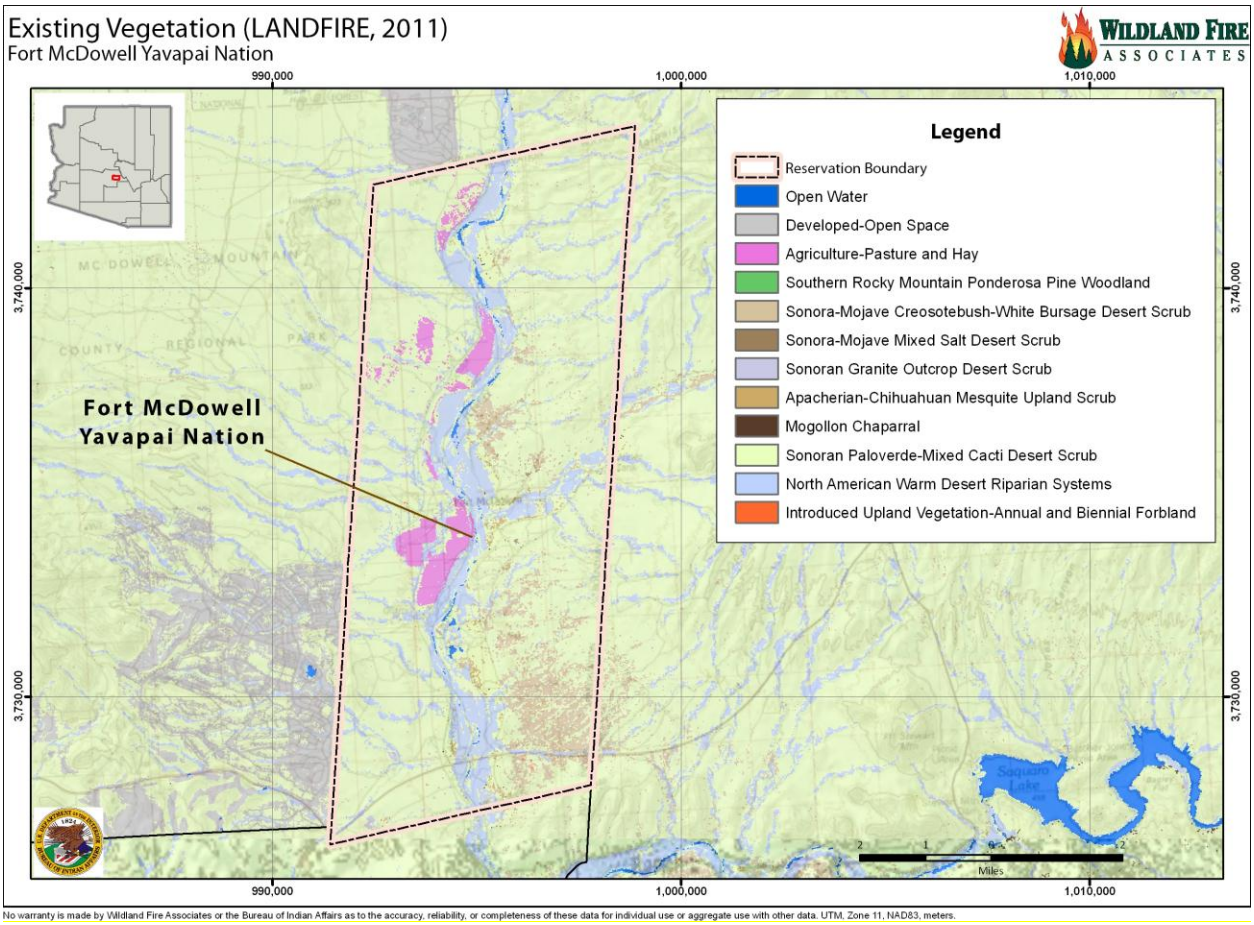


Figure 6. FORT MCDOWELL YAVAPAI NATION, EXISTING VEGETATION

5.3 Fire Management Unit (FMU) Information and Maps

Reference the BIA Salt River Agency WFMP

5.4 Fire Regime/Condition Class

Reference the BIA Salt River Agency WFMP

5.5 Communities at Risk and Wildland Urban Interface (WUI)

The size and location of designated fuel breaks in WUI areas will depend on values at risk, anticipated fire behavior based on fuels, topography, prevailing winds and other considerations. The actual extent of WUI treatments may range from a hundred feet to hundreds of yards from structures and other sites to be protected. The extent of treated areas and the design of treatments will, in essence, be guided by the need to provide adequate defensible space for fire crews employed in structure protection under extreme fire conditions.

WUI areas have been designated based on information from the SILVIS program developed by the University of Wisconsin-Madison Spatial Analysis for Conservation and Sustainability.

SILVIS has specific standards for designating WUI. WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres (16 ha). Intermix communities are places where housing and vegetation intermingle. In intermix, wildland vegetation is continuous, more than 50 percent vegetation, in areas with more than 1 house per 16 ha. Interface communities are areas with housing in the vicinity of contiguous vegetation. Interface areas have more than 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area (made up of one or more contiguous Census blocks) over 1,325 acres (500 ha) that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI.

The SILVIS WUI definitions also address buffer areas. The California Fire Alliance (2001) defined "vicinity" as all areas within 1.5 mi (2.4 km) of wildland vegetation, roughly the distance that firebrands can be carried from a wildland fire to the roof of a house. It captures the idea that even those homes not sited within the forest are at risk of being burned in a wildland fire. SILVIS WUI uses this standard when defining homes at risk in the mapping process.

WUI maps are intended to illustrate where the WUI was located in 2000. There are two map types of WUI: intermix and interface. Intermix WUI are areas where housing and vegetation intermingle; interface WUI are areas with housing in the vicinity of contiguous wildland vegetation. WUI maps should not be construed as maps of entire communities but rather they represent only those structures or cities that meet the above definitions. Nor should WUI maps be used for tactical or operational planning because the information is dated and the maps do not represent the actual locations of every structure.

Another formal program that exists that identifies WUI areas, is communities at risk. The State of Arizona Communities at Risk list shows there haven’t any communities designated on SRPMIC, PYT or FMYN.

Figures 7, 8, and 9 below, show the wildland urban interface area as delineated from the SILVIS program.

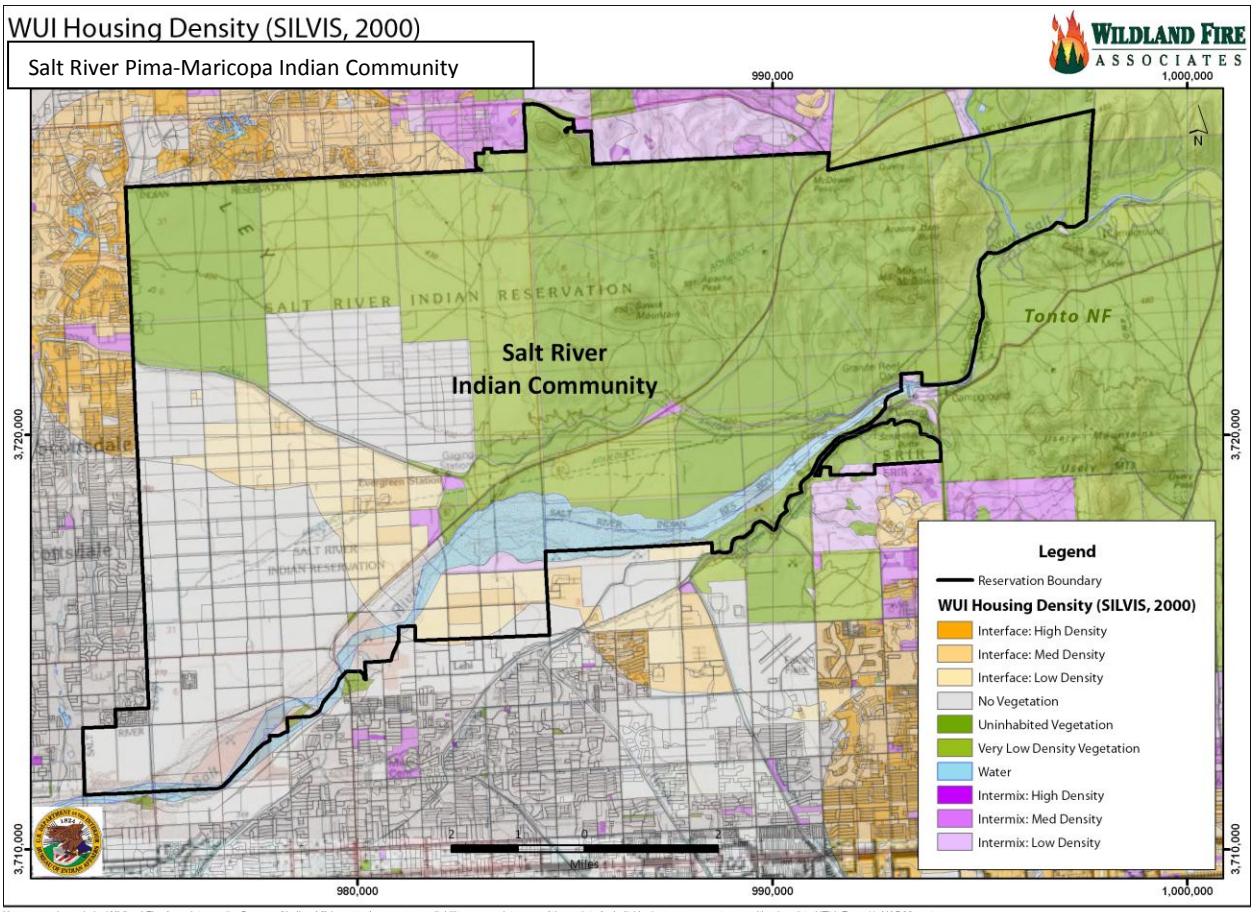
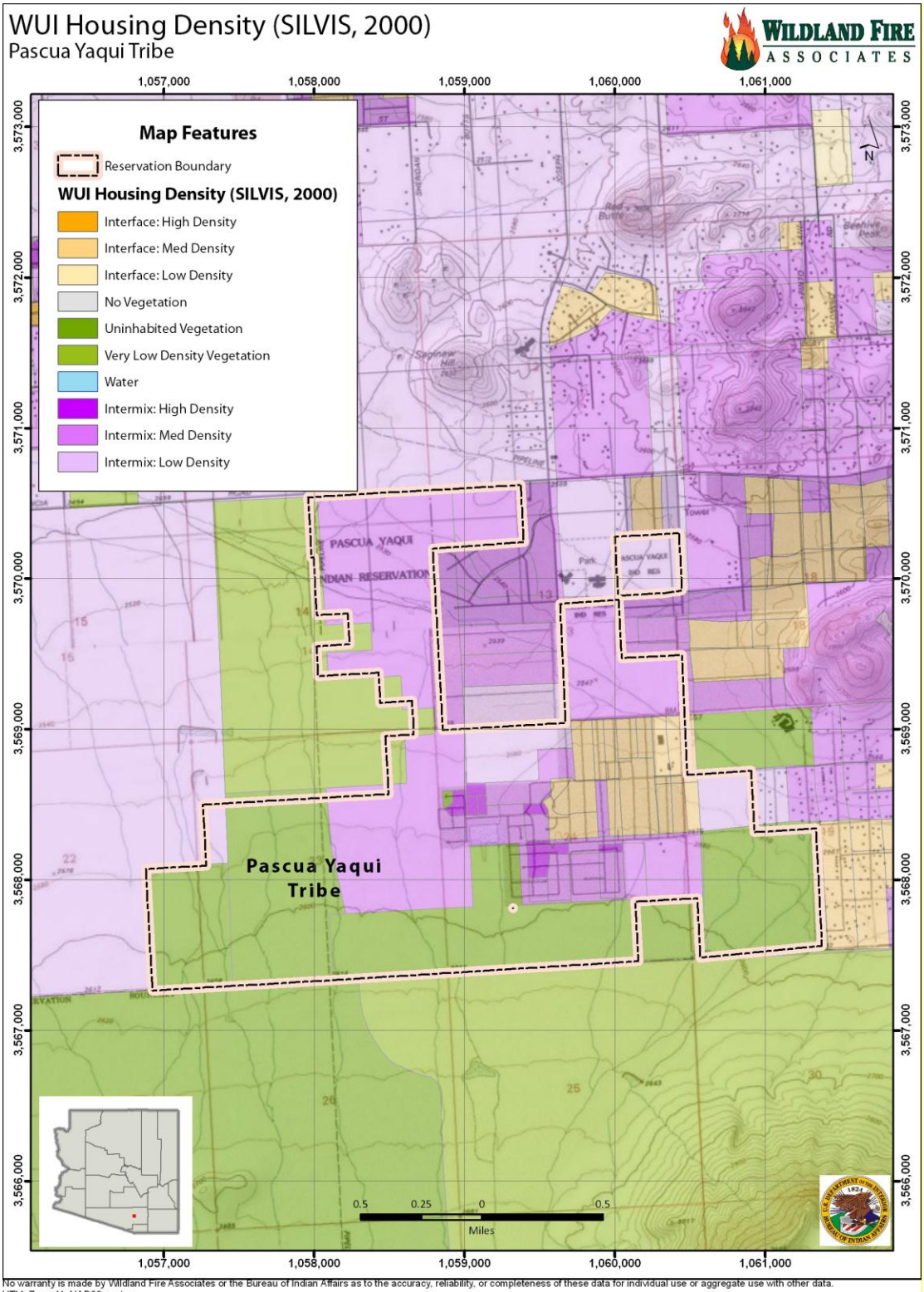


Figure 7. SRPMIC SILVIS MAP



No warranty is made by Wildland Fire Associates or the Bureau of Indian Affairs as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.
UTM, Zone 11, NAD83, meters.

Figure 8. PYT SILVIS MAP

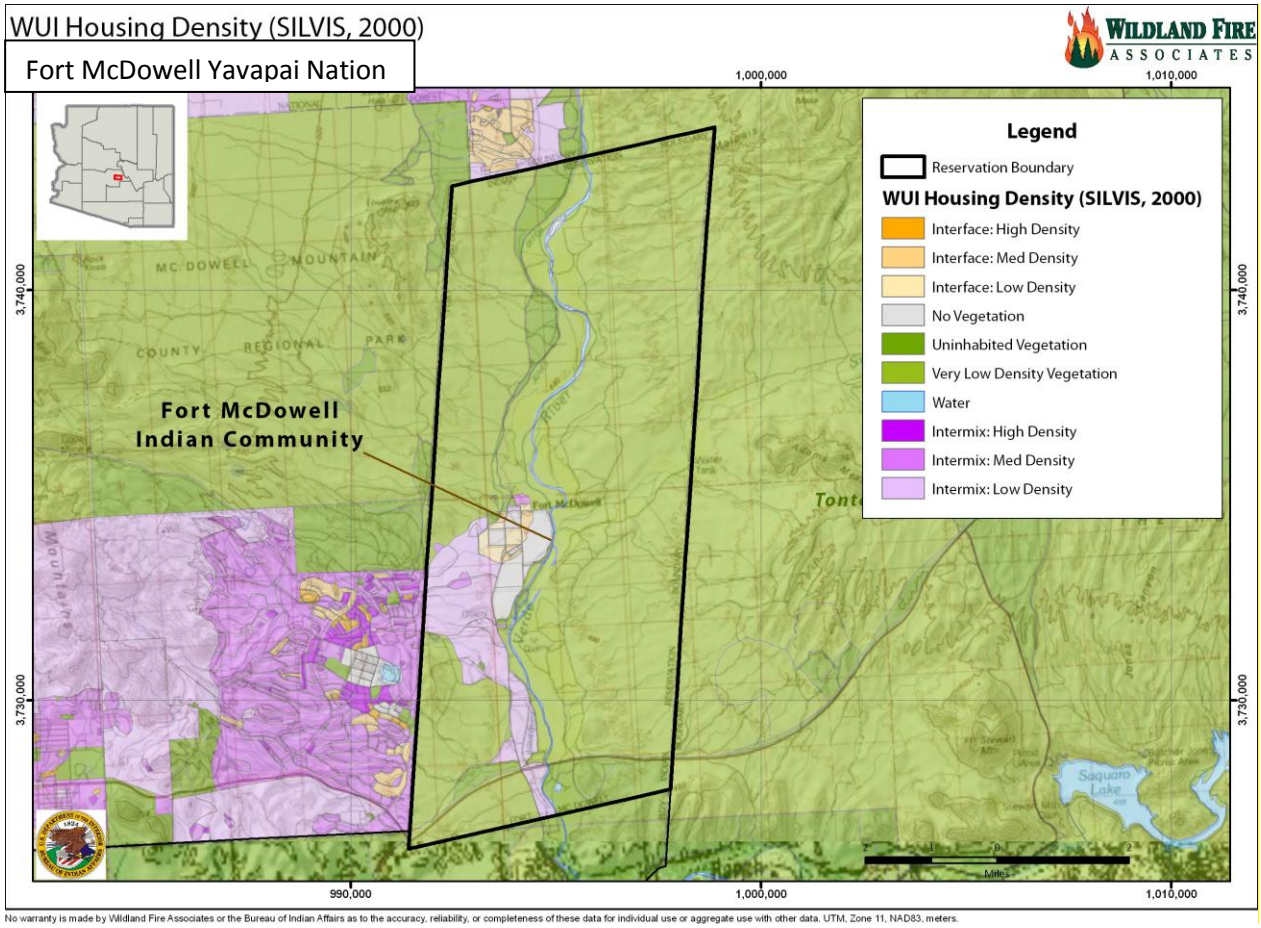


Figure 9. FMYN SILVIS MAP

5.6 Risk Assessment and Prioritization of WUI and Non-WUI Treatment Areas

Fire Management Units (FMUs) have been identified and described in detail in Chapter 3, of the Wildland Fire Management Plan. Based upon the criteria listed in that chapter, fuels treatments (and other management actions) appropriate for fuels type and conditions in relation to resources and values at risk are identified. Communities at risk and areas and Fire Regimes I, II, and III in Condition Classes 2 and 3 receive top priority as funding and available resources dictate.

Fuels treatments in the WUI will be prioritized using the SILVIS WUI classification system, supplemented by local knowledge and updated maps of communities. The first priority in all fire management units will be to manage tamarisk fuels in the high density WUI interface areas with the last priority being the treatment of fuels in uninhabited areas, locations with low fuel loadings and low density housing areas.

The priority for fuels management in Non-WUI areas will be to break up continuous concentrations of tamarisk fuels or buffelgrass by constructing fuel breaks.

5.7 Past Treatment Areas

There haven't been any documented fuels treatments on SRPMIC, FMYN and PYT.

6. Goals and Objectives

6.1 Interagency Program Goals

Interagency Prescribed Fire Program goals are to:

- Provide for firefighter and public safety as the first priority.
- Ensure that risk management is incorporated into all prescribed fire planning and implementation.
- Use prescribed fire in a safe, carefully planned, and cost-efficient manner.
- Reduce wildfire risk to communities, municipal watersheds and other values and to benefit, protect, maintain, sustain, and enhance natural and cultural resources.
- Utilize prescribed fire to restore natural ecological processes and functions, and to achieve land management objectives.

6.2 BIA National Program Goals

- Create a safe environment for firefighters and those who live and recreate in fire prone ecosystems
- Meet Tribal resource management goals
- Involve collaborative efforts with stake holders to reduce risks to communities, restore and maintain healthy ecosystems, and protect our cultural and natural resources
- Restore fire as a natural and managed process in fire dependent ecosystems
- Develop and maintain a competent and skilled work force
- Integrate fuels reduction with other natural resource program activities
- Support biomass utilization and promote healthy economies
- Incorporate fire monitoring to measure fire effects and assure desired conditions are met

6.3 Local Program Goals and Objectives

The fuels management program goals will reflect the goals and objectives as identified in the WFMP and the associated EA. The AZSRA, SRPMIC, PYT, and FMYN fuels management program emphasizes its commitment to the collaborative process necessary in the development of a fuels treatment program that crosses boundaries in order to effectively protect communities and restore and maintain ecosystems.

The Wildland Fire Management Plan provides general guidance for fuels management within each Fire Management Unit (FMU). It does not provide specific management direction including detailed treatment objectives, treatment priorities, monitoring or treatment schedules. Reference the WFMP for fire management goals, objectives and strategies.

6.3.1 Objectives and Strategies from the Environmental Assessment

The following objectives for the Indian Communities of Salt River, Ft. McDowell, and Pascua Yaqui were identified during internal scoping discussions by an interdisciplinary team following review of existing planning documents and Bureau policies. All alternatives selected for detailed analysis must largely meet all the objectives as well as the purpose and need for action.

It is recognized that achieving every objective to its fullest extent is often not possible because of inherent conflicts between specific objectives. That is, one objective cannot be completely emphasized to the exclusion of the others. However, human safety would remain the highest priority. The following is a list of resource-related fire management objectives for the proposed wildland fire management plan:

- Make firefighter and public safety the highest priority of every fire management activity.
- Suppress all unwanted and undesirable wildland fires to protect Indian Community property, and natural and cultural resources.
- Manage wildland fires in concert with federal, state, and local air quality regulations.
- Improve plant diversity in wildlife habitats.
- Reduce wildland fire hazard around developed areas and adjacent to cultural and historic sites.
- Promote understanding, appreciation, and support among Tribal leaders, members and neighbors for the wildland fire management program.
- Slow or halt the expansion of, and reduce existing stands of, salt cedar that present a fire hazard to Community values at risk.
- Reduce populations of buffelgrass and cheat grass where feasible to reduce hazardous fuels concentrations around Community values at risk.
- Enhance existing mesquite populations where feasible to promote traditional Indian Community cultural values.

The following are proposed strategies to meet objectives:

- Employ Tribal members for fire management activities whenever possible.
- Use minimum impact suppression techniques for all wildland fires.
- Use prevention and education strategies to promote understanding and support of the fire management program.
- Employ prescribed fire, mechanical, and/or hand methods for fuels management.
- Apply approved biocides (e.g., herbicides) under a fuels management plan for target species.

6.3.2 Salt River Pima Maricopa Indian Community (SRPMIC) Fuels Management Goals & Objectives

1. Reduction of hazardous fuels throughout SRPMIC, concentrating attention on the wildland urban interface
2. Reduction of hazardous fuels
   - Locations for fuel breaks, in wildland urban interface areas, and in areas of significant resource areas (cultural, sacred, or other) will be designated and constructed.
   - Hazardous fuels will be inventoried, prioritized, and reduced through the use of chemical, biological, or mechanical treatment.
   - Defensible space around SRPMIC developments, transportation corridors, and reservation boundaries that are adjacent to subdivisions of Scottsdale and Mesa will be created and maintained within and around these wildland urban interface areas.
3. Hazard reduction operations may employ mechanical and/or herbicide, and chemical treatments, as appropriate for specific projects.
4. Ensure that firefighter and public safety IS the first priority in every fire management activity
5. Minimize danger to people and damage to structures and other property in the wildland/urban interface
6. Prioritize, develop, and implement fire management plans, programs, and activities in support of BIA trust responsibilities and the Tribes' resource management initiatives.
7. To extent possible control smoke emissions from wildland fire to minimize impact on air quality
8. Monitor fuels management treatments for effectiveness and update GIS systems
9. Update GIS vegetation maps and work with the LandFire system to keep it up to date

6.3.3 Pascua Yaqui Tribe (PYT) Fuels Management Program Goals & Objectives

- Use fuels management treatments to improve wildlife habitat and to enhance native plants and ecosystems
- Use mechanical treatments and prescribed fire as a tool to manage hazardous fuels
- Maintain fuels in WUI areas at non-hazardous levels to provide for public and fire fighter safety
- Construct fuel breaks to protect WUI areas and to allow for safe access corridors
- Hazardous fuels will be inventoried, prioritized, and reduced through the use of chemical, biological, or mechanical treatment.
- Monitor fuels management treatments for effectiveness and update GIS systems
- Update GIS vegetation maps and work with the LandFire system to keep it up to date
- Burn piles generated from construction projects, canals cleaning or other natural events such as floods

6.3.4 Fort McDowell Yavapai Nation (FMYN) Fuels Management Goals & Objectives

- Use fuels management treatments to improve wildlife habitat and to enhance native plants and ecosystems

- Use mechanical treatments and prescribed fire as a tool to manage hazardous fuels
- Maintain fuels in WUI areas at non-hazardous levels to provide for public and fire fighter safety
- Construct fuel breaks to protect WUI areas and to allow for safe access corridors
- Hazardous fuels will be inventoried, prioritized, and reduced through the use of chemical, biological, or mechanical treatment.
- Monitor fuels management treatments for effectiveness and update GIS systems
- Update GIS vegetation maps and work with the LandFire system to keep it up to date
- Burn piles generated from construction projects, canals cleaning or other natural events such as floods

7. Fuels Management Strategies

7.1 General Operational Guidance

Fuels management treatment alternatives are an attempt to return to and/or maintain a desired site condition. SRPMIC, PYT, FMYN and AZSRA recognize that, due to the complexities of managing tamarisk fuels, and other overgrown or invasive species, that a wide variety of tools should be looked at in designing fuel treatment projects. Tools that should be considered include prescribed fire, mechanical, and chemical treatments. These treatments will be used to reduce naturally occurring hazardous fuels accumulations in addition to fuels accumulations resulting from prior resource management actions, such as fire suppression efforts, and other land use activities, such as grazing. The intent is to incorporate these fuels management treatments with other resource management activities, in order to meet Tribal goals and objectives.

The main emphasis for fuels management SRPMIC, PYT, and FMYN lands will be managing tamarisk or other invasive species infestations by constructing fuel breaks, generally on or near existing roads. The main priority will be on setting up projects on Tribal owned lands with consideration given to allotted lands.

7.2 Budget Requests and Reporting

The development of fuel treatment proposals is typically accomplished one to five years in advance of planned treatments. Field reconnaissance and interdisciplinary analyses are usually completed one to two years in advance of project implementation.

Funding for planned treatments will be submitted to the BIA Western Regional Office annually, based on analysis of areas identified for potential treatments. Funding requests for planning activities (i.e. NEPA, economic analysis, monitoring, and cultural resource surveys) can be submitted earlier than one year prior to implementation if needed.

All funding requests for hazardous fuels reduction project activities and treatments must be submitted through the National Fire Plan Operations and Reporting System (NFPORS) system by early spring (March/April) of the prior fiscal year. Activities funding requests (NEPA compliance, project planning, and project administration) only require the request to be submitted by the due date to be considered. Treatment funding requests, however, must be accompanied by an approved treatment plan, documentation of NEPA compliance (Decision Notice or Decision Memo), Tribal concurrence by Resolution, and a cover letter from the Superintendent stating that all NEPA compliance requirements have been met, or outlining the status of those projects awaiting final NEPA clearance.

7.3 Description of Treatments in Fire Management Units

7.3.1 General Philosophy

The intent of fuels management is to ensure selected approaches are effective and efficient, and decisions are well documented. Successful management will also remain open to new or altered approaches based on the latest information, technology, or experiences; i.e., adaptive management.

The fuels program needs to be a cooperative effort between the BIA, FMYN, SRPMIC, and PYT and should include other partners including the State of Arizona, local counties, and other Federal Agencies, as appropriate. This is due to the complex nature of managing fuels , especially invasive species in southwestern ecosystems such as tamarisk and buffelgrass. Matching fuels management funding with other sources of dollars is essential.

7.3.2 Fire Ecology of Tamarisk (Salt Cedar)

The management of tamarisk fuels is a very challenging prospect, due to the biology of this plant species and its fire ecology, which is well documented in the Fire Effects Information System (FEIS). For the purposes of this plan the name tamarisk (or salt cedar) will be used when discussing fuels management planning.

There are several species of tamarisk in the United States but not all are invasive. The principal invasive species are T. chinensis and T. ramosissima, and these species may have hybridized in the southwestern United States. T. ramosissima is native to the Ukraine and Iraq east though it is now commonly cultivated and invasive in Arizona and California, with specimens also found in Nevada, Utah, Colorado, New Mexico, Oklahoma, Texas, Kansas, Arkansas, and New Mexico. T. chinensis is native to Mongolia and China to Japan. It is now common in Arizona, New Mexico, Oklahoma, and Texas, with specimens from California, Nevada, Colorado, Arkansas, North Carolina, British Columbia, Manitoba, Ontario, and Quebec.

Fire adaptations: Evidence for specialized adaptation to fire in tamarisk remains unclear, despite its efficient post fire recovery. An abundance of anecdotal and observational evidence indicates that tamarisk can sprout and rapidly form new plants after top-kill from fire.

Tamarisk leaves are not highly flammable due to high moisture content, even though they contain volatile oils. Tamarisk flammability increases with the build-up of dead and senescent woody material within the plant, and dense stands of tamarisk can be highly flammable. When plants burn under conditions of high fuel loads, fire tends to be more severe, top-killing more tamarisk plants in a stand and increasing the likelihood of killing the root crown of some individuals.

Fire regimes: Information on fire regimes in which tamarisk evolved is lacking. There is little quantitative information on prehistoric frequency, seasonality, severity and spatial extent of fire in North American riparian ecosystems. According to a review by the U.S. Fish and Wildlife Service, fire frequency probably varied with drought cycles, prevalence of lightning strikes, prevalence of burning by Native Americans, and fires in surrounding uplands. Fire was probably more frequent along rivers in grassland and savanna biomes than those in deserts, chaparral shrub lands, and conifer forests.

Fires in low- to mid-elevation southwestern riparian plant communities dominated by cottonwood, willow and/or mesquite are thought to have been infrequent. Evidence used to support this supposition includes the high water content of most riparian forests; low fire frequency in much of the surrounding uplands (Sonoran and Mojave desert, and drier portions of Chihuahuan desert and Great Basin desert scrub); and suggestions that the dominant trees in these communities, notably Fremont and Rio Grande cottonwood, are not well-adapted to fire. There remains, however, considerable uncertainty as to the effects of fire on cottonwood.

Increases in fire size or frequency have been reported for the lower Colorado and Bill Williams, Gila, Rio Grande, and Owens rivers in recent decades. While tamarisk may promote more frequent and severe wildfires in these areas, the role of fire in these ecosystems is still not well understood. Fire appears to be less common in riparian ecosystems where tamarisk has not invaded. Increases in fire size and frequency are attributed to a number of factors including an increase in ignition sources, increased fire frequency in surrounding uplands, and increased abundance of fuels.

The structure of tamarisk stands may be more conducive to repeated fire than that of native vegetation. Tamarisk and Russian-olive can contribute to increased vertical canopy density, creating volatile fuel ladders, thereby increasing the likelihood and impacts of wildfire. Tamarisk plants can have many stems and high rates of stem mortality, resulting in a dense accumulation of dead, dry branches. Large quantities of dead branches and leaf litter are caught in tamarisk branches above the ground surface, enhancing the crowns' flammability. Authors have suggested that fire hazard peaks in tamarisk stands at 10 to 20 years of age.

Fire as a control agent

In some areas, prescribed fire can be used to manage tamarisk by eliminating the closed canopy, slowing the rate of invasion, and allowing desirable vegetation to respond, thereby increasing diversity in monotypic tamarisk stands. Burning these communities under controlled conditions can also reduce the potential for costly wildfires that must be suppressed to avoid property loss. Much current research on prescribed burning in tamarisk is conducted out of Texas Tech University. Research includes studies of fire behavior and spotting potential of fires in tamarisk-

dominated communities; effects of season of burning on response of tamarisk to prescribed fire; response of herbaceous species to prescribed fires in tamarisk-dominated communities; effectiveness of using herbicides in conjunction with prescribed burning on tamarisk control ; and tamarisk response to wildfire followed by mechanical and chemical control efforts.

Tamarisk stands can burn hot with erratic fire behavior and numerous firebrands transported downwind from the headfire. Therefore, burning tamarisk requires experienced personnel and a prescribed fire set-up that provides poorly receptive fuels downwind from the headfire. A study along the Pecos River floodplain was initiated to define prescriptions for burning dense stands of tamarisk and for reapplying fire to tamarisk after 5 years. Headfires are being applied to tamarisk stands throughout the year to provide data on a range of temperatures, relative humidities, and wind speeds, as well as various fine fuel, 10-hr fuel, and green shrub leaf moisture contents. Fire weather, fuel moisture, and fuel loading variables are measured before and during fires. Fire behavior (flame length, flame height, depth of burning bed, torching height, and rate of spread) and distance firebrands carried were monitored for each headfire. Tamarisk in dense stands that have not burned in 25 to 30 years exhibit extreme fire behavior and crowning due to the closed canopy, regardless of time of year. They can have flame lengths exceeding 140 feet (43 m), resulting in consumption of a majority of the woody material. Stands reburned within 5 to 6 years show vastly different fire behavior, carrying fire only if there is adequate fine fuel load and continuity. Few trees torch during burning, though some trees are top-killed

Some authors suggest that tamarisk stands are highly susceptible to fires due to accumulation of organic debris in the absence of flooding, whether of native or nonnative origin. Flooding may help reduce the impact of fires by increasing decomposition and reducing the standing stock of forest floor organic matter at sites dominated by cottonwoods or tamarisk in the Middle Rio Grande Valley of central New Mexico.

Whether an area of tamarisk has been burned before or not, it has the ability to transport firebrands at least 500 feet (150 m) downwind. Therefore, according to Racher and others, blacklines should be at least 700 feet (213 m) wide. Blackline burning should be under "the 40-60 rule": headfires can be installed with temperatures 65 to 95 degrees Fahrenheit (18 °C), relative humidity 25 to 40%, and wind speeds less than 15 mile/hour (24 km/hour). Managers should be prepared for extreme fire behavior in old, decadent stands.

7.3.3 Management of Tamarisk Fuels

The Tamarisk Coalition (TAC) identifies five basic components to have a successful riparian restoration program in tamarisk. These five basic components are: 1) planning informed by accurate inventory and mapping efforts, 2) control work, 3) biomass reduction, 4) revegetation, and 5) long-term monitoring and maintenance. Without considering all five components it is unlikely that tamarisk control projects will result in long-term success. Restoration is not a quick process and many restoration plans may span 10 years or more.

All currently available technologies should be evaluated; however, not all are applicable for a given river location. For example, active biomass reduction and revegetation are not always necessary steps in the restoration process. In many situations biomass levels may be very low and natural revegetation can occur.

A variety of tools and strategies should be considered when constructing and maintaining these fuel breaks including prescribed fire, mechanical and herbicides. As much as possible existing roads should be used as a starting point for building fuel breaks. Eventually the goal is to establish native vegetation that is fire resistant. Once tamarisk has been removed, aggressive revegetation is often required. Managers should be cognizant of subsequent restoration processes and/or revegetation requirements when selecting a control strategy. Without special planning and care, treated areas may be rapidly re-invaded by tamarisk or other invasive species. In such instances, sustainable control over the long term is best accomplished by planting competitive native plants that have a high exclusionary ability. Native riparian woody species such as cottonwood (Populus deltoides), Goodings willow (Salix gooddingii), and coyote willow (S. exigua) have a rapid growth potential under conditions of low environmental stress and are good candidate species for plantings.

Every treatment type has disadvantages and careful selection and study of alternatives is necessary. Various publications provide detailed information on environmental impacts and costs of various treatments. Reference the Tamarisk Coalition web site for state-of-the-art information at http://www.tamariskcoalition.org/.

- **Cut Stump (Hand Cutting) and Chemical Treatment**

Hand cutting and chemical treatment, also referred to as the cut stump treatment requires trained chain saw operators and herbicide applicators. Cut stump treatment is used particularly where other mechanical treatments or foliar applied herbicide spraying is limited because of the need to protect native vegetation. Trees should be cut to the lowest practical height (~4 to 6 inch) and the aerial tree portion piled for chipping, mulching, burning or later removal. Current strategies are to hand cut (chainsaw) in winter and to immediately (within 10-15 minutes) apply a solution of 33% triclopyr (or other approved chemical) plus 67% oil (bark, crop or diesel oil) to the surface and evenly around the outside edge of cambial bark material.

Application may be made with a low volume backpack sprayer or by brushing the solution directly onto the cut stump. Treatments have also been made using a hand-held spray bottle that can be attached to the belt of the cutter. Immediately after cutting the tree the operator sprays herbicide directly to the stump. This provides a relatively easy, fast, accurate method of herbicide application by one person actually doing two jobs in one operation. Some commercial operators prefer this method because the person cutting the trees knows where stumps of all sizes

are located as opposed to a second person following the cutter with a backpack who might miss a cut surface.

With any herbicide application method, it is imperative that every cut surface be thoroughly wetted in order to obtain root kill. Mortality rates following cut-stump treatments are directly related to care taken when treating cut surfaces. Under optimal conditions control is 60-80 % but because of the difficulty with this method it is not unusual for plant kill to be <40%. Therefore, follow up treatments using ground-based foliar application techniques should be anticipated.

Effectiveness: The cut-stump approach successfully controls tamarisk with a regrowth rate of approximately 15 percent. This regrowth will require a second herbicide treatment, typically a hand herbicide application. Herbicide sprays are effective regardless of the time of year unless the temperature exceeds 85 degrees F, at which point the triclopyr herbicide volatizes and can be potentially harmful to workers and surrounding vegetation. If temperatures are anticipated to be above 85 degrees F other herbicides are required. Freezing conditions may also limit its use.

Costs: Hand work can be very expensive, ranging from $1,500 per acre in lightly infested areas to $5,000 per acre in heavily infested areas for initial removal (Tamarisk Coalition 2003). To ensure effective control, resprouts must be treated with foliar and/or basal bark herbicide applications. The cost of resprout control must also be considered

- **Mechanical Removal With Heavy Equipment**

Mechanical removal is the use of heavy equipment to physically remove tamarisk. This is accomplished in one of two ways; root crown removal or mechanical cutting with herbicide application to the cut stump to prevent resprouting. Root crown removal eliminates the need for herbicide.

Root crown removal is the extraction of the root crown by either root plowing and raking or by extraction of the entire plant. Root plowing and raking involves using large dozers **(**D-7 or D-8 bulldozers for example) equipped with brush bars which are used to remove the above ground vegetation, root plows to cut the root system below the crown, and root rakes to remove the root crown. This method is extremely disruptive to the soil and often destroys native plants that may exist in these ecosystems.
Mechanical cutting with herbicide application is the mechanical removal of above ground biomass accompanied by herbicide treatment of the cut-stump. This approach is used with either equipment that cuts and mulches the trees or grabs and cuts the trees for removal. **Mulching equipment;** Recent work in several parts of Colorado and Utah shows that tamarisk can be effectively controlled with specialized equipment to mulch the trees and an herbicide application to the cut stumps. The trees are typically mulched in a six-foot wide path at a rate of 0.25 to 1.5 acres per hour depending on density, terrain, and equipment. The cutting head is either a rotary drum with knife blades or carbide teeth, or a flaying blade that resembles a lawnmower configuration. The carrier equipment can run on track or rubber tire systems and typically range from 100 to 225 horsepower. 500 horsepower equipment is occasionally suitable for large diameter trees (greater than 12 inches). The distinct advantage of mechanical mulching is that it

accomplishes tamarisk control and biomass reduction in one process. Foliar or basal bark herbicide applications will be needed for resprouts.

- **Extraction Method: Tractor Mounted Grubbing**

Tractor mounted grubbing implements are especially useful for control of scattered individual trees. The grubbing tool mounted on a tractor's front hydraulics drive a blade into the soil to sever below the root crown and uproot the plant onto the surface. Grubbed tamarisk should be piled, dried and burned or mulched rather than left on the surface to prevent the plant from re-rooting from adventious buds.

- **Extraction Method: Excavators**

Excavators are used to selectively remove individual trees, including the root crown and portions of the lateral and deeper roots. Operators on this equipment must be skilled in placing the extracting bucket beneath the root crown of the target plant and the opposing hydraulic thumb to grasp the plant so that it can be pulled directly upwards in a vertical motion. Extracting the tree vertically rather than sideways minimizes excessive breakage of the root material at or near the ground surface. On a tap rooted species such as tamarisk, this process is highly effective with control typically ranging from 80 to 90%.

- **Foliar Spray Using Herbicides**

Applying herbicides to the live canopy of tamarisk is another control method. Herbicides can be applied to tamarisk by a number of methods including fixed-wing aircraft, helicopter, power sprayers, backpack sprayers, and carpet rollers. How the herbicide is applied by aircraft or with ground equipment is critical to treatment success. Most important is to obtain complete coverage on the tamarisk foliage. When ground spraying, the terminal ends of all branches, including blooms should be wetted. The interiors of plants should then be laced with the spray solution to complete treatment. For aerial applications, the spray volume should be high to insure maximum spray coverage. Ground application of herbicide(s) to tamarisk foliage can be made with a variety of sprayers including hand-held pump-up or backpack sprayers; cattle or trailer sprayers; or ATV mounted low and high powered sprayer systems. Use an adjustable cone nozzle (X6 to X8 orifice size) that can deliver a coarse spray (large droplets). In general, individual foliar plant spray treatments applied in summer are quicker and easier to make and provide better tamarisk control than basal bark or cut stump sprays. Great care must be taken to protect water sources. Hand spraying is not efficient when treating large infestations of tamarisk.

- **Basal Bark Treatments Of Individual Plants Using Herbicides**

Basal bark treatments using herbicide mixed with oil and a mist sized adjustable nozzle (X0 to X1 orifice size) to deliver spray to the lower 4-6 inches of stem bark on individual tamarisk plants provides fair control. Triclopyr ester should be mixed with vegetable or diesel oil (50:50

v/v ratio) and sprayed around the surface of every lower stem. Imazapyr is also labeled for this application. The optimum triclopyr or imazapyr spray mixture is not known but a higher dose is needed as plant size/age increases. Basal bark treatments are very tedious and time consuming to apply, and this is especially true when tamarisk is multi-stemmed. Basal bark treatments are more easily made in winter when foliage is shed, but summer treatment is recommended in Texas. Hand treatment is not efficient when treating large infestations of tamarisk.

Table 7 represents general costs of different mechanical fuels treatments with one of the main variables being then number of tamarisk stems per acre. For a detailed discussion of tamarisk control costs reference the publication titled, Riparian Restoration, Assessment of Alternative Technologies for Tamarisk Control, Biomass Reduction, and Revegetation, Colorado River Basin Tamarisk and Russian Olive Assessment, Tamarisk Coalition, December 2009, at http://www.tamariskcoalition.org.

Table 7. COST ESTIMATES PER ACRE FOR MANAGING TAMARISK (TAC 2003)

Treatment Type	Low End	High End
Hand Crews, cut with chainsaw	$ 1,500	$ 5,000
Hand Crews, cut with chainsaw, treat w/herbicide	$ 1,500	$ 9,000
Mechanized root crown removal with root plow and rake (no herbicide)	$ 800	$ 1,000
Mechanized Extraction Technique w/o herbicide	$ 150	$ 600
Mechanized Mulching Technique with herbicide	$ 350	$ 1,200
Mechanized Grub and Cut-Stump Removal with herbicide & stacking of materials	$ 250	$ 800
Revegetation of Treated Areas	$ 200	$ 1,400

Note: In most cases there must be follow up treatments in following years. To ensure effective control, resprouts must be treated with foliar and/or basal bark herbicide applications. The cost of resprout control must also be considered.

7.3.4 Management of Buffelgrass and Other Invasive Species

Buffelgrass (*Pennisetum ciliare)*, is an invasive grass that is now found in four counties in southern Arizona including; Pima, Pinal, Yuma and Maricopa. It grows in areas with warm, frost-free winters and a summer rainy season with 6 to 24 inches of rainfall a year. Generally growth starts in late winter, and flowers from spring through fall.

Habitat: Road rights-of-way, agricultural areas, disturbed sites, vacant lots, range and grasslands, south-facing mountain slopes, and riparian zones. Occurs in all soil textures but is most common in sandy soils. Primarily a warm-season grass (C-4 grass), buffelgrass growing below 3,000 feet

Buffelgrass fine fuel loads are generally much higher than fine fuel loads from native plants in desert environments. Thus, fires in buffelgrass stands may have longer flame lengths, greater rates of spread, and higher temperatures than fires in native desert vegetation, and cause high mortality in native flora and fauna.

Buffelgrass stands burn "very hot" and can burn when green. In the Sonoran Desert, buffelgrass-fueled fires can reach temperatures so hot that the soil is scorched and the bedrock cracked. Headfires in buffelgrass stands can reach temperatures of 1,090 to 1,300 °F (585-700 °C). Because of fire behavior in this type of grass it represents new challenges for fire managers. Buffelgrass can be controlled by mechanical and chemical means.

For more detailed information on Buffelgrass management reference the following website: http://www.buffelgrass.org/.

Sahara Mustard (*Brassica tournefortii*) is native to North Africa, the Middle East, and Mediterranean lands of southern Europe. It is now found in many areas of the southwestern United States. Sahara mustard is thought to increase fuel loads and fire hazard in desert scrub and coastal sage scrub.

Sahara mustard control can be effectively done by hand pulling plants, especially if done before a seed bank has been established. Hand hoeing is also very effective in large stands of plants if done when the plants are in the rosette or early stages of flowering, particularly on sandy or gravelly sites. Weed whipping and mowing alone are not recommended because the plants will simply regrow flower and fruit stalks. Follow-up treatments are often required.

Prescribed burning will probably not be effective due to Sahara mustard’s ability to survive long periods of harsh conditions in soil seed banks. Fires do cause high seed losses; however, plants grow back rapidly following fire. Furthermore, fire in desert environments may harm native plants.

The effect of revegetation on the stand density of Sahara mustard also needs to be investigated. A dense cover of annual or perennial grasses may restrain Sahara mustard germination, establishment and long term persistence in an area.

Chemical Control: Early applications of chemicals may control Sahara mustard due to its extremely early development. Applications should be particularly effective if started before native species have begun to develop.

Additional information on management of Sahara mustard can be found in the following publication: Identifying and Managing Sahara Mustard, University of Nevada, Reno, Cooperative Extension Fact Sheet-05-02.

7.3.5 Fuel Breaks

The emphasis of the fuels program will be the construction and maintenance of fuel breaks. This is due to the high cost of restoration of riparian ecosystems and managing invasive species. A system of fuel breaks will be constructed and managed to:

- Provide for safety zones and escape routes for the general public and firefighters
- Provide protection of WUI areas
- Break up large continuous areas of heavy or volatile fuels to reduce the size of wildland fires
- Reduce the biomass of dead woody materials through prescribed burning (piling and burning) or chipping

7.3.6 Scheduling, Planning and Prioritization

A ten year schedule of fuels management treatments is recommended, but was not developed for this plan. A yearly plan or annual plan, listing proposed projects should be completed along with individual project (fuels management) plans.

An annual work plan is included in **Appendix A**. This plan should be revised as needed.

Planning for individual fuels projects generally should start a year or two in advance to allow for time to conduct any needed surveys (e.g. wildlife, cultural). Actual timing and implementation of projects will depend on values at risk, potential fire behavior, weather, climate, and smoke or dust concerns. Coordination and planning with Tribal Environmental Departments is critical during the initial proposal stages through implementation.

7.3.7 Prescribed Fire Treatments

Prescribed fire fuels treatments to consider include broadcast burning and pile burning. Pile burning is usually done in conjunction with a mechanical fuels or herbicide treatment. All guidelines would have to be following and a prescribed fire burn plan completed (RXPlan).

7.3.8 Mechanical and Herbicide Fuels Treatments

A wide variety of techniques and equipment exist for treating tamarisk. Basically there are two techniques for mechanical treatments which are: hand treatments and use of heavy equipment. Mechanical fuel treatments will consider: hand or mechanical thinning, piling, lopping and scattering, chipping on site or hauling chips off site and use of herbicides. A mechanical fuels treatment plan (MFTP) will have to be completed for all projects and an outline for completing this plan is included in the BIA Fuels Management Program Guide.

Treatments for other invasive species (such as Buffelgrass), vary depending upon the species and location. Buffelgrass can be treated using herbicides and through mechanic means.

7.3.9 Biological Fuels Treatment

No biological treatments were considered as part of this plan.

7.3.10 Follow-up Treatments and Revegetation

After fuels treatments have occurred it is important that follow up actions takes place, to insure tamarisk or other invasive species do not quickly revegetate these areas. Revegetation refers to the reestablishment of native grasses, shrubs, forbs, wetland species, and trees on disturbed areas through seeding, planting, or enabling natural regeneration to occur. Follow up treatments of invasive species need to consider the entire range of available tools. These actions need to be addressed in every proposed fuels treatment plan, and funding requested through the appropriate entity.

7.3.11 Costs

There are many variables that effect costs of tamarisk treatment including types of equipment used, topography, number of tamarisk stems per acre, fuels and use of hand labor versus machine, and land management goals and objectives.

7.3.12 Special Areas of Concern

SRPMIC: Management of fuels and invasive species in the Red Mountain area is a high priority. A variety of tools will be used to manage fuels and vegetation. The basic strategy will be to use roads as control areas and fuel breaks. Fuels will be treated along these buffers. Fuels treatments will be designed to reduce hazard fuels and limit the spread of invasive plants.

7.4 Equipment and Seasonal Use Restrictions

Equipment and seasonal use restrictions have been defined previously in this plan and also in the EA. In addition each project plan will have to clearly define how operations will take place to meet these guidelines and rules.

7.5 Annual Activities for Implementation

The fuels management program is undertaken to treat hazard fuels to meet natural resource management and fire management goals and objectives. Treatments have traditionally included wildlife habitat improvement, site preparation, and hazardous fuel reduction.

Annual Activities

- Determine the need to develop a 10 strategic fuels management schedule
- Complete an annual work plan (1 to 2 year out) for fuels treatment listing individual projects and priorities
- Prepare individual project plans for prescribed fire and mechanical treatments
- Request funding for required surveys of proposed projects and for actual implementation
- Request funds for projects
- Conduct mechanical and prescribed fire operations
- Complete field monitoring of projects and document in appropriate systems
- Meet with natural resources specialists to coordinate and complete proposed project plans

7.6 Prescribed Fire Plan and Mechanical Treatment Plan Requirements

The Interagency Prescribed Fire Implementation Guide and the BIA's Supplement Fuels Management Program provide specific guidance for the prescribed fire program including: plan requirements, complexity determination, prescription elements, personnel qualification standards, cooperation and assistance, escaped fire situations, computer modeling, weather parameters, maps and reporting.

Required Qualified Personnel

Only NWCG qualified personnel will participate in the implementation of prescribed fire projects.

Equipment Needs

Equipment needs for mechanical fuels treatments can vary greatly depending on the type of project. Hand cutting and hand spraying of tamarisk will require chainsaws and appropriate safety gear, and backpack or handheld type sprayers to apply herbicides. Prescribed fire operations will require engines, hand tools, chainsaws, radios and a wide variety of equipment

which would be very similar to what is used on initial attack on wildland fires. In addition various ignition devices maybe needed such as drip torches, fusees, aerial drip torches and ignition systems, flare pens, blivets, burnol canisters, and propane torches.

Treatment Maps

All specific prescribed fire plans will include project maps with acres, vicinity maps showing general location of the project area and smoke trajectory maps with identified sensitive receptors. Specifications for completing maps is available in the prescribed fire handbooks.

7.7 Safety

As always, all activities outlined in this plan will reflect the commitment to safety. Firefighter and public safety is the first priority in every fuels management activity. As part of the decision-making process associated with fuels treatment alternatives, especially when considering fire use as one of the treatment alternatives, long- and sort-term analyses of potential risks with their associated mitigation actions are an integral part of the planning process. Individual fuels treatment project plans are required to address all safety concerns and mitigation measures. Safety requirements are outlined in various handbooks and publications including:

- BIA Blue Book
- Fireline Handbook
- Salt River Agency WFMP
- Interagency and BIA Prescribed Fire/Fuels Handbooks
- Standard operating guides (Industry accepted standards)

8. Emergency Stabilization (ES) and Burned Area Rehabilitation (BAR)

Specific policy and guidance for emergency stabilization (ES) and burned area rehabilitation (BAR) are located in Bureau of Indian Affairs, Wildland Fire and Aviation Program Management Operations Guide, otherwise known as the Blue Book. The Blue Book is issued on an annual basis. Policies and procedures may change from year to year and it's important to reference this document.

ES and BAR treatments are an integral part of wildfire incidents, but are planned, programmed, and funded separately from each other. Reference the BIA Salt River Agency Wildland Fire Management plan for more information.

The BIA Salt River Agency and Tribal Fire programs should evaluate all wildland fires for emergency stabilization (ES) and rehabilitation (BAR) needs. A Burned Area Emergency Rehabilitation (BAER) Team or individual team positions (resource specialists), may be ordered through the dispatch system as needed to evaluate impacts to resources resulting from wildfires as well as to design resource mitigation efforts and prepare a fire-specific plan.

Rehabilitation efforts (BAR) will be undertaken as appropriate to protect and sustain ecosystems, public health and safety, and to help communities protect infrastructure. Coordination with key resource specialists, both Tribal and BIA, is required. These actions are undertaken during and immediately following the incident.

Non-emergency burned area rehabilitation (BAR) is the responsibility of the agency administrator and is focused on efforts undertaken within three years of containment of a wildland fire to repair or improve fire-damaged lands unlikely to recover naturally to management-approved conditions.

BAR projects are competitively funded among all four DOI bureaus. Funding is limited so there is no guarantee that BAR treatments/activities will be funded. BAR funds can only be provided three years from containment of the wildfire. Plans that request multi-year funding are not guaranteed funding each year. Funds will be given out on a yearly breakout as specified in and approved by the national BAER coordinators.

For further information reference the BIA Salt River Agency WFMP.

9. Monitoring

9.1 Introduction

The purpose of the fire monitoring program is to provide effective evaluation of the fuels management program. The fire monitoring program is designed to determine whether fire and resource management objectives are met, as well as to document any unexpected consequences of fire management activities (e.g. increased density of invasive plants, soil erosion).

9.2 Policy and Guidelines

Monitoring operating procedures, guidelines and policy for the management and administration of the BIA monitoring program are contained in the following handbooks:

- Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide
- BIA Fuels Management Program, Supplement to the Interagency Prescribed Fire Planning and Implementation Procedures Reference Guide

9.3 Treatment Plan Monitoring

All fuels treatment projects funded by the Bureau of Indian Affairs Fuels Program require monitoring consistent with the direction provided in this chapter. The minimum standards to determine the adequacy of project-level monitoring at the Tribal or agency level will be:

- Monitoring must be sufficient to provide a defensible answer to the question, "Was the treatment successful in meeting the project's management objectives?" For example if the objective was to reduce fuel loading on a tract of Salt Cedar from 50 tons per acre to 5 tons per acre, did the fuels work actually obtain that objective?
- The information necessary to answer this question must be documented in the project file.

9.4 Strategic Plan Monitoring

In addition to documenting treatment effectiveness, monitoring can also be implemented to measure success in meeting the objectives of broader management plans such as Fuels Management Plans, Fire Management Plans and Integrated Resource Management Plans. These strategic-level monitoring programs are more complex and must be carefully designed and guided by an approved written monitoring plan.

9.5 Four Levels of Monitoring Treatments

Level 1: Pre-Treatment or Existing Conditions

This data is a description of the physical and biological characteristics of the treatment unit and is usually collected during the planning process. The information in this category may include: location, size of treatment area, elevation, aspect, vegetation type/structure/condition, fuels characteristics, and specific concerns and values to be protected.

Level 2: Fire Behavior Observations

This category of data is required to document prescribed fire events, including specific burning conditions and fire behavior characteristics. These data are collected prior to and at various intervals during the fire event. Information collected will include:

- Ambient conditions: dry bulb temperature, relative humidity, wind speed and direction, shading and cloud cover, fuel moisture, live fuel moisture, drought index, and duff moisture.
- Fire characteristics: rate of spread, flame length, flame depth, and smoke characteristics.

Level 3: Short Term Post-Treatment

This level provides information on immediate vegetation change, fuel reduction, and/or other variables determined by management objectives as a direct result of a management action. Monitoring at this level generally occurs within the same field season as the treatment implementation; for some variables or management objectives, it may be necessary to repeat the measurements over the course of several seasons.

Level 4: Long Term Re-Measurement

Monitoring in this level identifies significant trends that can guide management decisions. This level usually requires monumented permanent plots that have been well documented and can be relocated. Monitoring frequency is based on a sequence of sampling at an interval defined in the monitoring plan based on specific management objectives. Agency/Tribal staff should select monitoring variables (with input from resource management specialists and other scientists if needed) by examining (1) fire management goals and objectives, (2) their ecosystem's sensitivity to treatment-induced change, and (3) special management concerns. This level is generally used for strategic-level monitoring, but it may also be appropriate at the treatment level when the management objectives are complex and involve species of special concern or those that have a long life span.

9.6 Monitoring objectives

- Implement the required monitoring program as specified in the BIA Fuels Management Handbook and Interagency Handbook
- Utilize the FFI Ecological Monitoring Tools
- Inventory and evaluate the extent and age class of the tamarisk fuel type
- Inventory and evaluate past tamarisk treatments to ensure effectiveness
- Inventory and map fire effects and burn severity on large wildland fires. Ensure data is recorded in the national Monitoring Trends in Burn Severity (MTSB) program.

9.7 Application of Results

Monitoring both short term and long term will provide data to managers, which will lead to better management of the prescribed fire and mechanical fuels treatment programs. Treatments

in tamarisk can become more cost effective and produce better results. Additionally, the information will provide an overall evaluation of how well the fuels program is achieving objectives relative to Tribal goals and objectives. Fuel breaks can be better managed and located to reduce the impact of fire on developed areas and natural resources.

9.8 Data Management and Analysis

Data Analysis

Data Analysis at a minimum needs to address the following:

- Pre-treatment versus post-treatment vegetation change
- Effectiveness in meeting the management and/or project objectives
- Treatment costs
- Treatment Effectiveness (life cycle costs)
- How performance measures (NFPORS) were assessed
- Any other remarkable or notable effects of the treatment
- Adaptive Management: What actions will be taken to adjust prescriptions or other management actions if results were unfavorable?

Data management

Data management includes utilizing the data systems that have specifically been designed for monitoring such as FFI, NIFPORS and MTSB. Data needs to be stored and archived on specified BIA and Tribal computer systems. These records should also be provided to the BIA Western Region as needed.

9.9 Annual Monitoring Work Plan

An annual work plan is a summary of the monitoring to be accomplished in the coming season based on the monitoring plan(s) and/or treatment plans. Annual work plans are strongly recommended for all fuels programs; they may be required to qualify for some funding sources (see BIA Fuels Management Program Business Rules Handbook).

9.10 Annual Monitoring Summary

An annual summary is an update of the annual work plan based on monitoring accomplished in the past season. Annual summaries are required for all fuels monitoring projects funded through supplemental requests; otherwise, they are recommended at the local unit or regional level. Guidelines for completion of this summary are include in the BIA Fuels Management Guide.

9.11 Responsible Parties and Documentation Requirements

The fuels management program is a function of the overall Wildland Fire Management Program. The Agency Fire Management Officer has the overall responsibility for the monitoring program.

All projects are requested, funded and tracked through the NFPORS system. It is the responsibility of the Fuels Management Specialist to ensure all necessary project completion information is accurately entered into the system in a timely manner. Documentation requirements are completed or reviewed by the project manager. For information on the requirements refer to the individual project plans.

A report summarizing the results of the monitoring activities will be placed in the official treatment project file, along with the treatment and monitoring plans, and all other monitoring documentation. Reference the BIA Fuels Management Guide for further information.

Fire and Fire Dispatch will maintain a fire file with the burn plan, dispatch log, resource orders, spot weather forecasts, OF-288 and CTR forms, Incident Action Plans, and Unit Logs. Fire Effects monitoring staff will maintain the fire effects data. The Burn Boss will maintain an ICS-214 Unit Log. The Lead Fire Monitor will prepare and submit an individual report that summarizes weather, fire behavior, and smoke observation data within two weeks after project field operations have ceased. The Burn Boss will prepare an Individual Fire Report, through the Wildland Fire Management Information (WFMI) System, within 14 days after field operations have ceased. All fire records will be stored according to standard procedure. The Fuels Management Specialist will prepare a project accomplishment report in the National Fire Plan Operational Reporting System (NFPORS) within 5 days of ignition/project completion.

10. Organization and Proposed Budget

10.1 Organization Structure

This program will be managed by a full-time Prescribed Fire/Fuels Specialist under supervision of the Fire Management Officer. The Fuels Specialist is the principal officer responsible for program planning, environmental compliance, budgeting, implementation, monitoring, and reporting. The Prescribed Fire/Fuels Specialist is also responsible for communication and coordination with the Tribal Council, Interdisciplinary Team, and individual Tribal Staff as well as other cooperators and government agency representatives.

Duties of the Fuels Specialist

- Coordinate all aspects of the fuels program
- Coordinate fuels management with Tribal environmental programs at SRPMIC, FMYN and PYT
- Complete project plans for prescribed fire and mechanical fuels treatments
- Request funds for monitoring and project implementation
- Prepare and submit contracts for fuels and monitoring projects
- Evaluate bid proposals from contractors and determine the best value for the government
- Prepare budgets and track funds
- Coordinate the implementation of fuels treatments
- Manage the monitoring program including the data base, field inventories and annual report requirements
- After wildland fires evaluate and document fire effects, coordinate with the FMO and incident commander to determine and implement needs to alleviate fire suppression activity damage. Determine the need on each wildland fire to complete emergency stabilization and rehabilitation and plans and coordinate the completion of these plans.

10.2 Personnel Costs

Table 8. ESTIMATED COSTS FOR FUELS SPECIALIST

Position	GS-Grade/Step	Yearly Salary (+ 35% EBC)	Training and Travel	Supplies and Equipment	Vehicle	Total Cost
Prescribed Fire/Fuels Specialist	GS-9/5	$ 63,590	$ 10,000	$ 5,000	$ 6,840	$ 85,430

Note 1: Wage Rates from 2012

Vehicle Costs: Pickup, Extended Cab, 4 X 4, equipment code 6151, Federal standard item 46C, $ 220 per month, per mile, .21 cents per mile, $ 2,640 per year base cost, $ 4,200 cost for mileage (20,000 miles per year). Total yearly cost $ 6,840.

10.3 Equipment Purchases, Leases

GSA 4 X 4 Extended cab truck from GSA (see above)

10.4 Management of Unusual Fuel Conditions

Every several years the grass fuel type be problematic due to higher precipitation, in the Sonoran desert. Grass fuels can become continuous and carry wildland fire where normally fuel loading would be to light or non-existent. Because it is impossible to plan for these type of events generally severity funds would be requested as needed, to provide for additional initial attack forces and for funding to manage fuels in and around WUI areas. Mowing with a tractor to reduce the height of grasses will reduce flame lengths.

10.5 Supplemental Funding Requests

Supplemental funds will be requested for fuels management projects including mechanical and prescribed fire. Additional monitoring costs for periodic assessment and mapping of tamarisk fuels can also be requested.

11.Collaboration

11.1 Introduction

Coordination of wildland fire management activities between federal, state and non-government fire protection agencies is an on-going process. The dialogue between these entities began many years prior to the March 20, 2002 Memorandum concerning Fuels Treatment Program Development and Collaboration Process. In reference to this document, however, it needs to be emphasized that;

"The Department of the Interior and the USDA Forest Service are committed to working together to accomplish community protection and ecosystem maintenance and restoration. These agencies along with other Federal, State, Tribal and local partners will work within a collaborative process to ensure effective fuels treatment efforts. This collaborative process will be consistent with direction provided in the joint USDA Forest Service/DOI document, "Restoring Fire-Adapted Ecosystems on Federal Lands—A Cohesive Strategy for Protecting People and Sustaining Natural Resources…."

11.2 Notification of Allottees

Management actions on allotments require a majority consent of all owners

11.3 Coordination

Coordination between BIA and Tribal programs is essential

11.4 Coordination with Surrounding Communities

Coordination with surrounding neighbors and entities that provide wildland fire protection and that are conducting fuels management projects is essential. This includes:

- Adjoining Cities and other jurisdictions
- Bureau of Land Management
- Local Fire Departments
- US Forest Service

12.Public Information

12.1 Introduction

Communication with the general public is essential during the planning process and during implementation of projects. For management efforts on and near the Reservations, maximize cooperation between BIA Salt River Agency, the Tribal governments and their fire departments, Allottees, owners of non-trust inholdings and adjacent lands, neighboring fire departments, and Zone dispatch centers.

12.2 FMYN, SRPMIC, PYT

Coordinate with Tribal public relations staff to provide information to tribal members and the general public.

12.3 Media Contacts

Local media contacts include:

- Arizona Republic Newspaper, Phoenix, AZ
- Tribal websites and other media
- Arizona Daily Star, Tucson, AZ

12.4 General Public Responsibilities

Homeowners have the responsibility for managing fuels around their homes and other structures.

ACRONYMS AND GLOSSARY

AAR	After Action Review: A post incident review covering what was planned, what actually happened, why it happened, and what we can do better next time.
Allotment	Individually owned Indian lands held in trust by the United States
Allottee	A land owner of an Indian Trust Allotment
AOP	Salt River Agency Annual Operating Plan: This includes numerous operational plans and guidelines (e.g., Suppression, Safety, National Fire Danger Rating System, Preparedness, etc.).
AZSRA	BIA Salt River Agency
BIA	Bureau of Indian Affairs
BIA-NIFC	BIA National Branch of Fire and Aviation, National Interagency Fire Center
Blivets	Small individual packets of gasoline and alumagel in plastic bags. Burn time of approximately 10-15 minutes. Effective in heavy or damp fuels.
BLM	Bureau of Land Management
Blue Book	Wildland Fire and Aviation Program Management and Operations Guide (issued by BIA-NIFC and updated annually)
Burnol	Burnol canisters. Napalm canister detonated by a fuse and fuse cap igniter. Hand throw. Burning napalm covers 20-30 ft. in diameter. Burns from 4-10 minutes at approximately 1400 degree F.
CAA	Clean Air Act. The Clean Air Act (CAA) is the comprehensive federal law that regulates air emissions from stationary and mobile sources. Among other things, this law authorizes the Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and public welfare and to regulate emissions of hazardous air pollutants.
DOI	Department of Interior
DI 1202	Department of Interior Individual Fire Report Form
EA	Environmental Assessment
EPA	United States, Environmental Protection Agency
EVT	Existing vegetation types. This is a designation from the LANDFIRE system. The Existing Vegetation Type (EVT) layer represents the vegetation currently present at a given site. LANDFIRE vegetation map units are derived from NatureServe's Ecological Systems classification, which is a nationally consistent set of mid-scale ecological units (Comer and others 2003).
FEIS	Fire Effects Information System
FFI	Feat Firemon Integrated**.** FFI (FEAT/FIREMON Integrated) is a monitoring software tool designed to assist managers with collection, storage and analysis of ecological information. It was constructed through a complementary integration of the Fire Ecology Assessment Tool (FEAT) and FIREMON.
FMO	Fire Management Officer: Also called Wildland Fire Program Manager.
FMP	Fire Management Plan. Another term commonly used is the Wildland Fire Management Plan **(WFMP).**
FMU	Fire Management Unit; A fire management unit (FMU) is defined by the National Wildfire Coordination Group (NWCG), as a land management area definable by objectives, management constraints, topographic features, access, values to be protected, political boundaries, fuel types, major fire regime groups, etc. that set it

	apart from the characteristics of an adjacent FMU. The FMU may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.
FMYN	Fort McDowell Yavapai Nation
FuelsMP	Fuels Management Plan
FWS	Fish and Wildlife Service. An agency under the USDI.
HFRA	Hazardous Fuels Reduction Act.
IPFP	Interagency Prescribed Fire Planning and Implementation Procedures Guide
IAM	Indian Affairs Manual
LandFire	LANDFIRE: Also known as the Landscape Fire and Resource Management Planning Tools Project, is a multi-partner project producing consistent and comprehensive maps and data describing vegetation, wildland fuel, and fire regimes across the United States. It is a shared project between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior.
MFTP	Mechanical Fuels Treatment Plans
NEPA	National Environmental Policy Act
NFFL	National Forest Fire Laboratory
NFPORS	National Fire Plan Operations Reporting System: A computer-based online information portal used to request project funding and track project progress.
NIFC	National Interagency Fire Center: An interagency facility located in Boise, Idaho that manages fire activities, at the national level, for all five federal wildland fire agencies.
NPS	National Park Service. An agency under USDI.
NWCG	National Wildfire Coordinating Group. A group formed under the direction of the Secretaries of the Interior and Agriculture to improve the coordination and effectiveness of wildland fire activities and provide a forum to discuss, recommend appropriate action, or resolve issues and problems of substantive nature.
NWS	National Weather Service
PYT	Pascua Yaqui Tribe
RXBB	Prescribed Burn Boss (RXBB). The Prescribed Fire Burn Boss is responsible to the Agency Administrator, Prescribed Fire Manager, or FMO/local fire management organization for implementing the Prescribed Fire Plan.
RXFire	Prescribed Fire: Any planned ignition intended to meet specific objectives. Prescribed fires are conducted in accordance with prescribed fire plans.
RXFM	Prescribed Fire Manager (RXFM). The Prescribed Fire Manager is responsible for implementing and coordinating assigned prescribed fire activities. A Prescribed Fire Manager may be assigned during periods when multiple simultaneous prescribed fires are being conducted; when multiple prescribed fires will be conducted within a short time frame; or where there is complex interagency involvement.
RXPlan	A strategic prescribed fire plan for the BIA that meets all standards specified handbooks, guides, and other documents
SILVIS	Spatial Analysis for Conservation and Sustainability, which is a program managed by the University of Wisconsin at Madison.

SMG NWCG Smoke Management Guide for Wildland Fire for Prescribed and Wildland Fire, NFES 1279

SRPMIC Salt River Pima-Maricopa Indian Community

TAC Tamarisk Coalition. A non-profit alliance that is working to restore riparian lands. http://www.tamariskcoalition.org

USDI United States Department of Interior

USFS US Forest Service

VTP Values to be Protected: These include property, structures, physical improvements, natural and cultural resources, community infrastructure, economic, environmental, and social values.

Wildland Fire A general term describing any non-structure fire that occurs in the wildland. Wildland fires are categorized into two distinct types: Wildfires - unplanned ignitions or prescribed fires that are declared wildfires, and Prescribed Fires - planned ignitions.

WFMP Wildland Fire Management Plan: A strategic plan that defines a program to manage wildland and prescribed fires which documents the Fire Management Program. The plan is supplemented by operational plans such as preparedness plans, preplanned dispatch plans, prescribed fire plans, prevention plans, etc. This term is synonymous with Fire Management Plan (FMP)

WIMS Weather Information Management System

WUI Wildland/Urban Interface: The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels or where humans and their development meet or intermix with wildland fuel. WUI is composed of both interface and intermix communities. In both interface and intermix communities, housing must meet or exceed a minimum density of one structure per 40 acres (16 ha). Intermix communities are places where housing and vegetation intermingle. In intermix, wildland vegetation is continuous, more than 50 percent vegetation, in areas with more than 1 house per 16 ha. Interface communities are areas with housing in the vicinity of contiguous vegetation. Interface areas have more than 1 house per 40 acres, have less than 50 percent vegetation, and are within 1.5 mi of an area (made up of one or more contiguous Census blocks) over 1,325 acres (500 ha) that is more than 75 percent vegetated. The minimum size limit ensures that areas surrounding small urban parks are not classified as interface WUI.

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Appendix A; Annual Work Plan for FY 2013

Activity	Date/When	Who	Funding/Notes
Develop list of proposed fuels projects	Oct/Dec 2012	FS	
Identify an Interdisciplinary (ID) team to review proposed fuels projects	Oct/Dec 2012	FS	
IDT Review/develop framework for each fuels project	Oct/Dec 2012	IDT	
NEPA			
Review/Determine Needs/Actions	Oct/Dec 2012	IDT	
Request Funds as needed	Jan/Mar 2013	FS	
Input Data Into NFPORS	Jan/Mar 2013	FS	
Implement Actions	Apr/June 2013	FS	Approval Through Line Officer
Request funds for surveys (archeological/historical)	Jan/Mar 2013	FS	
Complete Surveys/Review Info/Modify Plans as Needed	Apr/June 2013	FS/IDT	
Monitoring			
Program Design/Setup	Oct/Dec 2012	FS/WRO	
Request SCA Monitoring Crew as needed	Oct/Dec 2012	FS/WRO	
Setup Monitoring Plots	Jan/Mar 2013	FS/WRO	
Annual Summary	July/Sept 2012	FS	Provide to WRO
Request funds for fuels position(s) and other support (contracts)	Jan/Mar 2013	FS	
Community Assistance Project Proposal/Review & Submit	Jan/Mar 2013	FS/IDT	Provide to WRO
Contracting			
Determine Needs	Jan/Mar 2013	FS/IDT	
Implementation	Jan/Mar 2013	FS/IDT	
Tribal Approval; Obtain resolution	Jan/Mar 2013	FS/IDT	
Fuels Projects			
Request funding/input to NFPORS	Jan/Mar 2013	FS	Provide to WRO
Complete Plans and Submit	Jan/Mar 2013	FS/IDT	Provide to WRO
Implement fuels project	July/Sept 2013	FS/Contractors	
Track implementation/funding	Fiscal Year	FS	
Review/Record Accomplishments	July/Sept 2013	FS/IDT/WRO	
Request Supplemental Funds as needed	Jan/Mar 2013	FS	Provide to WRO
Initiate Plans for Coming Fiscal Year	July/Sept 2013	FS/IDT	
Review/submit Critical Needs	July/Sept 2013	FS	Provide to WRO

FS-Fuels Specialist
WRO= BIA Western Regional Office
IDT = Interdisciplinary Team