Restoring and Maintaining Resilient Landscapes through Planning, Education, Support, and Cooperation

on the

San Carlos Apache Reservation

San Carlos Apache Tribal elders. ***Photo courtesy Seth Pilsk.***

A Historical, Cultural, and Current View

May 8, 2013

"Apaches have a tradition of low impact, managing populations of humans and plants toward a natural environment."

Seth Pilsk, Ethnobotanist
San Carlos Apache Tribe

"It's good that we are hearing from our natural resources programs and San Carlos Apache Tribal members—receiving feedback from resource specialists and Tribal members. Both of these groups are telling us that the return of fire to the landscape—that has been excluded for many decades—is now providing positive effects, including plant diversity, improving wildlife habitat, and improving rangelands."

Duane Chapman
San Carlos Fire Management Officer

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Active management on Tribal lands—including forest activities and fuel treatments—provide for decision space, during the correct conditions, to allow resource benefit fires to treat more acres.

Executive Summary

The San Carlos Apache Tribe has worked toward incorporating natural fire regimes into their strategic fire planning and management goals in order to maintain ecosystem resilience and diversity. In exploring this significant theme, this report addresses and encompasses the following key areas and objectives.

Identify areas of fuels treatment effectiveness utilizing the following criteria:

- Protect community and firefighter safety.
- Reduce cost of catastrophic wildfire.
- Fire management opportunities.
- Limit negative effects to resources.

Values at Risk – San Carlos Apache tribal values:

- Natural and cultural.
- Commercial timber.
- Wildlife.

Review three recent fires (Maggie, Trail, and Shorten) on the San Carlos Apache Reservation that have been managed for both resource benefit and multiple objectives by utilizing timber activities and hazardous fuels treatments to manage these wildfires for positive benefits.

Recognize essential components necessary for a fire program to successfully plan and manage fires for multiple land management objectives in efforts to restore and maintain resilient and productive landscapes.

Conclusion – Opportunities:

- Increased community and firefighter safety.
- Enhanced fire management opportunities.
- Greater potential to reduce suppression cost and fire size.
- Minimized negative impacts on resources.

1. Introduction – Establishing a Cultural and Historical Land Management Perspective of the San Carlos Apache Reservation and its Relationship to Wildfire

The San Carlos Apache Reservation, located in east-central Arizona, is managed by the Bureau of Indian Affairs (BIA) and the San Carlos Apache Tribe (SCAT).

The reservation encompasses 1,834,781 acres. There are approximately 247,694 acres of ponderosa pine, 652,009 acres of woodlands and chaparral, 457,473 acres of plains and semi-desert grasslands, and 377,811 acres of Sonoran desert scrub. The management goal for these lands is to restore natural fire into fire-dependent vegetation types, maintain ecosystem health, and reduce hazardous fuel conditions conducive to catastrophic fires. There are also approximately 119,193 acres of Wildland-Urban Interface (WUI) that require full suppression.

The majority of these lands are located within Gila and Graham counties. A small portion of land is in Pinal County. The mining communities of Globe-Miami, Winkelman, Clifton, and Morenci are all located near the reservation's boundaries.

The San Carlos Apache Reservation spans across 1,834,781 acres.

Pre-Reservation and Land Management History

The San Carlos Apache Tribe has always understood and appreciated how fire is beneficial to the landscape.

Native people, including Apaches, have used fire for purposes such as cooking, warming, hunting, clearing farm and grazing land, and waging war for centuries. Historical records indicate that Apaches burned areas from .25 acres to approximately 12 to 15 miles in circumference to attract game with fresh forage or drive animals for hunting.

With the large number of lightning strikes and the susceptibility of the landscape to accept fire, lightning has most certainly accounted for far more fire occurrence and acreage than anthropogenic burning. The maintenance of resilient and diverse southwestern ponderosa pine ecosystems on the San Carlos Apache

In the early 1900s, grazing, along with more aggressive suppression of wildland fires, resulted in the exclusion of fire from most of the forests in the Southwest.

Reservation is a goal identified in the Tribe's long-term strategic planning and integrated resource planning initiatives.

The Apache people did not historically practice prescribed burning in southwestern ponderosa pine because they recognized that these ecosystems burned on their own through natural ignitions. Fire history studies conducted throughout the Southwest, including on the San Carlos Apache Reservation, provide a preponderance of evidence for a low-intensity, high-frequency fire regime, as well as late spring-early summer seasonality of the fire regime.

To maintain the resilience and diversity of these ecosystems, the Tribe has moved toward an acceptance of the natural fire regime as a method for meeting their strategic planning goals.

Chronology of Management

1871

The joint White Mountain/San Carlos Indian Reservation was established by the 1871 Executive Order of President Ulysses S. Grant. The following year, the "San Carlos Division" was formed.

1897

In 1897, by an Act of Congress, the "San Carlos Division" was designated the "San Carlos Indian Reservation".

This period coincided with the beginning of livestock grazing on the reservation. At this time, some interest in logging to meet local needs was also emerging.

Even in the 19th Century, it was recognized that collecting firewood reduced the danger from fire and also served as an economic benefit to the community.

Early 1900s

In the early 1900s, grazing, along with more aggressive suppression of wildland fires, resulted in the exclusion of fire from most of the forests in the Southwest. Management of timber resources gradually transitioned from military to civilian authorities and eventually to professional foresters.

By the 1930s, professional foresters John W. Allan and Burton A. Ladd were working at San Carlos.

1940s

By 1940—even though income from timber exceeded grazing income—livestock production remained a higher priority through World War II.

In 1943, Harold Weaver, Bureau of Indian Affairs Forester, recognized and reported on the role of a low-intensity, high-frequency fire regime in southwestern pine forests. Since that time, the San Carlos Apache Tribe has incorporated the use of managed fires on Tribal lands. Over the years, the benefits of a well-managed fire program—in collaboration with resource specialists and support from the public, Tribal leaders, and Agency administrators—have proven fundamental to this management process.

Harold Weaver arrived in Arizona in 1948. As Area Forester, he was a strong advocate of the use of prescribed fire to reduce the accumulation of fuels and wildland fire occurrence at San Carlos.

After surveying the damage with San Carlos Forest Manager Paul A. Buss from a 14,000-acre 1943 wildfire at Malay Gap and a 1946 stand-replacement fire, Weaver concluded: "It is a surprise that larger fires have not occurred more frequently."

1950s

In 1955, Richard Lyon was assigned to San Carlos as Forester. Lyon, concurring with Weaver, believed that, in some cases, prescribed burning "proved an excellent tool" to reduce the threat of wildfires. Lyon also tied the technical resource management plan to improving the Apache peoples' future quality of life.

During the 1950s, the beginning of commercial-scale logging began to occur at San Carlos.

1960s

David Reinhold, Manager at San Carlos from 1968-70 (and again during the 1980s), integrated prescribed burning into an overall program of forest management and fire protection. During his initial years here, Reinhold observed: "Prescribed burning has played a large role in pre-suppression activities at San Carlos in recent years."

1970s

Larry Schmidt became the Forest Manager at San Carlos in 1970, a position he held for the next nine years. In early summer 1971, four small lightning-caused fires along Malay Creek and the Black River merged to form the Black River Fire.

According to Schmidt, the Black River Fire was "the largest timber fire ever at San Carlos." It destroyed nearly 10,000 acres of prime timber on land that had received almost no precipitation in the preceding year.

In spite of the devastating 1971 summer fires, that fall—with a crew of five people—Schmidt ignited a prescribed fire that burned about 20 miles, from Dove Tank toward the Pole Corral area, then all the way to Barlow Pass.

Schmidt continued to receive support from the Tribal Council and community for implementing prescribed fire on the reservation's lands.

2. Values at Risk – Tribal Values

"We [the land managers] are setting the stage for future generations—my children and grandchildren—in relation to managing fire on the landscape."

Dennis Logan
San Carlos Fuels Specialist, San Carlos Tribal Member;
Incident Commander on the 2012 Shorten Fire

A. Natural and Cultural Resources

After 20 years as ethnobotanist for the San Carlos Apache Tribe, Seth Pilsk has a deep respect for its peoples' knowledge of—and appreciation for—the natural environment.

To Apaches, the natural environment exists not as something apart from themselves, but something to which they are intimately connected. "Apaches have a tradition of low impact, managing populations of humans and plants toward a natural environment," says Pilsk.

San Carlos Apache Tribal elders gathering plant materials. Photo courtesy Seth Pilsk.

To Tribal elders, plant diversity—especially of grasses—is a sign of ecological health. These elders have noticed an increase in this plant diversity inside burned areas.

Fire as an ecological process has been present in the pine forests of what is now central Arizona for millennia.

Pre-reservation tree ring studies conducted on four sites on the San Carlos Apache Reservation found broad-scale fire events recorded on fire scarred trees at a return interval of from three to eleven years.

The Tribal elders have noticed this increase in plant diversity is most evident inside low- to moderate-intensity burned areas. Apaches use many of these plants for ceremonial and medicinal purposes. Maintaining the diversity of plant species is incredibly important to continuing cultural traditions.

As with many Native communities, cultural and ceremonial areas are not defined in terms of market value. Rather, these areas are intrinsic and essential to a culture and a way of living. Within Tribal communities, residents are not separate from the natural and cultural resources that comprise their reservation landscapes—they live among these resources.

These resource values are a part of their legacy to be left to their children as part of their heritage. Therefore, economic viability and cultural existence are dependent on these vital resources.

B. Commercial Timber

The vegetative resources are a major asset of the San Carlos Apache Indian Reservation. These resources provide many benefits for tribal members, including: timber, firewood, livestock forage, water, wildlife habitat, recreation, local employment, and cultural values. Each of these benefits, to some degree, affects the Tribal welfare.

The reservation has more than 60,000 acres of commercial forestland that represents an estimated millions of dollars in future revenue.

Economic revenue for the Tribe depends on the continued management of this resource, as well as providing health and educational programs to the community and to future generations of San Carlos Apache Tribal members.

Current Forest Manager for the San Carlos Apache Tribe, Dee Randall, notes that: “This is a working forest. The people here live in the forest. It is a source of timber, fuel, water, wildlife, forage for livestock grazing, plants harvested for medicinal purposes, and food—including acorns collected from Emory oak to make acorn stew.”

Unlike their urban counterparts—who only *visit* the forest—Tribal residents are dependent on a healthy forest for their cultural, as well as economic, well-being. Thus, loss of productive timber due to a catastrophic wildfire is felt more heavily than other public lands.

C. Wildlife Habitat

The reservation is host to numerous wildlife species, including large and small mammals, reptiles, and various bird and fish species. The reservation’s ecosystems include the presence Rocky Mountain elk, Rocky Mountain bighorn sheep, pronghorn antelope, whitetail deer, mule deer, turkey, mountain lion, bobcat, coyote, javelina, Merriam’s turkey, goshawk, southern bald eagle, peregrine falcon, and quail.

The San Carlos Tribe offers guided hunts for its prized Rocky Mountain elk. These hunts provide seasonal revenue to the Tribe each fall.

The health, viability, and economic resource of these species are highly dependent on forest and landscape health.

Most of these species have developed within the fire-dependent ecosystems of dry ponderosa pine, Madrean woodlands, chaparral, and grasslands.

Threatened and Endangered Species
The Mexican spotted owl, a Federally Listed Species—and another fire-dependent ecosystem species—is present and being managed for on the reservation.

San Carlos Apache Tribal elder and young Tribal member gathering native agave.

Photo courtesy Seth Pilsk.

Canyon Fire District (near Globe, Ariz.) Chief Bob Arthur, who is also an Operations Branch Director on Tony Sciacca's Southwest Area Type 1 Incident Management Team, says he appreciates that on San Carlos Apache Tribal lands—due to forestry and fuels management—he will likely find opportunities to utilize some of these treatments as anchor points to help manage wildland fire.

3. Recent Fire and Fuels Management History

The San Carlos Apache Reservation—including its fire management program—has a long legacy of implementing and overseeing land management practices with an emphasis on land management goals and objectives that support a restored, resilient, and productive landscape.

From the 2003 San Carlos Apache Indian Reservation Wildland Fire Management Plan:

- Improve public and firefighter safety.
- Reduce the danger of fuel accumulations.
- Minimize damage and high cost caused by future wildfires.
- Enhance wildlife habitat.
- Maintain forest aesthetics.

Importance of Planning, Knowledge, and Developing an Educated Fire Program
It is important to understand that managing fires for resource benefit—as well as for multiple objectives—takes a certain amount of decision space that is a culmination of:

1. **Preplanning of Fuels Treatments**. These treated areas provide opportunities for "Protective Fire Management" that help establish anchor points and control features for wildfire suppression strategies and tactics. Canyon Fire District (near Globe, Ariz.) Chief Bob Arthur, who is also an Operations Branch Director on Tony Sciacca's Southwest Area Type 1 Incident Management Team, says he appreciates that on San Carlos Apache Tribal lands—due to forestry and fuels management—he will likely find opportunities to utilize some of these treatments as anchor points to help manage wildland fire.

2. **Knowledge of Fire History and Fire Management**. Having an understanding of the fire frequency of this region as well as how healthy landscapes have adapted to the frequency and lower intensity of these historic fires. This includes knowing how some of the land management practices have altered these landscapes away from the historic norm. In addition, this understanding encompasses knowing where recent fires have occurred and utilizing these fire scars as part of the planning area to treat and create a larger treatment and maintenance mosaic.

3. **Developing an Educated Fire Program.** A program that emphasizes land management as a fire tool versus purely fire suppression. Duane Chapman, Fire Management Officer for the San Carlos Fire Program, assures that: "Educating our up-and-coming firefighters about fire behavior, desired fire effects, and optimal burn windows that allow fires to run their natural course is an important part of training our young firefighters."

Wildfires successfully managed for resource benefit and multiple objectives by utilizing previous year's timber activities as well as accomplished and planned hazardous fuels treatments:

2011 Maggie Fire – 4,552 Acres – 10/10/11-10/27/11
Resource Benefit Fire (Timber/Shrub/Grass)

Maggie Fire – low to moderate intensity burn.

Maggie Fire burning in commercial timbered stand.

2012 Trail Fire – 2,512 Acres – 8/12/12-9/13/12
Multiple Objective Fire (Shrub/Timber)

Trail Fire – low to moderate intensity burn.

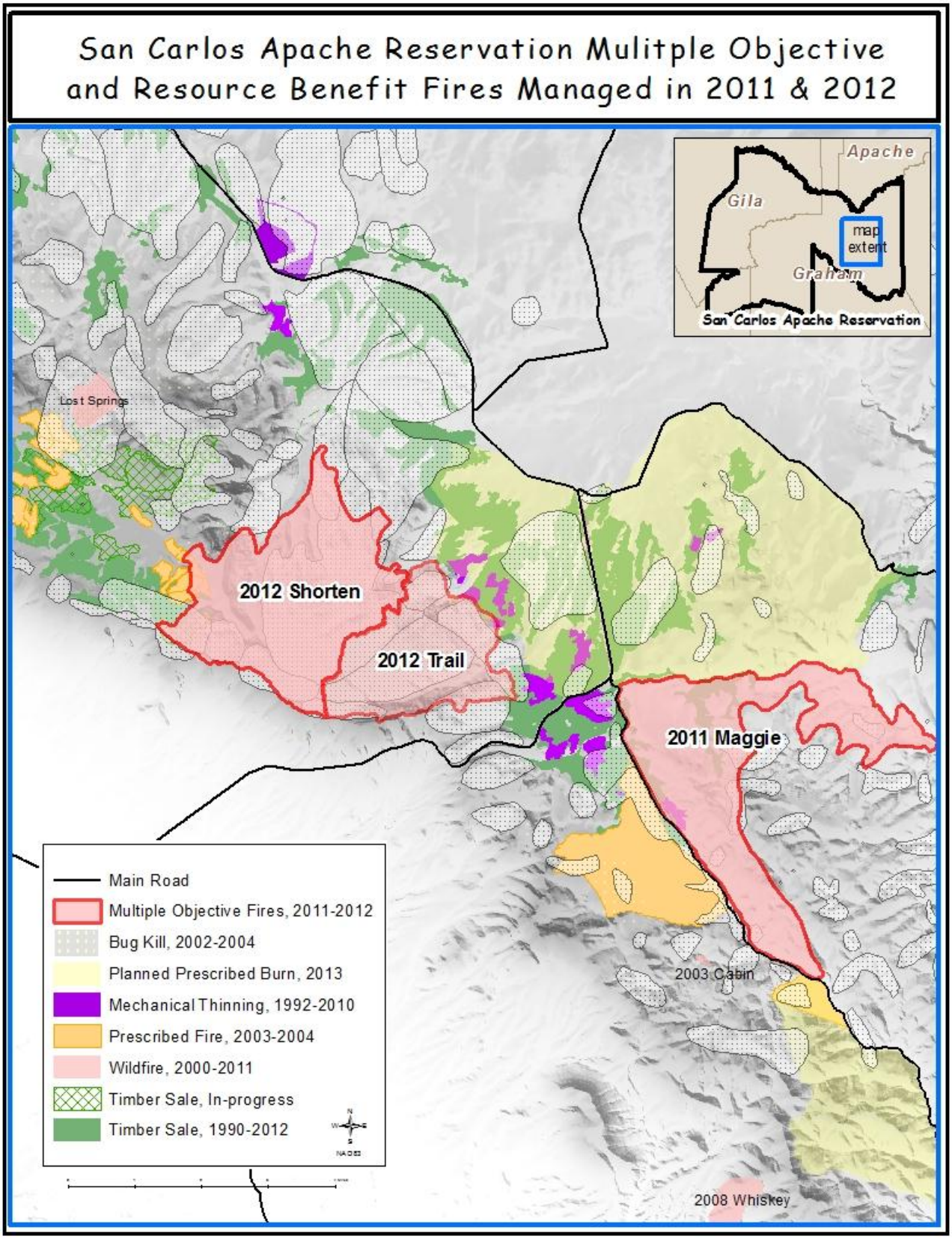
Trail Fire consuming large accumulations of dead and down fuel.

All fire photos on this page courtesy Duane Chapman and the San Carlos Apache Fire Program.

2012 Shorten Fire – 7,096 Acres – 9/25/12-11/26/12
Resource Benefit Fire (Timber/Shrub/Grass)

Shorten Fire – low to moderate intensity burn.

Shorten Fire exhibits low-intensity backing fire.



Map courtesy Robert Hetzler.

"Success depends on preplanning and clear deliberation, by which I mean intent, before the lightning strikes—not being in a position where the realization that managing a wildfire for its ecological benefit is an afterthought."

William Grauel, National Fire Ecologist
Bureau of Indian Affairs

A Recipe for Success

William Grauel, the previous San Carlos Fire Use Specialist and current Fire Ecologist with the Bureau of Indian Affairs/National Interagency Fire Center, discusses the opportunities that arose to manage the 2012 Trail and Shorten fires for multiple objectives, including treating a larger landscape:

"Both the Trail and Shorten fires began in an area that we knew had heavy dead and downed fuels from a beetle-kill episode about ten years previous," Grauel points out. "The Energy Release Component (ERCs) in July 2012 were at or below normal and trending down.

Grauel continues: "That whole Dry Lake higher elevation area has pretty bad mistletoe. It has received some thinning and is scheduled for more in the near future. In general, we had developed the deliberate mindset that the monsoon presented an opportunity to treat fuels and get fire back into the ecosystem at a historically—and perhaps ecologically—more appropriate time of year."

"It's a combination of these elements that develops a recipe for success," Grauel confirms.

Without the preplanning of hazardous fuels treatments, the knowledge of fire behavior and fire effects, experience with successful and unsuccessful decisions and education, these opportunities to treat a larger landscape would not be possible.

According to Grauel: "Success depends on preplanning and clear deliberation, by which I mean intent, before the lightning strikes—not being in a position where the realization that managing a wildfire for its ecological benefit is an afterthought."

Comparing Costs

The goal of managing large fire costs is also the goal of protecting the San Carlos Community, firefighters, valuable resources, and a way of life.

In doing so, planning and developing a mosaic of treatments across the landscape requires multiple tools to be utilized at different spatial and temporal scales. This includes practices such as mechanical thinning, biomass removal, prescribed burning, and utilizing wildfires for resource benefits.

The longer a landscape goes without treatment, the higher the costs will be to restore to the landscape to the appropriate fire regime. Thus, maintenance treatments are less costly over time.

The following three subsections identify and discuss: 1) Average cost per treatments over the past five years in Wildland-Urban Interface and non-Wildland-Urban Interface areas; 2) A cost comparison of fires on the San Carlos Apache Reservation; and 3) A comparison of estimated Stratified Cost Index costs versus actual costs of the Maggie, Trail, and Shorten fires.

1) Average cost per treatments over the past five years in WUI and Non-WUI areas

Hazardous Fuel Reduction Mechanical Treatments		Hazardous Fuel Reduction Prescribed Burning		Pre-Commercial Thinning
Wildland-Urban Interface (WUI)	Non-WUI	Wildland-Urban Interface (WUI)	Non-WUI	
$250 Acre	$400 Acre	$130 Acre	$50 Acre	$200 Acre

Average cost of treated acres within the past five years.

In developing a landscape mosaic of treatments along the Nantac Rim that will assist in protecting resources and restoring the landscape, San Carlos Apache Forestry and Fire programs have utilized a number of treatments that include practices such as mechanical thinning, biomass removal, prescribed burning, and utilizing wildfires for resource benefit.

Prior to the recent resource benefit fires (Maggie, Trail, and Shorten), the greatest amount of acres treated by these practices has been through prescribed burning. Each of these fires that were utilized for resource benefit were planned for "out" years to be treated as areas deemed necessary for prescribed burning.

The cost of prescribed burning in this area is averaged at $50 per acre. In comparing this cost with the average actual cost to suppress fires on the Reservation:

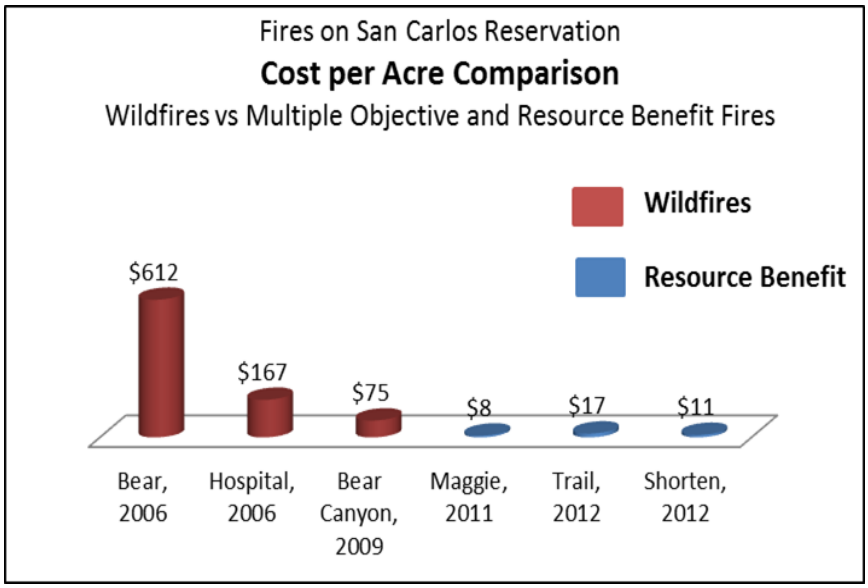
- $285 average cost per acre – for suppression activities.
- $50 average cost per acre – for prescribed burning.
  Representing an estimated cost savings of 82%.

(These costs represent solely fuels and fire management costs, they do not include economic, natural, or cultural loss to resources due to catastrophic wildfire.)

2) A cost comparison of fires on the San Carlos Apache Reservation managed for full suppression and those managed for multiple objectives and resource objectives using *actual costs*.

One method of comparing cost is comparing large fires that have occurred on San Carlos Apache Reservation in recent years. In comparing these fires, the assumption is made that fire costs are static (and not adjusted for inflation).

- $285 per acre – for suppression activities.
- $12 per acre – for minimal suppression activities.
  Representing an estimated cost savings of 96%.



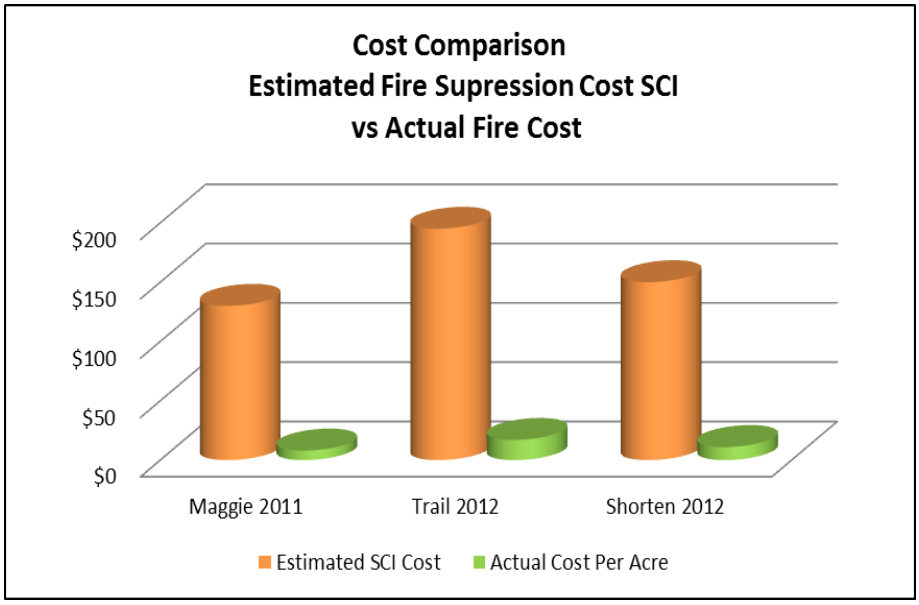
Actual cost of wildfires and resource benefit fires on the San Carlos Apache Reservation.

3) A comparison of estimated Stratified Cost Index costs versus actual costs of the Maggie, Trail, and Shorten fires.

Another method of estimating suppression expenditures for wildfires is utilizing the Stratified Cost Index with the Wildland Fire Decision Support System (WFDSS). The average cost for full suppression strategy opposed to a minimal suppression strategy (multiple objective or resource benefit) would see a difference of:

- $202 per acre – Full suppression activities.
- $12 per acre – Minimal suppression activities.

Representing an estimated cost savings of 95%.



Comparison of Stratified Cost Index – This would be the estimated cost per acre of these three fires if they were fully suppressed. Estimates are derived from fires with similar characteristics. The 50% and 75% of the SCI Costs were averaged to derive a single estimated cost. This index average, using the DOI/BIA Model in the Wildland Fire Decision Support Tool WFDSS Model, includes fires since 2004 across all Regions and compared 115 fires within similar fuel types, ERC, and slope condition.

Successful land management requires cooperation from administrators, interdisciplinary resource managers, land users, and the education of young firefighters.

4. Developing Support and Cooperation

"It is necessary to develop a high-level of trust by finding opportunities for education and outreach."

Duane Chapman
San Carlos Fire Management Officer

Due to the history and development of the San Carlos Forestry and Fire Program, proactive land management and land restoration objectives have become the program's key goal.

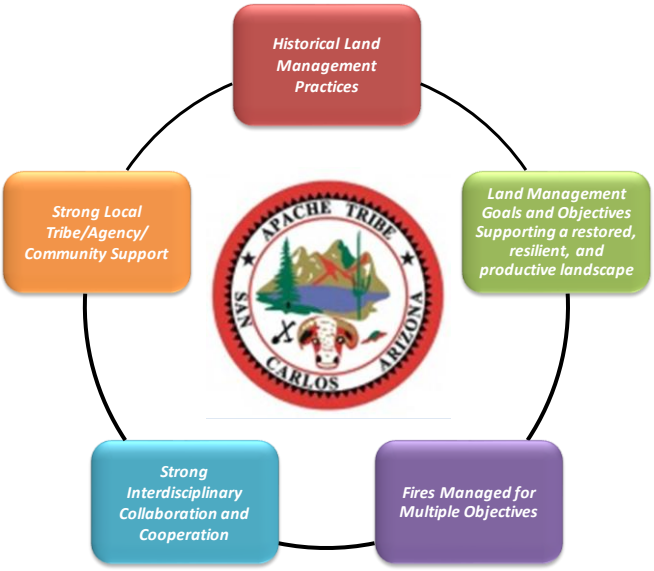
This successful emphasis is due in large part to several significant entities that live on—or help manage—the San Carlos Apache Reservation:

- San Carlos Apache Tribe Interdisciplinary Team
- San Carlos Apache Tribal Council
- Local Tribal and private community
- The Agency (Bureau of Indian Affairs)

San Carlos Apache Tribal Elders engaging in a Consultation Meeting. Photo courtesy Seth Pilsk.

Collaborative Efforts Protect Values at Risk

Effective fire management on San Carlos Tribal lands is accomplished through collaborative efforts. The fire program staff works closely with resource specialists, as well as Agency and Tribal administrators, to ensure that values to be



protected are consistent with identified resource objectives.

Identified values at risk include commercial forest lands with significant merchantable timber resources, rangeland grazing resources and infrastructure, and wildlife resources.

This interdisciplinary approach promotes careful planning and implementation for managing low- to moderate-intensity wildland fires that promote historical ecosystem structure, function, diversity, and dynamics.

This holistic approach allows for planning and dialogue in an interdisciplinary environment, which allows for input from administrators, land managers, resource specialists, and land users.

"It's good," explains Duane Chapman, San Carlos Fire Management Officer, "to hear from both our Natural Resources Programs and San Carlos Apache Tribal members—receiving feedback from resource specialists and Tribal members. Both of these groups are telling us that the return of fire to the landscape—that has been excluded for many decades—is now providing positive effects, including plant diversity, improving wildlife habitat, and improving rangelands."

Managing wildland fires for multiple objectives and resource benefits appears to be well-supported by the Agency, San Carlos Apache Tribe, and—most importantly—the local community.

This support is primarily based on the Agency and Tribal fire management goals and objectives identified in the 2003 San Carlos Apache Indian Reservation Wildland Fire Management Plan.

A Fire Program with an Emphasis on Land Management

The San Carlos Apache Tribe continues to develop a strong fire program that encourages firefighters to be proactive land managers—not just fire suppressors. The Tribe emphasizes fire behavior and fire effects as part of the fire curriculum.

5. Conclusion

1. Increased Community and Firefighter Safety

- Fuels treatments are being utilized by both the San Carlos Apache fire program and Interagency fire management teams for tactical operational decisions to manage wildfires on the San Carlos Apache Reservation.

2. Enhanced Fire Management Opportunities

- Years of timber and fuels management have allowed for the decision space to manage fires utilizing multiple objectives, including fires for resource benefit or minimal suppression action in order to treat the larger landscape under desirable conditions.

3. Greater Potential to Reduced Suppression Cost and Fire Size

- We need to increase or maintain funding levels for forest activities, range improvements, and fuels treatments in order to continue to restore and maintain the Reservation landscape.
- Fuel treatment costs versus suppression costs show a cost savings of 82%. Fires for resource benefit versus full suppression show a cost savings of 96%.

4. Minimized Negative Effects on Resources

- Fuels treatments allow for treating fuels under a low- to moderate-intensity, creating less damage to the resource and reducing a need for rehabilitation.
- Reduce loss of Tribal values such as natural, cultural, and economic resources.

The San Carlos Apache Tribe continues to develop a strong fire program that encourages firefighters to be proactive land managers—not just fire suppressors.

6. Future Considerations

- Long-term fuels planning and implementation is necessary to continue landscape restoration and treating a larger mosaic for greater protection and to reduce impacts of catastrophic wildfire.
- The protection of community and Tribal values requires the flexibility of treating in the backcountry as well as around the Wildland-Urban Interface areas—including forested and grazing lands.
- With decline of timber markets, the timber harvest and forest activities have slowed. Thus, fuels treatments have become the greatest management tool in recent years to continue land management restoration.
- The San Carlos Apache Reservation should continue to promote the benefits of timber activities and hazardous fuels projects in managing for resource objectives as well as actively solicit input from Tribal members and resource managers—allowing them to make recommendations in support of active fire management decisions.
- Seek out opportunities to incorporate current science in support of sustainable land management.
- Continued oversight from all programs (Timber, Fire, and Range Management to increase the overall resilience and sustainability of the San Carlos Apache Reservation landscape.

7. Report Team Members

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