Apache Trail, Tonto National Forest

Observations, Considerations, and Recommendations from the Interagency Transportation Assistance Group (TAG)

June 15 – 17, 2015

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This report summarizes the observations and findings of an interagency transportation assistance group (TAG) convened to discuss the long-term future of Arizona State Route 88, also known as the "Apache Trail," a historic road on the Tonto National Forest. The TAG included staff from the Volpe Center, the U.S. Forest Service, the Federal Highway Administration, and the Arizona Department of Transportation. Based on a June 2015 site visit to the Apache Trail and subsequent discussions, the Volpe Center outlined a number of potential management actions and scenarios for the road. This report described the background of the road, issues and goals noted in the site visit, as well as the management options and scenarios discussed by the TAG. It concludes by describing the TAG's recommended scenario for the Apache Trail and potential next steps.

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Introduction

From June 15 to June 17, 2015, an interagency transportation assistance group (TAG) conducted a field investigation and discussion focused on the long-term future of Arizona State Route (SR) 88, also known as the “Apache Trail,” on the Tonto National Forest. The U.S. Forest Service (FS), in coordination with the Arizona Department of Transportation (ADOT), and the Federal Highway Administration (FHWA) as joint members of a three-agency steering committee, requested that the U.S. Department of Transportation Volpe Center facilitate this TAG to help the agencies and their partners consider potential long-term approaches to the road. The primary concern is safety for road users, which is a challenge given the winding geometry of the road and the sensitive historic features and scenic views that make it an economic generator in the region.

This TAG report, developed subsequent to the site visit, documents the observations, conditions, issues, and recommendations arising from the TAG team’s analysis. It includes a list of potential actions that could benefit the Apache Trail corridor and packages some of these actions into a set of potential alternatives for the road. These alternatives balance issues of historic preservation, environmental protection, visitor safety, maintenance logistics, and access.

Background and Conditions

The Apache Trail is a state highway (State Route 88) that traverses through the Tonto National Forest from Apache Junction, AZ, at the northeastern edge of the Phoenix metropolitan area, northeast to Roosevelt Lake. From the entrance of the forest to Roosevelt Dam, the road is approximately 42 miles long and features scenic views of the Salt River, Canyon Lake, Apache Lake, and the adjacent mountains. The westernmost 19 miles of the road and an approximately 1-mile long section near Roosevelt Dam are paved while the remaining mileage is composed of native material surfacing.

The Apache Trail’s natural beauty has long made it a major attraction in Arizona. President Theodore Roosevelt stated that "the Apache Trail combines the grandeur of the Alps, the glory of the Rockies, the magnificence of the Grand Canyon and then adds an indefinable something that none of the others have. To me, it is the most awe-inspiring and most sublimely beautiful panorama nature has ever created." These natural qualities continue to draw visitors, especially since the road is close to the Phoenix metropolitan areas and is now part of the Tonto National Forest, providing access to campgrounds, trails, and other recreation sites. The history of the road as an early stagecoach trail and development road (outlined below) is an important part of its value and charm, and is still evident in the road today. The road retains much of the geometry and character from when it was first developed over 100 years ago.

The unique natural beauty and historic character of the road are essential to its wide appeal to local, national, and international visitors. However, these characteristics also pose challenges for maintaining the road and ensuring traveler safety.

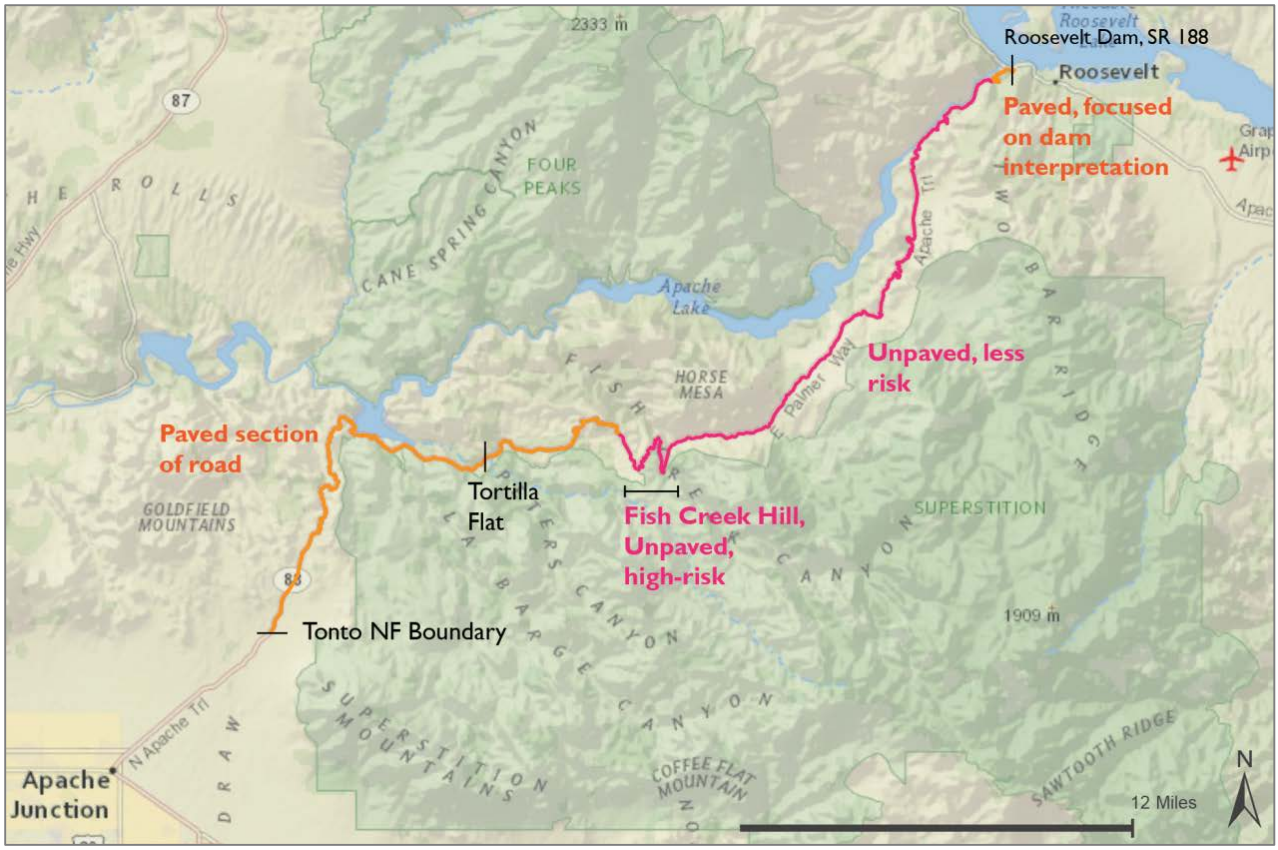

Figure 1: Map showing sections of the Apache Trail and major landmarks.

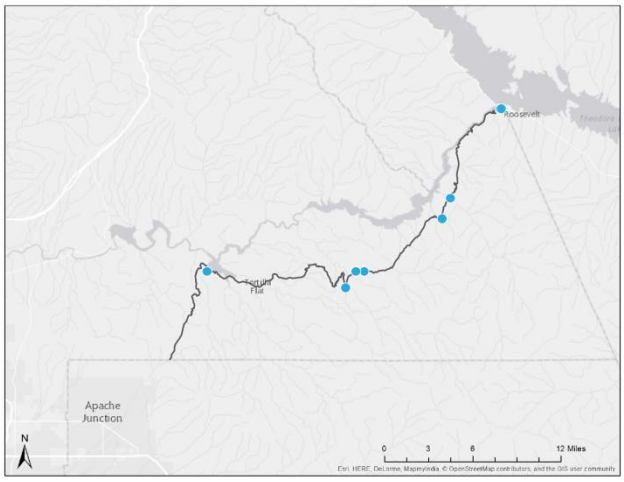

Figure 3: Locations of bridges along the Apache Trail

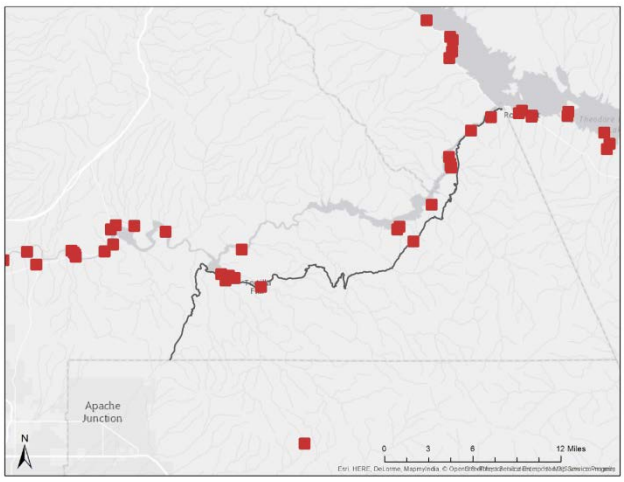

Figure 2: Forest Service recreation sites near the Apache Trail

Road section	Starting Landmark (approx.)	MP Start	Length (mi)
Paved section of road	Tonto NF boundary	201	19.2
Unpaved, high-risk: Fish Creek Hill	Interpretive rest area	220.2	3.8
Unpaved, less risk	End of Fish Creek Hill	224 (approx.)	17.6
Paved road near dam access	Power Plant Rd.	241.6	1.46
		Total	*42.06 mi*

Table 1: The Apache Trail, as broken up into key sections for discussion. Risk level as described in this table is based on the descriptions that FS and ADOT staff assigned to each road segment during the TAG.

Ownership and Management Background

The U.S. Reclamation Service (now the Bureau of Reclamation) built what is now the Apache Trail in 1903 and 1904 as a service road to enable construction of the original dam at Roosevelt Lake, a major milestone in the settlement and growth of central Arizona that enabled flood control and large-scale irrigation. The dam is now managed by the Salt River Project (SRP) utility agency. Constructed at the beginning of the automobile era, the road became a popular destination for sightseeing drivers in the area and was, according to a contemporary account, among the most traveled roads in the state in the 1910s. Once the road was no longer needed for dam construction, management responsibility became unclear and conditions deteriorated. After considering proposals to turn the road over to a toll authority, the U.S. Department of the Interior and SRP transferred management to the State of Arizona as a state highway in 1922.

The transfer coincided with the completion of what is now U.S. Route 60, a more direct eastern route from Phoenix to Globe and beyond. This diminished the Apache Trail's role as a regional travel route and directed investment towards US 60. Nonetheless, in the 1950s and 1960s, ADOT began to modernize, widen, and pave parts of the road. This prompted public concern that the scenic and historic character of the road was in jeopardy, and ADOT halted further changes to the road aside from routine maintenance. In 1986, Arizona designated the Apache Trail as a Historic Road, currently one of three in the state, recognizing its importance in Arizona's history and providing guidelines and rules on road operations and maintenance.

Figure 4: Fish Creek Hill, the narrowest and steepest section of the Apache Trail.

While still a state highway, many parts of the road, especially but not exclusively on the unpaved portion, are narrow, curvy, or steep, reflecting historic characteristics but not typical features of a state route. These and other "unique" conditions, which are described in more detail below, may be confusing, unexpected, or intimidating for inexperienced drivers or those unfamiliar with the Apache Trail, especially along particularly steep and curvy "white knuckle" segments such as Fish Creek Hill. In general, some people appreciate and travel the road because it is unique and an attraction in and of itself. However, other people, most notably many tourists that want to visit destinations along the road and are unprepared for conditions along the Apache Trail, drive the road once and vow never to drive it again.

Visitation, Uses, and Traffic

Since faster, less rugged routes exist for through traffic from Phoenix to Roosevelt Dam and Globe, most users are visiting destinations accessed solely by the Apache Trail and/or want to experience the road itself. The road accesses a number of Forest Service day use sites, scenic overlooks, trailheads, campgrounds, and boat launches. There are also marinas, restaurants, accommodations, and small shops that cater to recreation visitors.

Most of the facilities and businesses are concentrated along the paved portion of the road from Apache Junction to Tortilla Flat; however, businesses and accommodations associated with Apache Lake are accessed only by unpaved road and almost equidistant from either end of the paved portions of the Trail.

Traffic Summary

Table 2 shows the most recent traffic data for the Apache Trail. The Average Annual Daily Traffic (AADT) data does not represent the seasonal swings in traffic that can occur throughout the year. In addition, due to low use compared to other state routes, traffic data is often inferred from year-to-year, so may not be as reliable as counts for major, high-traffic roadways or reflect seasonal use.

Milepost	Location	2010 AADT	2013 AADT	2013 K Factor	2013 T Factor
201	Tonto NF Boundary	1,900	2,164	17%	12.9%
212	Tortilla Flat	850	929	20%	9%
228	Apache Lake Access Rd	200	146	10%	8.9%
240	Roosevelt Dam	150	151	10%	9.3%

Table 2: Average Annual Daily Traffic summary for the Apache Trail.

Figure 5: Tortilla Flat, one of the main concentration of visitor-serving businesses near the transition from the paved section to the unpaved section.

Traffic on the Apache Trail is highest in the winter seasons, and some destinations and campgrounds have limited or reduced hours in the summer. This use pattern is reflected in the "K factor," which is the traffic level during the 30th highest traffic hour of the calendar year, as expressed as a percentage of AADT. The K factor for the unpaved portions are typical for other Arizona state routes, while the high percentages around the southern forest boundary and Tortilla Flat likely reflect a high seasonal traffic peak in the winter.

Although the Apache Trail's geometry can be challenging for large vehicles, boating enthusiasts use the road to haul their boats to the launches at Apache Lake and Canyon Lake. This use is reflected in the "T factor," which is the percentage of AADT generated by large or commercial vehicles such as trailers. The T factors are not unusual for state routes in general (the 2013 average is 12.8%) but are high given the characteristics of the Apache Trail.

Figure 6: Roosevelt Lake Marina. Marinas at Roosevelt Lake, Apache Lake, and Canyon Lake are important recreation destinations near and along the Apache Trail.

Management

The 42 miles of the Apache Trail analyzed by this TAG are located on Forest Service land. ADOT has historically maintained and been recognized as having primary jurisdiction on the road. However, ADOT does not have a highway easement for the Apache Trail, as discussed below. ADOT's Central District maintains the paved portion of the road (from Apache Junction to approximately MP 220) while the Southeast District maintains the remaining, primarily unpaved, portion to Roosevelt Dam.

Law enforcement

A number of agencies provide law enforcement support on and around the Apache Trail. Since the road is a state highway, the Arizona Department of Public Safety (DPS) has jurisdiction over the highway and responds to incidents. Forest Service Law Enforcement Officers (LEOs) have jurisdiction on adjacent National Forest System land and Forest Service-managed recreation areas. Finally, Maricopa County Sheriff's Office also patrols the road and enforces traffic laws.

Section 4(f) and Section 106

The Apache Trail is a historic road that is eligible for inclusion in the National Register of Historic Places, and a number of the road features are also eligible or listed. For that reason, Section 106 of the National Historic Preservation Act and Section 4(f) of the Department of Transportation Act of 1966 are important legal references for managing and improving the road.

Section 106 requires federal agencies to take into account the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historic Places. With respect to the management and operation of the Apache Trail, this means that any undertakings, including construction projects or maintenance activities that are funded, permitted, or approved by the FHWA, the Forest Service, or any other federal agency, require review under Section 106 as well as the National Environmental Policy Act (NEPA).

In order to simplify and streamline the Section 106 process, the Forest Service, FHWA, ADOT and the Arizona State Historic Preservation Office (SHPO) are developing a Section 106 Programmatic Agreement (PA) that will allow for expedited review of simple, routine actions, and will guide the Section 106 process for more complex projects. The PA is one step in a comprehensive programmatic approach to the maintenance and operation of the Apache Trail.

In order to assist in the assessment of potential effects of various undertakings to the Apache Trail, the Forest Service, with funding from FHWA, has developed an inventory of all the road features of the Apache Trail. The process of evaluating which of those features contribute to the historic character of the Apache Trail is currently in process.

An additional aspect of the comprehensive programmatic approach is the development of a maintenance and operations plan. This plan, currently in draft, identifies routine activities that could be conducted under the programmatic agreement with minimal or no Section 106 review and consultation. It also will include guidance for ensuring that routine maintenance and repair activities are conducted in such a way as to avoid adverse effects to the Apache Trail whenever possible.

Section 4(f) of the Department of Transportation Act of 1966 stipulates that FHWA and other Department of Transportation agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless there is no feasible and prudent alternative to the use of that land, and that the proposed action includes all possible planning to minimize harm to the property resulting from such use. The Apache Trail is a historic property that is subject to protection under Section 4(f).

Title 23 CFR 774.13(a) identifies exceptions to the requirement for Section 4(f) approval for restoration, rehabilitation, or maintenance of transportation facilities that are on or eligible for the National Register. With respect to the Apache Trail, if FHWA concludes through the Section 106 process that a proposed federally funded maintenance activity or construction project will not adversely affect the historic qualities that contribute to the National Register eligibility of the Apache Trail, and if the Forest Service and the SHPO do not object to FHWA's conclusion, then Section 4(f) approval is not required for that particular project.

Action	Status
1. Inventory of heritage assets	Complete
2. Assessment of heritage assets	Complete for paved section; in progress for unpaved section
3. Official highway easement (paved section)	Underway
4. SHPO/ADOT/FHWA/FS Programmatic Agreement for Apache Trail	In draft
5. Maintenance and Operation Plan for historical features	In draft
6. Official highway easement (full road)	Underway
7. Apache Trail Strategic Plan	Proposed
a. Long-term, improvements and road maintenance	Proposed

Table 3: Critical path for Apache Trail documents, as identified on June 17, 2015. Step 7 (the Apache Trail Strategic Plan) would identify which actions from this TAG the agencies should pursue as road improvements.

Recent and planned activities

There have been few major improvements to the paved and unpaved portions of the road since paving work halted in the 1960s. However, ADOT continues to conduct routine maintenance, which includes blading the unpaved portion of the road, vegetation removal, cleaning culverts, and pavement maintenance on the paved portions among other activities. In an effort to address long term needs on the Apache Trail, the Forest Service and ADOT have recently focused partnership activities with an emphasis on management clarity that will allow safety improvements while placing a high value on the road's unique historical and scenic character. Most of these activities are part of a critical path as shown in Table 3 that will streamline maintenance and management of the road. This TAG report will help identify high-level options for future management and investments.

Recent actions include:

- **Road safety assessment on paved section (2009)**: ADOT and the Forest Service conducted a road safety assessment for curves along a 7-mile section of the road (See ADOT, "Road Safety Assessment SR 88, MP 203.4 to 210.5," 2009). This section of the road historically has a particularly high rate of fatal and non-fatal crashes, among the highest in the state system.
- **Retaining wall repairs (2010-2011):** The FHWA Central Federal Lands Division funded a project to repair failing or damaged retaining walls at five sites (MPs 222.8, 224.6, 225.3, 225.5, and 226.2) along the road. The project was implemented in a way that preserved the integrity of the historic stone retaining walls.
- **Inventory of heritage assets on entire road (2012):** The Forest Service and ADOT completed an FHWA-funded GIS inventory of all historic features that are part of or along the Apache Trail (See Jacobs, "Apache Trail GIS Based Inventory – Final Report," February 2012). Identifying and locating these features is the initial step for assessing their contribution to the road's historic character and establishing programmatic guidelines for long-term maintenance of the current road.
- **Curve corrections (2016)**: Based on the 2009 assessment, this project will mitigate safety concerns by reconstructing six curves on this section of road. Work is expected to begin in 2016 once full compliance with state and federal historic preservation and environmental protection

laws is ensured. This project (Project: Apache Trail to Tortilla Flat – TRACS No. H8112) also includes resurfacing the pavement on the currently-paved section of the road.

Potential upcoming or in-progress actions include:

- **Assessment of heritage assets**: Building from the completed inventory, the assessment will evaluate the significance of the road's features and ascertain those that contribute to the Apache Trail's National Register of Historic Places eligibility. This assessment is complete for the paved section of the road on the west end (from the forest boundary up to approximately MP 220) and is underway for the unpaved portion of the road.
- **Programmatic agreement between Arizona State Historic Preservation Office (SHPO), ADOT, FHWA, and the Forest Service**: Establishing a programmatic agreement (PA) under Section 106 would help streamline ADOT's routine maintenance and investments on the Apache Trail. A draft PA has been developed, and review and revisions are underway.
- **Maintenance and Operation Plan for historical features**: This plan, currently in draft, establishes routine activities that could be conducted under the programmatic agreement. Review and revisions to the draft are underway.
- **Highway easement deed to ADOT**: The highway easement deed to ADOT for the Apache Trail would formalize management responsibilities for the road. Preparation for this is currently ongoing. Depending on other actions in the critical path, ADOT and the Forest Service could decide to implement the easement in sections (i.e. for the paved portions before the unpaved portions).
- **Apache Trail Strategic Plan**: Building on the discussion and ideas from this TAG visit as well as the management documents listed above, this plan would define the future, long-term investments and management changes required to meet the agencies' goals for the Apache Trail into the future.

Figure 7: One of the paved hazardous curves identified in the RSA (Location #8, Source: RSA).

Issues and Challenges

As part of the TAG, a core team composed of staff from the participating agencies visited the Apache Trail, met with public and private stakeholders, and discussed each organization's experiences and insights with the road. The team identified the following key issues:

Public Safety

Infrastructure and road condition

- **Surface quality:** Both the paved and unpaved portions of the road include segments with significant surface deficiencies such as washboarding and potholes. These can contribute to motor vehicle crashes and create stressful driving experiences for visitors.
- **Blind and hazardous curves/geometries**: A significant number of curves along the Apache Trail have deficient curve radii and/or there is inadequate sight distance due to steep roadside cut slopes or encroaching vegetation. This includes blind curves (where drivers cannot see approaching traffic due to roadside rock faces), hairpin curves with very small radii, and decreasing radius curves (where the curve radius changes within the curve itself).
- **Road width:** Significant portions of the road have inadequate roadway width. The narrowness of the road and lack of consistent shoulders increase the potential for sideswipe or head-on crashes from vehicles crossing into the opposing lane, especially around curves.
- **Steep drop-offs and lack of guardrails**: Much of the Apache Trail winds along mountains or cliffs; veering off of the roadway can quickly cause a car to fall a significant distance. This issue is compounded on parts of the road with tight or unusual curves, no shoulders, or where guardrails are not in place or are not built to current safety standards.
- **Lack of pullout areas**: Because of the Apache Trail's scenic and historic qualities, visitors often want to pull over to take photographs. However, there are few areas to pull off the travel way

along the road. Visitors sometimes suddenly stop, fully or partially blocking travel lanes to enjoy the scenery. The lack of safe areas to pull off the road means that drivers do not have a safe place to address vehicle breakdowns or await emergency assistance, and is also a concern for law enforcement officers, as there may not be a suitable place nearby to pull drivers over.

- **Fish Creek Hill** is the most extreme example of the hazardous geometries outlined above on the road. This steep one-mile segment along the unpaved portion of the road has an 800-foot climb/descent. It includes a number of hazardous curves and is only wide enough for one lane with few pullout areas.
- **Bridge condition and restrictions:** ADOT's bridge inventory lists ten bridges along this section of the Apache Trail, including at least one disused bridge (See Appendix). A number of these are one-lane, which can cause unsafe conditions on busy days, and/or load restricted. Load restricted bridges prevent critical access by SRP for very heavy equipment (they currently use a barge instead). In addition, swimmers sometimes dive off of the bridges despite posted prohibitions.
- **Lack of cellphone connectivity**: Cell phone signal is poor or nonexistent along much of the road. Visitors may be unable to quickly report emergencies or use navigation services (such as Google Maps) that depend on a cellular data connection.
- **Many sections of the road do not comply with current roadway design standards**: ADOT does not have standards for unpaved roads, as many local governments in Arizona do.

Figure 8: A relatively flat stretch of the Apache Trail on the unpaved section.

Visitor behavior and expectations

- **Excess speed**: While the conditions of the Apache Trail cause most drivers to reduce their speeds, thrill-seekers, those unaccustomed to the road, or confident frequent users may drive faster than is prudent, especially along the paved portion. High speeds increase the hazard posed by the road's many curves.
- **Mixed suitability for vehicles other than passenger cars**: In addition to standard passenger cars, pickup trucks hauling boats, trailers, and other recreation vehicles such as campers, frequently use the Apache Trail. Motorcyclists and bicyclists also travel the road, especially during the

winter. However, portions of the road may be unsuitable or challenging for these vehicles. For example, motorcyclists may encounter difficulty driving on the unpaved portion of the road, and trucks hauling RVs or boats may not be able to easily ascend or descend Fish Creek Hill. Since the Apache Trail is a state highway, users may not expect these challenges with their vehicles. However, in other cases the Apache Trail is the sole access route for some users, particularly for recreational boaters hauling their boat to Canyon Lake or Apache Lake.

  - **Bicyclist vulnerability:** Bicycle users are particularly vulnerable on the road given the condition of the surface, inadequate lane widths, a lack of consistent shoulders, and encroaching vegetation.
  - **Emergency responder access:** Due to their size and the road conditions, emergency vehicles may face challenges accessing the site of a crash or other emergency in a timely manner. Crashes where vehicles fall off the road are particularly challenging. Responders may need to use helicopters to respond to serious incidents.
  - **Oversize vehicles:** Campers and other large vehicles may be too wide for the Apache Trail's travel lanes. This exacerbates safety hazards on sections of the road that are already hazardous due to curves and other factors.

- **Impaired drivers:** Intoxicated or otherwise impaired drivers place themselves and others at risk on the Apache Trail, which has in the past resulted in injuries and fatalities.
- **User expectations and awareness**: Apache Trail is a state highway and is signed to reflect this. But the road has a character and purpose distinct from most other state highways. First-time visitors may not know that the Apache Trail is a historic road maintained to preserve historic and scenic value rather than create a fast and direct drive. Unaware visitors may be distraught or angry and may not be prepared to drive the road as prudently as its conditions require.
  - **Personal navigation devices, maps, and atlases:** GPS and cell phone navigation software, as well as printed maps and atlases, may exacerbate this issue by directing through travelers down the road and by enabling backcountry navigation without the use of local maps or knowledge.
  - **Signage and infrastructure:** There is insufficient signage for communicating either the trail's historic nature or its rugged character. Turn-around areas do exist at the northern and southern ends of the unpaved portion but not at other key decision points such as Fish Creek Hill.

Environmental and other hazards

- **Falling rocks:** The Apache Trail traverses steep and rocky terrain. Falling rocks are a risk to drivers and can be difficult to report due to the lack of cell phone signal.
- **Vegetation encroachment**: Desert vegetation is part of the scenery of the Apache Trail, but also quickly grows and encroaches on the road itself, often negatively affecting sight distance. This can effectively narrow the road even further, increasing the potential for head-on or sideswipe crashes.
- **Flooding:** During heavy seasonal rain storms, water can overflow the roadway at Tortilla Flat and Mesquite Washes, both of which are just past Tortilla Flat where the road changes from paved to unpaved. While the Tortilla Flat Wash was initially "designed" to flood, it is no longer adequate and threatens vehicle traffic and motorist safety. If the water is deep enough, it can prevent the passage of vehicles driving away from hazardous condition or limit emergency response access.
- **Dust:** In dry conditions, dust may negatively affect visibility. Dust stirred up through traveler use also negatively affects surrounding area air quality.

- **Open range:** The Apache Trail crosses through open range area, which exposes drivers and livestock to potential conflicts and collisions.

Maintenance and Logistics

- **High cost of recurring maintenance on unpaved surface**: The unpaved portion of the Apache Trail is surfaced with decomposed granite, which gives the road a distinctive color. Decomposed granite was historically available and reflects the road's historic color but has a number of disadvantages compared to other materials. It does not have the strength, gradation, and plasticity required to meet compaction standards. This results in washboarding, loss of material to roadside ditches, and dust. The dust issue in particular requires ADOT to constantly spray down the road with water while addressing the frequent issues that arise on the unpaved sections.
- **Ownership and responsibility**: There is no formal highway easement granting ADOT direction and authority to operate and maintain the Apache Trail on Forest Service land. ADOT has been working under the authority of a quit claim deed. This may pose a challenge in transferring control of the road to another public road authority.
- **High volume of users at peak times:** The paved portion of Apache Trail sees a large number of users concentrated during the peak season and peak hours for recreation activities. Crashes, emergencies, or unavoidable maintenance at these times can severely disrupt traffic and limit officials' ability to respond to emergencies or provide roadside assistance.
- **Logistics for road work, maintenance, and other events**: The Apache Trail's narrow and confined geometry makes it difficult for ADOT to stage and complete maintenance activities. The peaking of road traffic at certain times of the day and year, as well as the need for water tanks (on the unpaved portion of the road), further complicate maintenance logistics.
- **Lack of clear vision**: There is not a clear, articulated vision for the future of the Apache Trail. This makes it difficult for the partner agencies—as well as businesses along the road—to strategically plan for the future. It also means that each major action on the road must be reviewed for compliance with the applicable historic preservation requirements.

Figure 9: Roosevelt Dam, the SRP-managed dam at the northern end of the Apache Trail. The road is visible through a cut on the left.

Heritage and Environmental Protection

- **Maintaining integrity of scenic quality**: Any decisions around improving the road have the potential to affect the renowned scenic views that the road provides visitors.
- **Maintaining the road's historic character**: In addition to providing views of surrounding forest land, the Apache Trail is a historic resource in itself, reflecting the conditions of early development in the Phoenix area. Changes to the road require adherence to regulatory processes described previously (Section 106, Section 4f) either on a project-by-project basis or programmatically.
- **Threatened and Endangered Species**: In some locations, further regulatory processes must be followed to protect local plant and wildlife species and to comply with the Endangered Species Act.
- **Watershed Health / Water Quality**: The unstable decomposed granite surface easily erodes, resulting in the deposition of sediment into the lakes and Salt River.
- **Air quality**: The decomposed granite surface on the unpaved portion of the road easily enters the air when dry and disturbed, decreasing visibility and overall air quality. This is a particular challenge for decomposed granite surfacing compared to other unpaved surface materials. The Apache Trail is fully within Maricopa County, which is in nonattainment for particulate matter.
- **Adjacency to wilderness area**: The Apache Trail passes close to and occasionally directly abuts the Superstition Wilderness. Activities on the road and future improvements cannot impinge on the wilderness.
- **Sequencing of reviews, reports, and actions**: Rules around changes and maintenance on historic assets require ADOT, FHWA the Forest Service, and partners to coordinate extensively on Section 106, and Section 4(f) compliance for investments or actions on the road. This coordination can be a long process that requires additional staff time from each agency. Even as the agencies move towards a management strategy and long-term vision for the road, which will ultimately streamline the process, significant cross and intra-agency coordination is still required.

Access and mobility

- **Economic impact of road conditions**: While many visitors seek out the Apache Trail because of its rugged character, poor road conditions may discourage potential visitors visiting the area and the destinations along the trail. Local businesses reported that some customers avoid their establishment or do not return because they had a prior negative experience on the road.
- **Access to Forest Service recreation opportunities**: The Apache Trail is the sole access route for a number of Forest Service recreation and interpretation opportunities associated with the lakes, the historic road, Roosevelt Dam, and adjacent wilderness areas. These include Burnt Corral Campground, Boulder Recreation Site, as well as various washes and docks. Difficult or intimidating conditions on the road could inhibit the public from experiencing these places.
- **Access to Dams**: SRP uses the Apache Trail for access to dams and facilities at Canyon Lake, Apache Lake, and Roosevelt Lake. Load restrictions on the bridges prevent SRP from bringing in heavy equipment at certain points. As a result, barges, instead of the Apache Trail, are used to transport heavy or large equipment that is needed to complete important maintenance on the dams. SRP reports that the barge solution costs the organization $75,000 each instance, and they have used this option 3 times in the past 2 years. In addition, flooding that occurs on the road at Tortilla Flat during seasonal storms can disrupt or endanger SRP access to the dams when it is most critical. SRP reports employees are occasionally stranded at dam sites after driving through flooded parts of the Apache Trail to access dam controls during storms.

Potential Actions

The TAG considered a range of actions that could potentially address some of the issues and challenges outlined in the previous section. This section lists these potential actions and notes potential advantages and disadvantages. The next section "packages" some of these actions into three potential long-term management scenarios for the Apache Trail.

The actions are categorized into four groups in the tables below:

- **Infrastructure – Less Complex:** Less costly interventions; may include changes to operation and maintenance activities or minor capital investments
- **Infrastructure – More Complex:** More expensive interventions; includes larger capital investments in the Apache Trail
- **Awareness:** Actions that increase visitor awareness about the road before or during their visit
- **Policy:** Non-infrastructure actions that could benefit the Apache Trail

The tables note advantages and disadvantages of each approach, along with:

- Cost (Low, Medium, or High);
- Disturbance to the current road environment (Low, Medium, or High);
- Whether it improves traveler safety;
- Whether it improves maintenance efficiency ;
- Whether it benefits natural resource/heritage assets; and
- Whether it improves access and mobility.

Infrastructure – Less Complex

Action	Advantages	Disadvantages	Cost	Disturbance	Effect on…				
					Safety	Logistics	Environment	Heritage	Access + mobility
Remove vegetation along roadside	Addresses safety issues caused by encroachment and obstruction of sight lines. Reduces need for regularly mowing the edge of the road.	Potentially impacts scenic views and sensitive plant species. Would need to determine an appropriate amount of vegetation removal given the character of the road.	L	M	+	+	-		
Rock scaling	Reduces safety hazards from loose rock and reduces the need for emergency road work when debris falls into the road.	Scaling activities would need to be conducted with appropriate sensitivity to surrounding environment, especially in wilderness areas.	M	L	+	+	-		
Continue blading on unpaved section, add new material	Reduces washboarding, rutting, potholes, etc. on unpaved surfaces, improving safety.	Current decomposed granite surface type requires particularly frequent blading to be effective; berms of material are growing along some sections of the road, sometimes even burying historic features.	L	M	+				
Construct traffic calming devices such as rumble strips around curves	Improves safety by encouraging reduced speeds, especially around hazardous areas of the road.	Some traffic calming devices may look out of place on the Apache Trail.	L	L	+				
Replace and add guardrails around dropoffs and steep curves	Helps reduce the potential for vehicles falling off of steep roadway edges.	Some existing guardrails may be considered historical assets, and adding guardrails where they did not historically exist could be considered an adverse effect on historical assets. Guardrails also require adequate right-of-way width. (a minimum 2-ft offset to the barrier is needed).	H	M	+			-	

Action	Advantages	Disadvantages	Cost	Disturbance	Effect on…				
					Safety	Logistics	Environment	Heritage	Access + mobility
Plan and construct pullout areas along high-use, scenic, and one-lane parts of the road	Improves safety by providing a safe area for visitors to stop and admire views, address vehicle problems, or pull over to let other vehicles pass.	The narrow right of way and proximity to wilderness and sensitive environmental assets may make it difficult to plan and construct pullouts at certain points along the road.	H	M	+	+			+
Apply a chemical stabilizer to the current surface on the unpaved section	Provides some of the safety and air quality benefits of paving or chipsealing at a lower cost. Improved maintenance efficiency.	Needs to address environmental and scenic concerns with past stabilizer use (Although technology appears to have improved). Requires regular reapplication.	M	L	+		+		+
Gravel the unpaved section	Provides a more resilient surface that produces less dust than decomposed granite and is less susceptible to runoff and deformation.	Using typical gravel could give the roadbed a different color than currently exists and would introduce a non-local material to the area. Gravel still requires a considerable amount of regular maintenance.	H	L	+	+	+	-	+
Improve striping on paved section	Provides better definition to the roadway and lanes, potentially reducing incidents where vehicles stray from their traffic lane, especially at night.	To remain effective, striping must be maintained and protected from encroachment, etc.	L	L	+				

Infrastructure – More Complex

Action	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
					Safety	Logistics	Environment	Heritage	Access + mobility
Widen unpaved section to two lanes and straighten alignment	Addresses traffic congestion at peak times, many safety issues associated with road geometries.	Significant impacts to natural, scenic, and historic character of the road and to surrounding area. May increase speeds.	H	H	+	+	-	-	+
Chipseal or pave the unpaved portion (in whole or parts)	Reduces maintenance cost and helps address safety issues. Improves air quality due to reduced dust, and reduces the introduction of fine materials into water bodies. Color could be made to match current road color. Paving only from Roosevelt Lake to Apache Lake would provide enhanced access for boats and RVs with less disturbance than full paving. The TAG team noted during the site visit that the access road from the highway to the Apache Lake Marina is paved with a chip seal with no reported issues.	Increases potential for speeding and may change the character of this roadway portion.	M	M	+	+	+	-	+
Bridge rehabilitation	Aligns with the national emphasis on bridge condition. Improves safety and access for large vehicles. SRP offered to be a partner in funding these improvements.	Most bridges along the road are listed or eligible for listing on the National Register of Historic Places, potentially increasing complexity of rehabilitation or replacement.	H	M	+				+

Action	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
					Safety	Logistics	Environment	Heritage	Access + mobility
Provide transit shuttle with potential limit on private vehicle access	Provides safe alternative access for those who prefer not to drive the Apache Trail, potentially reduces demand at peak times. Could be combined with access restrictions to limit the number of safety incidents on the road. The closure and shuttle could begin at Fish Creek Hill, removing drivers from the most challenging areas where there are the fewest destinations. This would also limit negative impacts to businesses along the paved portion.	No existing transit service exists to connect with a shuttle. May require new parking areas. Requires operating funds and oversight. Could discourage visitors and have a negative impact on concession businesses if private vehicle access is limited. Many recreation activities along the road are not conducive to transit (e.g., boating, fishing). The long length of the corridor and dispersed uses could make shuttle service financially challenging.	H	L	+	-	+	+	
Ease steep grades	Reduces maintenance cost and helps address safety issues.	Would require realigning some segments of the road. Significant impacts to natural, scenic, and historic character of the road and to surrounding area.	H	H	+	+	-	-	+
Raise/improve Tortilla Flat and Mesquite wash	Improves reliability of access for all users, especially SRP and emergency services during storm events and improves safety during normal use, especially during flooding.	Though this would benefit safety overall, the flooding issues is only usually present during times when the fewest number of visitors are using the road.	H	M	+				+
Straighten additional curves	Improves safety by correcting the geometry of certain dangerous curves. The 2009 study identified nine curves between MP 203 and 210 for potential improvement. An additional study would likely be necessary for the remainder of the road.	Many curves are located on steep slopes, adjacent to wilderness boundaries, or near historic features. Straightening these curves could be very expensive. It could also disturb environmental or heritage assets and would likely change the experience of driving the road.	H	H	+	+	-	-	

Action	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
					Safety	Logistics	Environment	Heritage	Access + mobility
Guardrail at Fish Creek Hill	Helps reduce the potential for vehicles falling off of the road along one of the steepest parts of the Apache Trail.	Very narrow right of way and steep conditions around the road make guardrail installation at Fish Creek Hill likely more intrusive and complex than other locations.	H	H	+			-	

Awareness

Action	Further description	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
						Safety	Logistics	Environment	Heritage	Access + mobility
Improve education and outreach	Could raise public awareness about the Apache Trail's historic character as well as its rugged character that is distinct from other state highways. Potential actions would include coordinating with digital and paper map organizations to include information or warnings about the road, creating a clear online and social media presence that could share alerts and events, and promoting the road to local media stations and online blogs.	Informs new visitors about road conditions so that they can make informed decisions on whether to visit the Apache Trail and the type of experience they can expect.	Maintaining social media and websites requires regular staff attention and ongoing coordination among many agencies.	M	L	+				+
Provide visitor alerts via 511 and GPS providers	Provide information about road work, closures, and incidents to the public via statewide 511 phone lines and webpages, and also through 3rd party GPS providers such as Tom Tom and Google Maps. Posting a standing "alert" about the nature of the Apache Trail could prevent unprepared visitors from being directed to drive down the trail by navigation software.	GPS and navigation software is used in particular by younger drivers and those not familiar with the area. This action could help inform these users.	Drivers may not check or pay attention to alerts provided on 511 or their navigation system. Requires coordination with 3rd party organizations.	L	L	+				+

Action	Further description	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
						Safety	Logistics	Environment	Heritage	Access + mobility
Additional roadside signage	Provide additional signage at key "decision points" such as the southern entrance to Tonto National Forest, approaching Fish Creek Hill, and the northern start of the unpaved section. This would help inform visitors about the historic significance of the road and also inform them about the driving conditions. Visitors who preferred not to drive the trail would have the opportunity to turn around at a safe point.	Communicates with all road users, not just those who viewed outreach materials.	Would not prevent frustration for visitors who already drove to the Apache Trail and were unaware of driving conditions until they arrived.	L	L	+				
Require visitors to agree to a permit or waiver	Create a system where visitors must purchase a permit or sign a waiver before driving on the entire length or segments of the Apache Trail. This could be implemented in a number of ways, including staffed or un-staffed entrance kiosks, permits that can be obtained online, or through integration with the existing Tonto Pass.	Would ensure all road users have been informed about conditions and potential hazards.	Potentially high implementation cost. Could discourage visitors from traveling on the road and have a negative effect on local businesses, especially if implemented along the paved portion as well. There may be legal restrictions on ADOT applying this kind of restriction on a state highway.	H	L	+	-			-

Action	Further description	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
						Safety	Logistics	Environment	Heritage	Access + mobility
Install vehicle awareness ITS sign at Fish Creek Hill	Installing vehicle detectors and corresponding ITS signs at Fish Creek Hill could help manage traffic along this one-lane stretch of road. Visitors approaching Fish Creek Hill would be alerted if another vehicle was traveling in the opposite direction and could pull over to allow them to pass where it is safe.	Increases driver awareness and safety along this section of potentially hazardous road.	Communication between signs and detectors could be a challenge due to lack of cell phone signal.	M	M	+				
Improve cell phone coverage	Increased cell phone reception in the area would allow visitors to more quickly report traffic incidents and emergencies.	Increased responsiveness to safety incidents, increased potential for ITS, improved ability for road crews and emergency responders to communicate.	Would potentially require new tower(s) on Forest Service land that could have a negative environmental impact.	M	M	+	+			

Policy

Action	Further description	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
						Safety	Logistics	Environment	Heritage	Access + mobility
Continue emergency traffic management approach	During storm events and other emergencies, ADOT or law enforcement station themselves at either end of the Apache Trail to prevent the public from accessing the road. This prevents visitors from becoming stranded due to flooding.	Limits safety risk to the public during the most hazardous times to be on the Apache Trail.	Requires significant staff time during storm events.	L	L	+				
Establish a high-level vision and goals or Strategic Plan	Establishing a long-term vision with goals, as a standalone document or in a Strategic Plan, will help ADOT and the Forest Service decide which management actions make sense for the Apache Trail.	Improved decisionmaking and clarity, especially for future decisions affecting the road's scenic, environmental, and historic character.	A high-level plan may not be sufficient to provide specific direction and prioritization of actions.	M	L	+	+	+	+	+
Increase enforcement	Work with law enforcement agencies with jurisdiction over the road to increase patrols.	Would help improve safety and potentially traffic flow, especially on high-traffic days and sections of road.	Multiple agencies have jurisdiction, and the current road infrastructure can make enforcement challenging. There are few places for law enforcement to pull over vehicles or pass slow-moving traffic.	M	L	+				+
Establish advisory committee	ADOT, the Forest Service, and potentially other stakeholders could establish a committee focused exclusively on the needs of the Apache Trail.	Could help agencies drive current and future improvements to the road.	Requires additional staff time, may overlap with the existing ADOT/FS Steering Committee.	L	L		+	+	+	

Action	Further description	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
						Safety	Logistics	Environment	Heritage	Access + mobility
Put a highway easement in place	The three agencies are committed to granting a FS highway easement to ADOT, via FHWA, for the Apache Trail by November 2016. This could be done in segments so that sections where management documents are in plan can go under easement more quickly.	Clarifies issues of responsibility, asset management, and liability. Enables future long-term visioning for the road.	Requires significant staff time to implement.	L	L		+	+	+	
Implement a toll or fee	In the early 1920s, some members of the public advocated for the Apache Trail to become a toll road before the Department of Interior transferred it to SRP and eventually the state. Similar to a pass or waiver, adding a toll or recreation fee to today's Apache Trail would help control use to those who users who are aware of the road's condition while also providing revenue for maintenance activities.	Would ensure all road users have been informed about conditions and potential hazards. Provides some revenue for road maintenance.	Could negatively impact businesses along the route by potentially discouraging visitation. Charging a toll or fee may also create user expectations about ease of travel that don't fit the character of the Apache Trail. There may be legal and political barriers for implementing a toll.	L	L	+				-

Action	Further description	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
						Safety	Logistics	Environment	Heritage	Access + mobility
Transfer road ownership	Three agencies could potentially assume ownership: the Forest Service, the National Park Service, and Maricopa County. Transferring the road to federal control would actually prevent its eligibility for federal FLAP funds, but make it eligible for currently more scarce FLTP funds. Counties generally have more flexibility in their management standards and may be interested in investing in unpaved roads to improve regional air quality compliance. NOTE: Neither Maricopa County nor NPS have yet been consulted about this potential action.	Could open up new funding sources or management flexibilities. Counties in Arizona, unlike ADOT, typically have maintenance standards for unpaved roads and can sign roads as “drive-at-your-own-risk” routes. This action only enables further changes that would benefit the road, but has limited benefit in itself outside of bringing standards, actual maintenance activities, and public communication into closer alignment.	Would need to coordinate extensively with receiving agency on legal matters. An NPS transfer would likely require an executive order or act of Congress. The Forest Service and ADOT have a strong partner relationship that the Forest Service would need to build with any new owner of the road. New funds for road maintenance would need to be determined.	M	L		+			

Action	Further description	Advantages	Disadvantages	Cost	Disturbance	Benefits to…				
						Safety	Logistics	Environment	Heritage	Access + mobility
Change to a one-way road	Change the Apache Trail to a one-way road requiring users to loop onto SR 188, US 60, and/or SR 87.	Reduces the number of needed pullovers and roadway width. Reduces potential conflicts on narrow sections such as Fisk Creek Hill by eliminating two-way traffic on single-lane road sections.	There is no nearby alternative parallel route. A missed turn or lack of information could require drivers to loop back over 100 miles on SR 87, SR 188, or US 60. This could reduce customers for local businesses.	L	M	+	+			-

Potential Long-Term Management Scenarios

The four scenarios outlined below arrange the potential long-term management actions in the previous section into coherent packages that reflect different potential long-term management goals. Developing a Strategic Plan and high-level goals for the Apache Trail would help ADOT and the Forest Service decide which, if any, of these scenarios match most with their future vision for the road.

None of the scenarios envision an Apache Trail that fully complies with current road standards for a state highway. Fully meeting current design standards would be extremely expensive and eliminate the scenic and historic qualities that make the road a destination in itself. However, it should be recognized that the Apache Trail is the only route for access to several businesses and recreation destinations within the forest, and the safety and convenience of drivers accessing those places is a very important consideration. The scenarios range in how they balance scenic and historic value with safety and user convenience. Scenario 3 places the highest importance on safety and convenience for visitors and road users. Scenario 1 places the highest importance on the preservation and protection of the road itself as a scenic and historical resource. Scenario 2 and Scenario 4 strike a balance between these goals.

Each of the four scenarios builds on an "Improved Baseline," which includes critical or low-complexity improvements that could be implemented regardless of which overall long-term vision is chosen.

Improved Baseline

Infrastructure	Awareness	Policy
Rock scaling	Conduct education	Continue emergency management approach
Construct traffic calming devices	Install additional roadside signage	Establish high-level vision and goals, strategic plan
Improve striping on paved section	Improve cell phone coverage	Put a highway easement in place

The infrastructure changes proposed under the Improved Baseline are small, but could have a significant impact on visitor safety. In particular, traffic devices such as rumble strips around curves on the paved section could help mitigate safety hazards due to the road's winding geometry. These devices are already being implemented on some curves along the first 7 miles of the road, which is being addressed following the 2009 road safety assessment. Awareness actions focus on improving signage and education while investigating the possibility of improved cell phone reception. These Awareness actions would be instrumental for emergency response and managing congestion. Policy actions align with the critical path identified by the Forest Service/ADOT Steering Committee on June 17, 2015 (listed at the beginning of this report).

The outreach actions are particularly important for the Improved Baseline. Providing information about the Apache Trail's character and driving conditions to visitors before they visit and at key decision points along the road is a cost effective way of reducing driver frustration and increasing awareness and safety.

Scenario 1: Permit-only Access, Preserve and Protect

Infrastructure	Awareness	Policy
Rock scaling	Conduct education	Continue emergency management approach
Construct traffic calming devices	Install additional roadside signage	Establish high-level vision and goals, strategic plan
Improve striping on paved section	Improve cell phone coverage	Put a highway easement in place
Apply chemical stabilizer to unpaved sections**	Require permit or waiver on parts of the road**	
	Provide alerts via 511 and GPS providers**	

Table 4: Scenario 1 overview. Actions above the baseline highlighted in dark green and with **.

This scenario reflects a vision for the Apache Trail where preservation of the road takes priority over other major concerns like safety and user convenience. This package of actions includes just a few infrastructure improvements, and addresses safety concerns by requiring that, to access the unpaved area between Fish Creek Hill and Roosevelt Lake, Apache Trail users obtain a permit to that includes a waiver.

This waiver could be part of the Tonto Pass or a separate free waiver that can be obtained at Forest Service offices, online, or at other outlets. Permit holders would be provided with information about the road, its history and attractions, and safety concerns. Before receiving the waiver, visitors would need to acknowledge receipt and reading of these materials.

The Forest Service and ADOT would likely need to study potential options for on-site implementation as well. Compliance could be enforced through a "pay-and-display" method, where law enforcement officers could verify an up-to-date waiver sticker on a vehicle or through an ITS system at the head of the roadway where waiver-holders scan their passes. A staffed booth would be most effective for enforcement, but would likely be too expensive and impractical.

Two key challenges under this scenario are limiting the negative effects on local concession businesses and the legal authority to limit public access to a state highway. Most businesses on the Apache Trail are concentrated on paved section towards Apache Junction, but the agencies would need to consider how to limit the effect on other businesses and Forest Service destinations, likely through close coordination with stakeholders.

Scenario 2: Retain as State Highway, Focus on Critical Safety Improvements

Infrastructure	Awareness	Policy
Rock scaling	Conduct education	Continue emergency management approach
Construct traffic calming devices	Install additional roadside signage	Establish high-level vision and goals, strategic plan
Improve striping on paved section	Improve cell phone coverage	Put a highway easement in place
Apply chemical stabilizer to unpaved sections*	Provide visitor alerts via 511 and GPS providers*	Increase enforcement**
Rehabilitate bridges**	Install vehicle awareness ITS sign at Fish Creek Hill**	
Remove vegetation along roadside**		
Replace and add guardrails**		
Plan and construct pullouts**		

Table 5: Scenario 2 overview. Actions above the baseline and in common with Scenario 1 are highlighted in light green and with *. New actions for the scenario are highlighted in dark green and with **.

Scenario 2 strikes a balance between access and preservation by retaining public access and making key safety investments. These safety investments will cause some disturbance to the existing road, but to a lesser degree than under Scenario 3.

The most critical improvements include installation of guardrails and additional pullouts. The new pullouts would also create areas for law enforcement officers to pull over vehicles under an increased enforcement regime. Increased police patrols would need to be coordinated with DPS and the Maricopa County Sheriff's Office.

Because the Apache Trail would remain open to all visitors, awareness activities would continue to be extremely important, and this scenario includes the installation of an ITS system on Fish Creek Hill to make drivers aware of vehicles navigating the hill from the opposite direction.

Scenario 3: County Ownership, Focus on Access

Infrastructure	Awareness	Policy
Rock scaling	Conduct education	Continue emergency management approach
Construct traffic calming devices	Install additional roadside signage	Establish high-level vision and goals, strategic plan
Improve striping on paved section	Improve cell phone coverage	Put a highway easement in place
Rehabilitate bridges*	Provide visitor alerts via 511 and GPS providers*	Increase enforcement*
Remove vegetation along roadside*	Install vehicle awareness ITS sign at Fish Creek Hill*	Transfer road ownership**
Replace and add guardrails*		
Plan and construct pullouts*		
Raise/improve Tortilla Flat and Mesquite washes**		
Pave or chipseal part of the unpaved section**		
Straighten additional curves**		

Table 6: Scenario 3 overview. Actions above the baseline and in common with Scenario 2 are highlighted in light green and with *. New actions for the scenario are highlighted in dark green and with **.

While maintaining the Apache Trail's current geometry, Scenario 3 emphasizes driver safety and access to recreation destinations. Of the three scenarios, it includes the most major changes to the Apache Trail's current condition, including paving the unpaved section of the road, removing some amount of roadside vegetation, installing new and replacing existing deficient guardrail, and improving the Tortilla Flat and Mesquite drainage structures.

Paving the full length of the road would likely not be effective given the cost, potential disturbance, and logistical challenges along Fish Creek Hill. However, paving from Roosevelt Lake south to the Apache Lake marina would provide improved access for boats, RVs, and other large vehicles without disturbing unpaved areas south of Apache Lake, where access for those kinds of vehicles would be challenging even with an improved surface.

A key policy shift is transferring ownership of the Apache Trail to Maricopa County due to their increased management flexibility, including maintenance standards for unpaved roads and the ability to designate portions of roads as "drive-at-your-own risk." This transfer is purely hypothetical, and neither the TAG team nor any of the agencies have discussed this with the county. The transfer would require extensive coordination between ADOT, FHWA, the Forest Service, and the county, which may ultimately not be interested in assuming ownership of the road. The other actions are not necessarily contingent on county ownership, but the key action of paving or chipsealing part the unpaved section of the road aligns with county goals for air quality improvements.

While paving or chipsealing part the unpaved section and addressing dangerous curves would increase ease of access to the Canyon Lake area from the north, this scenario does not address unsafe alignment and roadway width on Fish Creek Hill. There is still a need to provide information to visitors about driving conditions along the road, especially at and near Fish Creek Hill.

Scenario 4: Protect Central Part of Corridor; Improve Access in North/South (Preferred)

Infrastructure	Awareness	Policy
Rock scaling	Conduct education	Continue emergency management approach
Construct traffic calming devices	Install additional roadside signage	Establish high-level vision and goals, strategic plan
Improve striping on paved section	Improve cell phone coverage	Put a highway easement in place
Rehabilitate bridges*	Provide visitor alerts via 511 and GPS providers*	Increase enforcement*
Remove vegetation along roadside*	Limit access to Fish Creek Hill area for certain vehicles**	Transfer road ownership **(Fish Creek Hill area)***
Replace and add guardrails **(north/south ends)***		Reduced maintenance schedule **(Fish Creek Hill area)****
Plan and construct pullouts **(north/south ends)***		
Raise/improve Tortilla Flat and Mesquite washes*		
Pave or chipseal (**north/south ends)***		
Improve interpretation signage and opportunities, invest in heritage protection **(Fish Creek Hill area)****		

Table 7: Scenario 4 overview. Actions above the baseline and in common with Scenario 3 are highlighted in light green and with *. New actions for the scenario are highlighted in dark green and with **.

Scenario 4, an adapted version of Scenario 3 selected by the TAG Team as the preferred option, focuses access improvements on the northern and southern sections of the Apache Trail while emphasizing heritage and environmental protection in the middle portion of the route. This reflects the concentration of visitor uses near Roosevelt Dam in the north and the forest boundary in the south. In addition, the constrained geometries around Fish Creek Hill between these concentrations make this section difficult to maintain and less attractive for visitors. Visitors to the Apache Lake area—and especially boat haulers to Apache Lake—often already use US-60 and SR-88 to approach the Apache Trail from the north rather than traveling directly from Phoenix through Apache Junction.

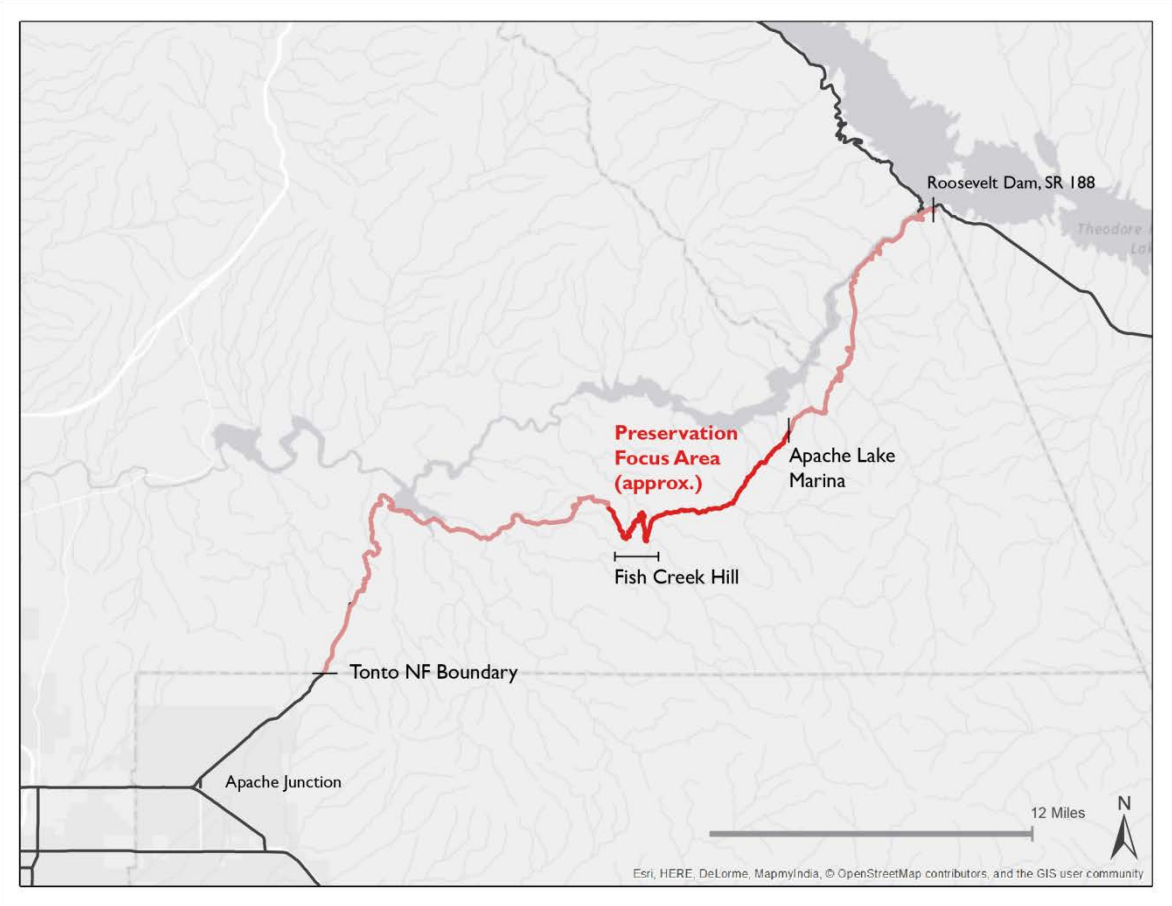

Figure 10: Map showing approximate potential location of the protected portion of the Apache Trail.

The high-protection area would need to be determined at a future date, but would likely start near the head of Fish Creek Hill (MP 220), continue north, and end before the access road to Apache Lake (MP 228). Those parts of the road not included in the high-protection area would be paved and receive other improvements similar to Scenario 3. Pullouts or interpretive at either end of the high-protection area would enable visitors to learn more about the area and turn vehicles around if they do not wish to drive through Fish Creek Hill. (An interpretive area like this already exists near the southern end of Fish Creek Hill).

Access to the high-protection area could be restricted to exclude large trucks or trailers, reflecting the Apache Trail's narrow geometries in that area and current travel preferences. For recreational drivers through Fish Creek Hill, additional interpretive signs or locations could be created. Maintenance activities would focus on preserving the historic character of the road and associated heritage assets rather than user access. These access changes would likely require ADOT to transfer ownership for this portion of the road to Maricopa County or the Forest Service, which both have guidelines for maintaining unpaved roads. Funds or manpower for preservation and maintenance could come from multiple partners.

The key next step for this scenario is to make the ownership and designation changes required to shift the management strategy. Signage and awareness-building, including a turnaround and interpretive

area on the north portion of the high-protection section, could be the next priority. Once these are in place, ADOT, the Forest Service, and their partners can begin to pave unpaved portions of the north route, protect heritage resources in the high-protection area, and make other improvements.

General TAG Recommendations and Conclusions

At the conclusion of the TAG visit and meeting in June 2015, the focus was discussing and identifying the critical path for formalizing management documents for the Apache Trail such as a highway easement and a programmatic agreement under Section 106. These steps are reflected in Table 3 in the Background and Conditions section of this document. Once these are in place, the agencies can begin to implement the potential improvements discussed in the scenarios above.

Ownership, Designation, and Level of Service

The TAG team discussed whether removing the state highway designation or reducing the functional class could give ADOT more flexibility to manage the road to a standard more in line with the Apache Trail's geometry and historical status. However, there are legal restrictions on the minimum functional class ADOT-owned roads can have, and the agency does not have standards for unpaved roads. Changing these restrictions or standards would require the state legislature to pass a law altering these rules or exempting the Apache Trail specifically.

Transferring ownership of the road to a different entity would allow the partners to maintain the Apache Trail to different standards more appropriate to the road's character and historic status. Partners and potential partners, such as Maricopa County and the Forest Service, have standards for unpaved roads. In addition, counties in Arizona, unlike ADOT, typically have maintenance standards for unpaved roads and can sign roads as "drive-at-your-own-risk" routes.

Funding Sources

The capital improvements suggested in Scenarios 2, 3, and 4 would be eligible under the Federal Lands Access Program (FLAP) as long as ownership of the Apache Trail is with the state or county. This federal funding program is for roads, like the Apache Trail, that access federal lands but are under the jurisdiction of a state or local agency. The Forest Service could apply with ADOT or another local partner for funding calls, which Central Federal Lands Highway conducts on a state-by-state basis. Safety, a key concern on the Apache Trail, is a priority for the FLAP program and collaboration on a FLAP application could be part of a broader management partnership with Maricopa County. The road falls entirely within Maricopa County, and is eligible for Congestion Management and Air Quality (CMAQ) funds administered by the metropolitan planning organization, regardless of whether it is owned by the county or ADOT. These funds would be especially relevant for projects that reduce dust (e.g. paving). In addition, the road is eligible for Federal-aid Highway Program Surface Transportation Program (STP) and the Highway Safety Improvement Program (HSIP) funds which are administered by the FHWA through ADOT.

Potential Additional Research

If the agencies decide to develop a Strategic Plan that further explores preferred improvements for the road, they will likely want to study a few of the solutions in more depth. In particular, there may be chemical stabilizers that could provide some of the benefits of paving or chipsealing, but these would need to be identified and potential environmental effects examined. The legal effects of requiring a waiver on the road and whether the road's status as a state highway would prevent this policy should be determined by qualified attorneys. Finally, while businesses and stakeholders indicated to the TAG team that they were open to road improvements, wider public outreach on the strategic plan should outline the potential benefits of any action and how it would relate to the road's scenic and historic character.

Appendix: List of TAG Participants

Core Team:

- Joel Mona, Civil Engineer, Tonto National Forest (Tonto NF)
- Tom Torres, Staff Officer – Engineering and Minerals, Tonto NF
- Christine Crawford, Assistant Forest Engineer, Tonto NF
- Jesse Gutierrez, District Engineer, Arizona Department of Transportation (ADOT) Globe District
- Wayne Grainger, ADOT Globe District
- Matt Moul, Assistant District Engineer, ADOT Globe District
- Marjorie Apodaca, Transportation Group Leader, U.S. Forest Service Southwestern Region
- Ben Rasmussen, U.S. Department of Transportation Volpe Center (Volpe)
- Logan Nash, Volpe
- Tom Deitering, Project Delivery Team Leader, Federal Highway Administration (FHWA) Arizona Division
- Kimberly Utley, A-3 District Engineer, FHWA Arizona Division
- Jennifer Brown, Team Leader – System Performance, FHWA Arizona Division

External Stakeholders

- Apache Lake Marina
- Canyon Lake Marina
- Tortilla Flat
- Salt River Project (SRP)

Internal Stakeholders

- Kerwin Dewberry, Tonto NF
- Gary Hanna, Tonto NF Mesa District Ranger
- Kelly Jardine, Tonto NF Tonto Basin District Ranger
- Michael Sullivan, Tonto NF Forest Archaeologist
- Bray Addison, Tonto NF Law Enforcement Officer
- Bill Harmon, ADOT Southeast District Engineer*
- Raul Amavisca, ADOT Phoenix District Operations
- Jim Windsor, ADOT Phoenix District Operations
- Sarah Greener, ADOT Risk Management
- Ted Howard, ADOT Risk Management
- Sue Olson, ADOT Risk Management
- Ruth Greenspan, ADOT Environmental Planning
- Paul O'Brien, ADOT Environmental Planning

* Note: On October 1, 2015 the ADOT Globe and Safford Districts were combined into the new Southeast District and the Phoenix District was renamed the Central District.

Appendix: List of Bridges

Structure Number	MP	Name	District	Built	Major Load Restriction?*	Eligible or Listed for Nat'l Register of Historic Places?
26	209.62	First Water Creek Br	PH	1924	Yes	Listed individually
193	211.05	Boulder Canyon Br	PH	1916	Yes	Listed individually
4685	215.02	Ash Creek RCB	G	1961		Contributing to historic character of the road
MP 220: Fish Creek Hill / Beginning of Potential Preservation Focus Area						
27	223.5	Fish Creek Bridge	G	1928**	Yes	Listed individually
28	224.6	Lewis Pranty Crk Br	G	1922	Yes	Listed individually
15	225.55	Dry Wash Bridge	G	1928	Yes	Contributing to character of the road
MP 228: End of Potential Preservation Focus Area						
221	231.7	Davis Wash Bridge	G	1939		
31	233.5	Pine Creek Bridge	G	1925	Yes	Listed individually
-	-	Alchesay Bridge	-	1905	Closed when road was rerouted in 1990.	Listed individually
6906	241.1	Alchesay Canyon RCB	G	1990		
2061	242.3	Apache Trail Bridge	G	1990		

* Load restriction is for vehicles greater than 80,000 lb.

** Build date is 1928 in ADOT bridge database, although one of the abutments has a 19 June 1923 date carved in the concrete