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Introduction
This section discusses the effects of the alternatives on management and maintenance of National Forest System (NFS) roads and trails (i.e., transportation facilities). It addresses the extent to which the alternatives respond to the direction related to transportation facilities in the Tonto National Forest Plan (Forest Plan) (U.S. U.S. Forest Service, 1985) and considers whether changes to these facilities provide for adequate public safety and result in a sustainable route system.

Affected Environment
The current National Forest (NF) transportation system has developed over time and reflects the history of the area. Initially, roads were primarily wagon tracks to access ranches, farms, and mining claims. With the advent of the automobile, new road and highway construction added to the network of existing roads, and provided improved access to the area. After World War II, inexpensive 4-wheel drive (4WD) vehicles became available to the public and were initially used by farmers, ranchers, hunters, and fishermen. The 1960s saw an increased availability of 4WD vehicles and widespread availability of off-road vehicles of various types (ATVs, UTVs and Jeeps). This increased availability caused a shift from transportation for the purposes of commerce and access to transportation for recreation and exploring.

National Forest System roads are used for multiple purposes by various user groups. Forest staff utilizes the transportation system for a variety of administrative purposes, including fire management, law enforcement, and facilities management (e.g., utility, telecommunication and mining facilities). Ranching, utility, telecommunication and mining permittees and operators depend on the transportation system to maintain their permitted operations. Most roads on the forest are also used by hunters, for access to dispersed camping and by off-highway vehicle (OHV) recreationists. One example of a multiple-use road is Forest Road 24 on the Cave Creek Ranger District, also known as Seven Springs Road. The road accesses private property, range improvements, administrative sites, mining resources and recreation sites; and is used by recreationists, hunters, FS staff, private landowners, and OHV users among others. This road is categorized as a principal feeder/trunk route serving as a connector road with minor system roads feeding into it. Forest Roads 41, 562 and 468 are examples of roads that feed into Forest Road 24.

The Forest Service currently classifies maintenance of National Forest System roads by five maintenance levels (ML). This analysis refers to ML 3-5 roads that are maintained for prudent drivers in a standard passenger car, ML 2 roads that are maintained for high-clearance vehicles, ML 1 roads that are placed in storage for intermittent use. Utilization of roads identified as “administrative use only” is restricted to Forest Service personnel and emergency response personnel. Other authorized users of these routes can include special use and grazing
permittees; mining companies; county, state, and Federal agencies; private land owners; and utility companies.

According to the current database for roads on the Tonto National Forest, there are approximately 2,952 miles of roads open to the public: 645 miles for passenger vehicles and 2,308 miles for high clearance (Table 1). This database shows that there are 1,739 miles of ML 1 (closed to vehicular use) roads and 267 miles of decommissioned routes. However, after reviewing updated satellite imagery and gathering on-the-ground information from ranger district personnel, Forest Service Law Enforcement Officers, and Arizona Game and Fish Department employees, it was determined that many of the ML 1 and decommissioned routes are currently open to the public and being used. Because of this, it was decided that the existing condition for the roads system on the Tonto National Forest, the baseline for which the effects of the proposed changes to the road system for this project, results in approximately 4,959 miles of roads open to motor vehicle use\(^1\). Currently, there are no trails designated for motorized use only.

Table 1: Existing Road System

<table>
<thead>
<tr>
<th>Road Maintenance Level</th>
<th>Miles</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Under Forest Service Jurisdiction</td>
<td>13</td>
<td>n/a</td>
</tr>
<tr>
<td>Decommissioned</td>
<td>n/a</td>
<td>0</td>
</tr>
<tr>
<td>Level 1</td>
<td>n/a</td>
<td>0</td>
</tr>
<tr>
<td>Level 2</td>
<td>2,308</td>
<td>47</td>
</tr>
<tr>
<td>Level 3</td>
<td>458</td>
<td>9</td>
</tr>
<tr>
<td>Level 4</td>
<td>136</td>
<td>3</td>
</tr>
<tr>
<td>Level 5</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>Open to Public, ML unknown</td>
<td>2,006</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total (FS Jurisdiction)</strong></td>
<td><strong>4,959</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

* For simplicity of analysis, roads which can accommodate passenger cars (ML 3, 4, and 5) were grouped or treated the same regarding the analysis of alternatives.

One example of maintenance level 1 roads still being utilized occurs in the Sugarloaf area on the Mesa Ranger District. Several roads feeding into the 1855 road that accesses the area, including forest roads 1857, 1857A and B, 3472, and 1877 (equating to approximately six miles) remain open despite their ML 1 status.

\(^1\) A more detailed discussion of the inconsistencies between what is in the Tonto National Forest databases for roads and trails and what is currently on the ground can be found in the draft EIS, Chapter 2, Alternatives Considered but Eliminated from Detailed study.
In addition to roads under Forest Service jurisdiction, the Forest is traversed by 402 miles of highways and interstates that fall under the jurisdiction of other governmental agencies.

The average annual road maintenance budget is $2,326,900 (based on fiscal year 2008 to fiscal year 2012). Though not every mile of NFS road requires yearly maintenance, the annual maintenance budget is insufficient for supporting the Forest’s annual maintenance needs. Only a percentage of the total roads on the forest are maintained each year, as opposed to the entire 2,757 miles of ML 2 through 5 roads. Maintenance that goes unperformed each year is considered deferred maintenance. Over the years, the Tonto National Forest road system has accrued a substantial amount of deferred maintenance. The Tonto does have cooperative maintenance agreements with Gila and Maricopa counties to help address combined road maintenance needs. Approximately 514 miles of NFS roads (264 miles of ML 2 roads, 193 miles of ML 3 roads, 44 miles of ML 4 roads, and 13 miles of ML 5 roads) are included in cooperative maintenance agreements with these counties. (Forest Road Agreement between U.S. Forest Service and Gila County, 2009 and Forest Road Agreement between U.S. Forest Service and Maricopa County, 2010).

Motorized travel occurs on some unauthorized routes. An unauthorized route is not a National Forest System road or trail. It is a route that is not "A road or trail wholly or partly within or adjacent to and serving the National Forest System that the Forest Service determines is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources" (36 CFR 212.1). These routes may appear as “two-track” routes that access popular areas for dispersed recreation (camping, hunting, horseback riding, etc.) These routes are not kept in the Forest Service roads inventory, and do not receive maintenance. The forest has identified and inventoried approximately 672 miles of unauthorized routes (see Travel Analysis Process reports for site-specific information, U.S. Forest Service, 2011.)

Environmental Effects

Legal and Regulatory Compliance


Based on direction in the Forest Plan, an intensive analysis of all inventoried roads was conducted by forest personnel in 1990. An interdisciplinary team analyzed each inventoried road on the forest. The team proposed that each road be: 1) obliterated, or 2) closed except where needed for accessing a specific project, or 3) left open, or 4) placed under a special use permit for a specific user. In addition, specific areas in Payson and Pleasant Valley were changed to reflect the general guidance in the Forest Plan, which stated that areas would be open unless posted closed (see decision memo for specific information). The decision to implement RATM changed the road maintenance levels compared to the Forest Plan as depicted in Table 2.
Table 2: Miles of road by maintenance level (ML) and decision

<table>
<thead>
<tr>
<th>ML</th>
<th>O*</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990 RATM</td>
<td>13</td>
<td>1,906</td>
<td>2,198</td>
<td>399</td>
<td>83</td>
<td>77</td>
<td>4,676</td>
</tr>
</tbody>
</table>

*indicates miles of road to be obliterated

**Special Order Closures:** Until recently, travel restrictions could only be enacted through two means on National Forests: 36 Code of Federal Regulations (CFR) 261 Subpart A (restrictions or general prohibitions), and 36 CFR 261 Subpart B (prohibitions that are created through special order).

The Subpart A prohibitions that apply to the use of roads and trails have historically dealt primarily with violations of applicable state laws that regulate licensing, noise, safe operation of vehicles, damaging roads or trails, interfering with road or trail use, driving under the influence of alcohol or drugs, careless or reckless operation in a manner which damages resources or wildlife (36 CFR 262.12[a.]-[d.] and 36 CFR 261.13 [a.]-[i.]). These general prohibitions of the CFRs are considered “strict liability” prohibitions, meaning that it is the user’s responsibility to know and adhere to these regulations without any additional notification or posting on the part of the agency.

Most travel restrictions that historically prohibited types of travel on the forest were implemented through 36 CFR subpart B authority for special orders, specifically 36 CFR 261.53 (special closures), 36 CFR 261.54 (use of forest development roads), 36 CFR 261.55 (use of forest development trails), and 35 CFR 261.56 (use of vehicles off of forest development roads). These specific sections of the CFRs permit the agency to prohibit certain uses of roads and trails to limit use to specific vehicle types and to prohibit off road travel.

A challenge to enforcement of these special order restrictions is the 36 CFR 261.51 (a) and (b) requirement for posting of prohibitions. 36 CFR 261.51 (a) states, “Placing a copy of the order imposing each prohibition in the Offices of the Forest Supervisor and District Ranger, or equivalent Officer who has jurisdiction over the lands affected by the order and [emphasis added],” 36 CFR 261.51 (b) states, “Displaying each prohibition imposed by an order in such locations and manner as to reasonably bring the prohibition to the attention of the public.” The latter requirement becomes problematic when attempting to post area closure or trail restrictions on the ground across large areas. The issue is that without adequate posting on the ground, special order restrictions are less enforceable. Lack of maintenance and vandalism of posted prohibition signing creates ongoing issues, and has the effect of negating or jeopardizing the effectiveness of special order closures. For more information about enforcement on the Tonto National Forest related to travel management, see the Law Enforcement Specialist Report (part of the project record).
2005 Motorized Travel Management Rule: In 2005, the Motorized Travel Rule changed the legal authority for regulating off-route travel of motor vehicles. The final rule modified regulations in 36 CFR 295, which historically governed the management of OHVs on National Forests. In addition, the rule changed the enforcement authority for motor vehicle restrictions from 36 CFR 261 Subpart B: Special Orders to the Subpart A: General Prohibitions section, making motor vehicle violations in the future a strict liability infraction. This change relieves the Agency of the posting and signing requirements of 36 CFR 261 Subpart B and authorizes map notification to be the enforcement tool in the future. The decision mandates that the forest complete a travel management review with public involvement to designate motorized roads, trails, and areas and produce a Motor Vehicle Use Map that identifies these designations (36 CFR 212.56). Once this is completed, travel management restrictions may be enforced under Subpart A without being required to post and maintain prohibition signs in the field.

This EIS will fulfill the 2005 Motorized Travel Rule requirements of review and public involvement for each of the action alternatives and no action. Upon publishing the Motor Vehicle Use Map (MVUM) for the selected alternative, the new 2005 Motorized Travel Rule regulations will become enforceable on the forest (36 CFR 261.13). The MVUM would display those routes open to motorized travel by the public, along with the types of vehicles and seasons of use. The Forest intends to post route number signs on the open routes to correspond with numbers shown on the MVUM. Hard-copy and electronic versions of the MVUM will be available to forest users and will identify those roads and trails available for motorized use by the public. This is expected to reduce confusion regarding where motorized vehicle use is legal. In addition, law enforcement officials and forest protection officers will have clear authority for issuing citations for violations of motorized travel management decisions.

Assumptions and Methodology

Assumptions
The descriptions of the four alternatives being analyzed, including the No Action, in the draft EIS are organized by six elements to help the reader understand the differences and similarities among them. These elements are:

- Roads and Trails Open to Motorized Travel
- Areas Open to Motorized Cross-country Travel
- Permit Zones
- Big Game Retrieval Using Motor Vehicles
- Access of Dispersed Camping Using Motor Vehicles
- Additional Information Pertaining to Motor Vehicle Use Designation

These elements affect the Forest System Roads differently and will require different assumptions to effectively analyze them. Roads and trails open to motorized travel will be
analyzed further. The effect of the cross-country travel will not be analyzed further as routes created by cross-country travel are not considered U.S. Forest Service routes.

The assumption for this analysis is that there are no additional impacts in road maintenance associated with special order (or seasonal) closures because road maintenance is planned around the closures. Therefore, seasonal closures will not be discussed further in this analysis.

The assumption for this analysis is that motorized big game retrieval (MBGR) utilizes the existing forest roads and trails to the hunting destination. Therefore no additional analysis is needed for this portion of the MBGR. The retrieval efforts made off the forest roads and trails are not creating a road and therefore not analyzed as such.

The assumption for this analysis is that there are no additional impacts in transportation maintenance costs associated with designation of permit zones. The maintenance costs associated with the gates and signage needed for managing permit zones are considered part of the annual maintenance cost for that route. The construction of necessary fencing for permit zones however are considered project work and will not be analyzed as an annual cost in this analysis.

Motorized dispersed camping corridors are designated on several of the alternatives. However, there are no impacts in associated transportation maintenance costs that are not captured by total mileage of available NFS roads and motorized trails.

Methodology

**Desired Road Network**

The Travel Management regulations at 36 CFR 212.5.2(b) require the identification of the Minimum Road System (MRS) needed for safe and efficient travel and for administration, utilization, and protection of National Forest System lands.

In concert with the regulations to “incorporate a science-based roads analysis,” an analysis of the current road system and the user-created routes captured was completed by the Tonto National Forest Engineering group. A seven question criteria (Appendix A of the draft EIS) was developed to help in determining if a route was best categorized as a road or a motorized-trail. As part of developing this Desired Road Network (DRN), the intended and actual uses were taken into consideration in reflecting if the route should be open to the public, open for administrative use or decommissioned because it has no value to the public or the Forest.

**Safety**

In addition, the Travel Management rule (36 CFR 212.55(a)) requires effects on public safety to be considered in the development of the road and trail additions proposed in all action
alternatives. Further, the analysis assumes that users are prudent drivers, observe “the rules of the road,” and practice safe driving.

The Travel Management regulations at 36 CFR 212.55(b) require that conflicts among different classes of motor vehicle uses on National Forest System lands or neighboring federal lands be considered in the designation of roads and trails. Each route was evaluated for its possible environmental effects as well as the recreational opportunities provided to the public (see Travel Analysis Process route reports for each district).

In compliance with the Travel Management regulations at 36 CFR 212.55(c), speed, volume, composition, and distribution of traffic was also considered. Limitations dictated by the terrain, site distance, and condition of the road surface made routes suitable for addition to the transportation system as low standard roads or motorized trails rather than higher standard roads, and also drove the proposals to change existing transportation system roads to motorized trails. The number of roads and trails available for use generally results in a low traffic density on most of the transportation system and unauthorized routes. There is some congestion on more popular routes. The width of the road or trail limits the number and type of vehicles using that route and leads to further distribution of users.

In compliance with 36 CFR 212.55(c), the compatibility of vehicle class with road geometry and road surfacing was considered in the development of the road additions proposed in the action alternatives. Routes added to the transportation system would be entered into the system as either ML 2 roads or motorized trails based on vehicle compatibility considerations and the need to provide a range of different recreational opportunities (see Travel Analysis Process route reports for each district).

The forest does not currently have any motorized trails. It should be noted that designation of roads or trails for motor vehicle use by a particular class of vehicle under 36 CFR 212.51 should not be interpreted as encouraging or inviting use, or to imply that the road, trail, or area is passable, actively maintained, or safe for travel. Designation only indicates the types of vehicles that are permitted to be used on that route.

The compatibility of each vehicle class with the road geometry and surfacing is determined by considering the type and size of vehicle. Road geometry and surface type affects the speed at which a vehicle can safely travel. Additionally, road surface conditions affect the comfort of the vehicle occupants. Each route was evaluated for its condition, as well as the opportunities provided to the users (see Travel Analysis Process route reports for each ranger district as part of the project record).
**Maintenance**

The Travel Management Rule (36 CFR 212.55) requires consideration of the need for maintenance and administration of the designated transportation system. Costs associated with administration of transportation facilities include costs for needed maintenance work that has not been completed for various reasons (deferred maintenance) and costs of maintenance that should be performed routinely to maintain the facility to its current standard (annual maintenance). Routine maintenance includes items like the repair of drainage features, such as water bars and the repair and/or replacement of signage. Deferred maintenance is work that can be deferred, without loss of road or motorized trail serviceability. Deferred maintenance is incurred when either routine maintenance items or high value items such as replacing a bridge or culvert is deferred due to funding constraints. In addition, there may be additional costs associated with proposed changes to the transportation system (implementation costs). These costs may be for improving unauthorized routes that would be added to the National Forest transportation system, costs for proposed safety and resource improvements, costs for changing maintenance levels, and costs for closing routes to use by motor vehicles.

An annual maintenance plan for the road system is developed prior to the road maintenance season. The maintenance plan takes into account roads that require maintenance to ensure user safety and those that typically require spot maintenance due to spring run-off, winter tree and snag fall, and other environmental factors. Road maintenance focuses on maintaining high traffic volume roads; major repairs such as culvert replacement; and repairs required to prevent or mitigate resource damage. Because the road maintenance budget is not determined by permitted use of roads, restrictions such as season of use and permit zones have no measurable funding impact and will not be discussed further in this analysis.

The majority of the Forest’s annual road maintenance budget goes to maintenance of roads for passenger vehicles (ML 3 to 5). Higher volumes of traffic occur on higher maintenance level roads driving the need for maintenance measures to ensure user safety. There is public expectation of greater comfort, speed, and safety measures (such as increased signing) on ML 3 to 5 roads maintained for passenger vehicles. Moderate grades, well-drained soils, and maintained road cross-slopes require a less intense level of maintenance to prevent resource damage on existing ML 3 to 5 transportation system roads.

The Forest’s annual maintenance plan includes addressing maintenance needs on ML 2 roads. High-clearance vehicle roads are managed as Maintenance Level 2. Maintenance of these roads includes drainage maintenance, repairs to heavily rutted areas, limited brushing for clearance and sight distance, and maintenance of minimal signage. The focus of maintenance on level 2 roads includes preventing or mitigating resource damage rather than maintaining the road for user comfort or speed. Routine maintenance is generally less costly and not performed as
frequently as on higher standard roads based on low volume of use and thereby minimal damage due to use (such as rutting or loss of surfacing).

The Forest is required to maintain National Forest System roads in a condition to safely accommodate intended use in accordance with the maintenance objective for that road. Trail maintenance is intended to preserve the trail and related facilities to meet established objectives for that trail. Reduction of maintenance costs was not used in the evaluation of roads and trails for the proposed action or development of the action alternatives in this analysis. Funding for road and trail maintenance varies from year to year and was determined to not be a suitable filter for determining routes that should or shouldn’t be designated for public motorized use.

The cost of National Forest System road maintenance is funded on an annual basis and varies by maintenance level. Shortfalls in road maintenance funding have resulted in a large backlog of deferred maintenance needs. Deferred maintenance can be generally defined as annual or routine maintenance that was not completed when scheduled.

The ability to perform road and motorized trail maintenance is limited by the availability of time, personnel, equipment, materials, and funding. The amount of road maintenance accomplished per year or per season is dependent on the road maintenance level and condition of the road or motorized trail being maintained. The condition of the road or motorized trail is affected by both the environment and the volume of traffic over the road between maintenance cycles. Environmental factors include soil moisture, tree and brush growth, storm and spring run-off, and other natural events such as floods.

The vast majority of roads maintained for high-clearance vehicles have natural surfaces and native materials are used to resurface and repair the road on an as needed or less frequent basis. In some situations, aggregate surfacing is used to prevent resource damage or facilitate traffic on steep inclines. Passenger car ML 3 roads are mostly native surfaced; however, they are graded on a yearly cycle to maintain the running surface to accommodate passenger vehicles. Passenger car level ML 4 and ML 5 roads are largely paved and require higher cost maintenance to maintain pavements and conform to the public’s expectations of higher comfort and safety. The ML 4 and 5 roads are primarily in developed recreation sites or are roads leading to popular destinations. Traffic ranges from passenger cars to large motor homes. These roads are also used by commercial vehicles delivering goods to various resorts and other commercial enterprises.

The Forest Service uses a computer database to maintain an inventory of its infrastructure. This database is commonly referred to as Infra. Infrastructure includes buildings, roads, bridges, recreational facilities such as campgrounds, land management units, trails, trail bridges, and other items for which accountability is required.
The Forest Service does not receive sufficient funding to match the calculated estimates in Infra. Annualized items are funded on a project-by-project basis and are competed for regionally and nationally. Therefore, annual maintenance costs do not reflect the way the Forest actually maintains its road system. Every mile of road does not need to be maintained every year. Rather, roads are maintained on a cyclic basis and in response to safety hazards and situations where resource damage may occur. There are some high-use roads that receive maintenance every year to repair winter and storm run-off damage and damage due to heavy traffic loads. Other roads do not require more than periodic inspection and occasional maintenance to repair damage to the road surface and road structures, eliminate traffic hazards, and prevent resource damage. This is true of most of the existing roads maintained for high clearance vehicles (ML 2) and the roads and motorized trails proposed for addition to the system under the action alternatives.

Table 3 shows how many miles of road received annual maintenance from fiscal year 2009 to fiscal year 2012.

Table 3: Summary of Road Receiving Annual Maintenance by Maintenance Level (in Miles)

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th>FY2009</th>
<th>FY2010</th>
<th>FY2011</th>
<th>FY2012</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>470</td>
<td>477</td>
<td>341</td>
<td>276</td>
<td>391</td>
</tr>
<tr>
<td>3</td>
<td>279</td>
<td>298</td>
<td>255</td>
<td>173</td>
<td>252</td>
</tr>
<tr>
<td>4</td>
<td>38</td>
<td>31</td>
<td>38</td>
<td>66</td>
<td>44</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>800</td>
<td>816</td>
<td>636</td>
<td>518</td>
<td></td>
</tr>
</tbody>
</table>

The consideration of tracking the true cost of maintaining each mile of road is problematic. The costs and metrics that are currently available do not effectively convey how the annual road maintenance budget is being managed with respect to the roads that need maintenance. The Infra costs available would show that the needed budget to maintain our roads will exceed our available budget by five times. Although there is always a need for additional funds to maintain our roads, there has never been a time that the Forest has had the Infra-based funding available on an annual basis. The cost comparison will be included in the analysis; however the analysis will focus on the relative difference in cost between alternatives, not the discrepancy of available funding.

The methodology compares the amount of roads that we have historically maintained with our budget as a percentage of the overall roads system to those of each alternative. This would effectively show how far our historical maintenance efforts would go toward maintaining the road system for each of the alternatives. The motorized trails would not be considered as a road as they will be analyzed through the recreation specialist report.
Direct and Indirect Effects
The four alternatives, presented in the draft EIS, vary greatly in the mileage of roads needing maintenance.

Table 4. The mileage noted in this table represents the road system the Tonto National Forest Service is required to periodically maintain. A portion of the road system is open to the public, while a portion of the road system is open for administrative purposes only. The mileage noted below reflects the total road miles for each maintenance level category inclusive of the administrative use only roads, and will be used for the analysis.

Table 4: Road Miles Needing Maintenance by Maintenance Level for Each Alternative

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th>Alternative A</th>
<th>Alternative B</th>
<th>Alternative C</th>
<th>Alternative D</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>645</td>
<td>376</td>
<td>572</td>
<td>548</td>
</tr>
<tr>
<td>2</td>
<td>2,308</td>
<td>663</td>
<td>935</td>
<td>2,849</td>
</tr>
<tr>
<td>Total</td>
<td>2,953</td>
<td>1,039</td>
<td>1,507</td>
<td>3,397</td>
</tr>
</tbody>
</table>

Cycle-Time Analysis
The metric used for comparison between the alternatives is the “cycle” time between regular forest road maintenance as a measure of years. The cycle time is the ratio of the total number of miles to the average miles maintained per year. The result will be a measure of how many years it will take to maintain every mile of road once before we start over. The lower the cycle time, the more often we maintain a forest road.

As an example, ML 2 roads designated in Alternative A equates to 2,308 miles (Table 4). Table 3 indicates the Tonto National Forest has maintained on average 391 miles of ML 2 roads per year. Dividing Alternative A ML 2 mileage (2,308) by the average number of miles of ML 2 roads maintained per year (391) results in a value of 5.9, indicating with the number of ML 2 roads in Alternative A it would take 5.9 years to maintain each road one time. Similarly, if the total number of miles of ML 3-5 for Alternative A (645), is divided by the average number of miles of ML 3-5 roads maintained per year from Table 4 (303), derived from adding averages for ML 3, 4 and 5, the result is 2.1. This indicates with the number of ML 3-5 roads in Alternative A it would take 2.1 years to maintain each road one time.

Alternative A
The alternative would not add any new facilities to the existing transportation system. Maintenance, signing, and improvements of unauthorized routes would not occur, because appropriated road and trail maintenance funds are restricted to expenditure for system roads.
and trails. Initially this alternative requires the least expenditure of funds. However, it has the potential to increase the need for resource funding to repair damage and degradation caused by continued motorized use of existing unauthorized routes and the creation of new unauthorized routes through continued cross-country travel (Table 5). Maintenance of the ML 2 roads would be a 5.9 year cycle (once every 5.9 years the road would be maintained). Maintenance of the ML 3-5 roads would be a 2.1 year cycle.

Table 5: Road Miles Needing Maintenance by Maintenance Level for Alternative A

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th>Alternative A</th>
<th>Average Maintenance*</th>
<th># of Years to Cycle all Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>645</td>
<td>303</td>
<td>2.1</td>
</tr>
<tr>
<td>2</td>
<td>2,308</td>
<td>391</td>
<td>5.9</td>
</tr>
</tbody>
</table>

* From data provided in Table 3

Alternative B
This alternative provides the least amount of motorized access of all alternatives. This alternative would result in the decommissioning of all roads not designated for motorized use. Administrative roads would remain open. Some of these roads may already be effectively closed on the ground from lack of use or due to previous road closure efforts. Maintenance of the ML 2 roads would be a 1.7 year cycle (once every 1.7 years the road would be maintained) (Table 6). Maintenance of the ML 3-5 roads would be a 1.2 year cycle.

Table 6: Road Miles Needing Maintenance by Maintenance Level for Alternative B

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th>Alternative B</th>
<th>Average Maintenance*</th>
<th># of Years to Cycle all Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>376</td>
<td>303</td>
<td>1.2</td>
</tr>
<tr>
<td>2</td>
<td>663</td>
<td>391</td>
<td>1.7</td>
</tr>
</tbody>
</table>

* From data provided in Table 3.

Alternative C
This alternative is a modified version of the proposed action scoped in February 2013. It reflects the changes that resulted from a review of the desired road network\(^2\). This information was further reviewed on a district level, involving district rangers, Forest Service personnel familiar with the existing road and resource conditions, and Arizona Game and Fish Department

\(^2\) More information about the method to determine the desired road network can be found in Chapter 2 of the draft EIS.
enforcement officers whose game retrieval units overlapped with the corresponding district boundaries. This process allowed for the correction of alignment issues of roads using aerial imagery gathered in 2012, as reflected in this alternative. This alternative would result in the closure of all motorized routes (road and trails) not designated for motorized use that are not located within an area already closed to motorized use or entry. Some of the roads may already be effectively closed on the ground from lack of use or due to previous road closure efforts. Maintenance of the ML2 roads would be a 1.9 year cycle (once every 1.89 years the road would be maintained) (Table 7). Maintenance of the ML3-5 roads would be a 2.4 year cycle (once every 2.4 years the road would be maintained).

Table 7: Road Miles Needing Maintenance by Maintenance Level for Alternative C

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th>Alternative C</th>
<th>Average Maintenance*</th>
<th># of Years to Cycle all Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>572</td>
<td>303</td>
<td>1.9</td>
</tr>
<tr>
<td>2</td>
<td>935</td>
<td>391</td>
<td>2.4</td>
</tr>
</tbody>
</table>

* From data provided in Table 3

Alternative D
This alternative provides the most motorized access of all alternatives. This alternative would result in the closure of all motorized routes (road and trails) not designated for motorized use that are not located within an area already closed to motorized use or entry. Some of these roads may already be effectively closed on the ground from lack of use or due to previous road closure efforts. Maintenance of the ML 2 roads would be a 1.8 year cycle (once every 1.8 years the road would be maintained) (would be maintained). Maintenance of the ML 3-5 roads would be a 7.32 year cycle (once every 7.3 years the road would be maintained).

Table 8: Road Miles Needing Maintenance by Maintenance Level for Alternative D

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th>Alternative D</th>
<th>Average Maintenance*</th>
<th># of Years to Cycle all Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>548</td>
<td>303</td>
<td>1.8</td>
</tr>
<tr>
<td>2</td>
<td>2,849</td>
<td>391</td>
<td>7.3</td>
</tr>
</tbody>
</table>

* From data provided in Table 3

Maintenance Cost Analysis
The cost of NFS road maintenance occurs on an annual basis and varies by maintenance level. The following table shows the funding required to perform routine and periodic maintenance for all existing system roads on an annual basis (Table 9). It does not show actual funding. The
annual cost shown below would maintain the roads in their current condition and begin to address the backlog of deferred maintenance. Shortfalls in road maintenance funding have resulted in a large backlog of deferred maintenance needs. Deferred maintenance can be generally defined as annual or routine maintenance that was not completed when scheduled. Because no motorized trails exist on the Forest, no costs are associated with maintaining these.

Table 9: Routine and Deferred Maintenance Cost Estimates for Existing NFS Roads (RATM) by Maintenance Level

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th># of Miles</th>
<th>Annual Maintenance Needs per mile</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5</td>
<td>559</td>
<td>$8,230</td>
<td>$4,600,570</td>
</tr>
<tr>
<td>2</td>
<td>2,198</td>
<td>$1,949</td>
<td>$4,283,902</td>
</tr>
<tr>
<td>Totals</td>
<td>----</td>
<td>------</td>
<td>$8,884,472</td>
</tr>
</tbody>
</table>

The ability to perform road maintenance is limited by the availability of time, personnel, equipment, materials, and funding. The amount of road maintenance accomplished per day or per season is dependent on the road maintenance level and condition of the road being maintained. The condition of the road is affected by both the environment and the volume of traffic over the road between maintenance cycles. Environmental factors include soil moisture, tree and brush growth, storm and spring run-off, and other natural events such as floods.

The average annual road maintenance budget is $2,326,900 (based on fiscal year 2008 to fiscal year 2012). It is important to note that while the annual maintenance budget is insufficient for supporting the Forest’s annual maintenance needs, not every mile of NFS road or trail requires yearly maintenance. As shown in table 5, only a percentage of the total roads on the forest are maintained each year, as opposed to all 2,757 miles of ML 2 through 5 roads. Therefore, the difference between the annual maintenance budget and the annual needs is not as drastic as it appears. For example, in 2003, the estimated annual cost to maintain all NFS roads to standard was about $4.8 million. While this amount still exceeds the annual budget of approximately $2.3 million, this is a significantly smaller annual difference.

Alternative A
The alternatives reflect the No Action and would not add any new facilities to the existing transportation system. Maintenance, signing, and improvements of unauthorized routes would not occur, because appropriated road and trail maintenance funds are restricted to expenditure for system roads and trails. Initially this alternative requires the least expenditure of funds. However, it has the potential to increase the need for resource funding to repair damage and degradation caused by continued motorized use of existing unauthorized routes and the creation of new unauthorized routes through continued cross-country travel (Table 10). The cost to maintain the ML 2 -5 routes within this alternative would be $9,718,195 which is 417% of our annual maintenance budget.
Table 10: Maintenance Cost Estimates for Alternative A (based on 2006 figures)

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th># of Miles</th>
<th>Annual Maintenance Needs per mile</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 3-5</td>
<td>645</td>
<td>$8,230</td>
<td>$5,308,350</td>
</tr>
<tr>
<td>ML 2</td>
<td>2,308</td>
<td>$1,949</td>
<td>$4,498,292</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>4,319</strong></td>
<td></td>
<td><strong>$9,718,195</strong></td>
</tr>
</tbody>
</table>

Alternative B
This alternative provides the least amount of motorized access of all alternatives. This alternative would result in the decommissioning of all roads not designated for motorized use that are not located within an area already closed to motorized use or entry. Administrative roads would remain open. Some of these roads may already be effectively closed on the ground from lack of use or due to previous road closure efforts.

The cost to maintain the ML 2-5 routes within this alternative would be $4,386,667 which is 189% of our annual maintenance budget (Table 11).

Table 11: Maintenance Cost Estimates for Alternative B (based on 2006 figures)

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th># of Miles</th>
<th>Annual Maintenance Needs per mile</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 3-5</td>
<td>376</td>
<td>$8,230</td>
<td>$3,094,480</td>
</tr>
<tr>
<td>ML 2</td>
<td>663</td>
<td>$1,949</td>
<td>$1,292,187</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>4,319</strong></td>
<td></td>
<td><strong>$4,386,667</strong></td>
</tr>
</tbody>
</table>

Alternative C
This alternative is a modified version of the proposed action scoped in February 2013. It reflects the changes that resulted from a review of the Desired Road Network that was discussed earlier in this chapter. This information was further reviewed on a district level, involving district rangers, U.S. Forest Service personnel familiar with the existing road and resource conditions, and Arizona Game and Fish Department enforcement officers whose game retrieval units overlapped with the corresponding district boundaries. This process allowed for the correction of alignment issues of roads using aerial imagery gathered in 2012, as reflected in this alternative. This alternative would result in the closure of all motorized routes (road and trails) not designated for motorized use that are not located within an area already closed to motorized use or entry. Some of the roads may already be effectively closed on the ground from lack of use or due to previous road closure efforts.

The cost to maintain the ML 2-5 routes within this alternative would be $6,529,875 which is 281% of our annual maintenance budget. (Table 12)
Table 12: Maintenance Cost Estimates for Alternative C (based on 2006 figures)

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th># of Miles</th>
<th>Annual Maintenance Needs per mile</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 3-5</td>
<td>572</td>
<td>$8,230</td>
<td>$4,707,560</td>
</tr>
<tr>
<td>ML 2</td>
<td>935</td>
<td>$1,949</td>
<td>$1,822,315</td>
</tr>
<tr>
<td>Totals</td>
<td>4,319</td>
<td></td>
<td>$6,529,875</td>
</tr>
</tbody>
</table>

Alternative D
This alternative provides the most motorized access of all alternatives. This alternative would result in the closure of all motorized routes (road and trails) not designated for motorized use that are not located within an area already closed to motorized use or entry. Some of these roads may already be effectively closed on the ground from lack of use or due to previous road closure efforts.

The cost to maintain the ML 2-5 routes within this alternative would be $10,062,741 which is 432% of our annual maintenance budget (Table 13).

Table 13: Maintenance Cost Estimates for Alternative D (based on 2006 figures)

<table>
<thead>
<tr>
<th>Maintenance Level</th>
<th># of Miles</th>
<th>Annual Maintenance Needs per mile</th>
<th>Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>ML 3-5</td>
<td>548</td>
<td>$8,230</td>
<td>$4,510,040</td>
</tr>
<tr>
<td>ML 2</td>
<td>2849</td>
<td>$1,949</td>
<td>$5,552,701</td>
</tr>
<tr>
<td>Totals</td>
<td>4,319</td>
<td></td>
<td>$10,062,741</td>
</tr>
</tbody>
</table>

Summary of Direct and Indirect Effects
The cost of NFS road maintenance would vary by alternative. Alternative D increases maintenance costs more than any alternative. Alternative B would reduce the annual maintenance needs by approximately $5.3 million per year compared to alternative A, resulting in the lowest annual road maintenance cost. Alternative C would reduce the maintenance need by $3.2 million per year compared to Alternative A. Consideration of costs for maintaining the additional routes that would become motorized trails is detailed further in the Recreation Section. These costs would offset some of the savings mentioned above. Based on this analysis, Alternative B is the preferred alternative.

To support the existing transportation system with current and projected appropriated and non-appropriated maintenance funding, routine maintenance is being reduced, maintenance cycles are extended, and selective repairs are made to ensure public safety and prevent resource damage. Major repairs such as resurfacing or new bridges are funded by special appropriations outside of the Forest’s annual budget. Current and projected funding levels do not cover deferred maintenance, which means that the deferred maintenance backlog grows annually.
All action alternatives would all create maintenance funding shortfalls to a greater degree than Alternative A, mostly because of adding motorized trails to the transportation system. Not performing routine annual maintenance on time may increase the amount of deferred maintenance. If annual maintenance was fully funded, it would still leave a large amount of deferred maintenance that would prioritized for completion upon identification of danger to the public or the potential for severe resource damage.

**Cumulative Effects – All Alternatives**

The forest achieves yearly road maintenance totals by working in conjunction with county and state governments. Fluctuation of budgets with other governmental agencies could impact the total number of miles of maintenance achieved.

Potential effects on the road system from activities such as urban development, increased visitation, mineral exploration and other construction activities could include temporary increases in the amount of traffic and road use by OHV vehicles and larger vehicles, primarily construction trucks. Much of the cost of any additional road maintenance needed as a result of commercial activities proposed with these future projects would be borne by the purchaser of the commercial product, and any temporary road needed to access the product would be constructed and then decommissioned by the purchaser when no longer needed.

The effects of cumulative activities, when added to the effects of the activities proposed with this project, would result in additional current maintenance needs. There is also the potential for increased conflict between commercial and noncommercial road users. Some roads and trails being designated as open for motor vehicle use could have an increased concentration of traffic, while other roads and trails could have a decreased concentration of traffic. Potential for conflict would be mitigated by the appropriate use of signing and traffic control during implementation of activities.
References


2005 Motorized Travel Management Rule

Forest Road Agreement Between U.S. Forest Service and Gila County, 2009

Forest Road Agreement Between U.S. Forest Service and Maricopa County, 2010

Travel Analysis Process reports for site-specific information, U.S. Forest Service, 2011
Appendix A: Desired Road Network Criteria

Assumptions and Limitations
Assumptions are based on original RATM decisions of 1990 which identified system roads, instituted current road numeration, and identified long term objectives for roads. These designations of roads were the initial consideration of the minimum roads system necessary for management of the National Forest in a safe and efficient manner. These decisions were documented through corporate databases and maps and became the foundation of the current roads atlas data which is currently stored in the I-Web databases.

The I-Web database contains operational and objective changes and additions such as newly added campgrounds which have systemized roads within them. Newly collected roads that were found to be systemized through local district management, as well as miscellaneous routes that may have been collected for future decisions may also exist as part of the standard atlas data held in I-Web.

The limitations of this I-Web road atlas data exist in that there is no differentiation between roads and what could further be described in the context of motorized recreational use specific to a "motorized trail," therefore the current limitation is that all routes which were systemized appear to have been added as roads without criteria or consideration of types of vehicle use, predominate usage, maintenance and administration characteristics.

The following questions provide a basis for Engineering analysis in determining the road system above previously identified roads, which allow for an additional level of consideration in determining our minimum roads system and differentiating the aspects of transportation routes that may exist and function solely as a motorized trail and those which provide administration as part of an engineered road system or primary transportation group.

A weight of 1 point is awarded for each yes answer. A total of 7 points are available for each route. If the combined total of the yes answers are 4 or more there is sufficient subjective data to presume the route can be considered as a portion of a road system. If the total is 4 or less, further subjective analysis related to the type and class of vehicles should be rationalized.

Evaluation Criteria

**Question 1:** Does the route provide access for any function related to a facility, Residence, or site of importance? Yes = 1 Point; No = 0 Point

**Question 2:** Does the route provide connectivity on a macro level to a system which is fundamental to the minimum needs of the agency and the public to provide access and administration to portions of the Forest which are without any other type of access? Yes = 1 Point; No = 0 Point

**Question 3:** Does the route have any nonrecreation based administrative uses such as allotment management, mining, special uses, commercial uses, beyond recreational access? Yes = 1 Point; No = 0 Point

**Question 4:** Is there any record of maintenance in the last 7 years on the route? Does the route exist on a schedule, agreement or other instrument which indicates maintenance? Yes = 1 Point; No = 0 Point
**Question 5:** What is the predominate type of vehicle that utilizes the route on a most regular basis (what traffic is perceived and acknowledge by local Forest Staff in ongoing operations and observations as well as local expertise)? And in what terms would it be most commonly identified in terms of the majority of use and widely used and accepted by public travelers? 1 Point = High clearance full sized vehicles such as suburbs, tahoes, and pickups in administration and utilization of the National Forest system lands, generally accepted as 4x4 full sized vehicles; 0 Points = Recreation based off highway travel primarily recreation based traffic in the form of OHV/UTV/ATV/Motorcycle, Jeeps and other short wheelbase, 4x4 or off highway types of vehicles.

**Question 6:** Would a prudent driver in a standard 4x4 SUV or pickup truck consider the route as a safe and efficient route for primary transportation access? Yes= 1 Point; No = 0 Point

**Question 7:** Does the route End or terminate at a dead end termini? NO= 1 Point; YES = 0 Point