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Ecosystem Functions and Processes (EF)

EF(1): What ecological attributes, particularly those unique to the region, would be affected by roading of current unroaded areas?

The attributes that would be affected include threatened, endangered and sensitive species habitats, riparian areas, and caves.

There are no plans to build roads within inventoried roadless areas. In addition, no permanent roads are planned for construction in other unroaded areas. The ecological attributes of these areas will continue to be protected by the Forest Plan and project-level design features.

EF(2): To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?

The presence of roads increases the risk of spread of existing and new noxious weeds to the Forest and surrounding landscapes. The higher the assigned maintenance level and subsequent frequency of road maintenance increases the chances for spread of many exotic (noxious) plants into new areas. Noxious weeds will often displace the habitat of existing native species. The end result is ecosystem function can be dramatically altered by the introduction and spread of noxious weeds and our road system provides a major opportunity for introduction of new species from other areas.

EF(3): To what degree do the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?

The presence of roads allows access to the Forest for many types of treatment, including, mechanical, chemical and burning. It is important to have road access to all areas of the Forest in order to monitor Forest health and conduct treatment activities as needed. Higher maintenance level roads allow for easier and more frequent access to the Forest.

EF(4): How does the road system affect ecological disturbance regimes in the area?

Effects to ecological disturbance regimes may have occurred during the construction of the road system. Since no new Level 3, 4 or 5 roads are planned for the Coronado National Forest there will be no new affects from road construction. Current effects to these regimes may occur due to the presence, use and/or maintenance of existing roads.

The most common disturbance regimes on the Coronado National Forest are fire and drought. These regimes are interrelated since drought often leads to increased incidences of fire. Although road access provides risk for human-caused fires on the Forest it also allows for rapid response opportunity for fire suppression activities. Even though it is acknowledged that road

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access in the Forest increases risk for human caused fire, this risk can be minimized through administrative means such as smoking and campfire restrictions and complete closures during high and extreme fire danger periods.

EF(5): What are the adverse effects of noise caused by developing, using, and maintaining roads?

Noise from developing, using and maintaining roads may affect people and wildlife within hearing distance. There is no specific data on the effects of noise from Forest roads on people. Studies have been conducted on effects of noise on wildlife on the Lincoln and Mendocino National Forests.

The adverse effects of noise on wildlife have been documented in two studies (Delaney et. al., 1999 and Delaney and Grubb, 2001). Delaney et. al., 1999 studied the effects of noise, specifically low-level helicopter flights and chainsaws, on the Sacramento Ranger District, Lincoln National Forest. The study focused on nesting and non-nesting Mexican spotted owls and their response to helicopter and chainsaw noise. The study found that Mexican spotted owls are affected by noise levels above 92 dBA at a distance of < or = to 105 meters. The study also found that chain saws were more disturbing to Mexican spotted owls than helicopter flights at comparable distances. The study concluded that a 105 meter buffer zone for helicopter overflights on the Lincoln National Forest would minimize spotted owl flush (i.e. leaving a nest or perch) response and any potential effects on nesting activity.

Delaney and Grubb, 2001 studied the effects of recreational motorcycle noise on Northern Spotted Owl Habitat on the Mendocino National Forest. The study did not locate spotted owls during the course of the study, and therefore could not provide definitive recommendations for mitigating the effects of noise. However, the researchers did provide preliminary findings and areas that needed further study. The preliminary findings include; 1) Northern spotted owls are not likely to flush in response to motorcycle activity > 180 meters from an owl location based on prior noise research conducted on Mexican spotted owls and chainsaws, 2) Motorcycles passing on steep slope trails (> 16%) may elicit greatest behavioral response by spotted owls, followed by horizontal slope (0%) and moderately sloped trails (9-16%). In addition, motorcycle traffic on straight trails may elicit greater response behavior than curved trails, 3) Nest types also differ on the degree of noise effects. Cavity nest may receive higher noise levels than other external structure nest types due to a resonating effect within the nest cavity itself, 4) Motorcycle type and driver aggressiveness also result in different noise effects. Higher frequency motorcycles (200 cc motorcycles) are potentially more disturbing to spotted owls than lower frequency motorcycles (400 cc motorcycles). In addition, more aggressive the driver, the more substantial the effect on noise levels and noise energy distribution, 5) Enduro check points and fuel stops should not be located near owl locations because of the potential increases in noise levels and duration of noise levels.

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Aquatic, Riparian Zone, and Water Quality (AQ)

AQ(1): How and where does the road system modify the surface and subsurface hydrology of the area?

Roads have three main effects on water: 1) they intercept rainfall directly on the road surface and road cutbanks and subsurface water moving down the hillslope or springs; 2) they concentrate flow, either on the surface or in an adjacent ditch or channel; and 3) they divert or reroute water from normal flow paths had the roads not been built. With increasing road density increases the impact to a watershed and it's waterways. For example, by intercepting surface and subsurface flow, and concentrating and diverting it into culverts, ditches, gullies, and channels, road systems effectively increase the density of streams in the landscape, thereby changing the amount of time it takes for water to enter a stream channel, altering the timing of peak flows and hydrograph shape. Usually the change in the hydrograph's shape is a quicker runoff response time (i.e. "flashier" flow response), which produces a taller and sharper shape in the hydrograph's peak flow design.

AQ(2): How and where does the road system generate surface erosion?

The road system and their adjoining cutbanks and fillslopes are direct generators of surface erosion at an accelerated rate because they are generally void of vegetation or sparsely vegetated. Cutbanks and fillslopes also frequently have altered soil structure on the surface, making soil particles more easily detached. Additionally, road systems generate surface erosion by the flashier hydrographs they cause as described in AQ (1). It must be understood all roads do not generate erosion equally during storms, and the same road segment may behave quite differently during storms of different magnitudes. As storms become larger or soil becomes wetter, more of the road system contributes water and sediment directly into streams. Road gradient has a profound effect on the magnitude of hydrologic change on roads and to surrounding areas. Discharge from hillslopes, cutbank height, frequency of stream crossings, soil properties, and response to storms all affect surface erosion

Given the understanding that each road generates surface erosion an important consideration of how roads impact surface erosion in a watershed is the number of roads and miles built as well as the type of road whether it's paved, graveled, or dirt. The greater the road density value, the greater the potential impact to a watershed and its hydrologic system caused by those roads. Proper design and maintenance of roads can reduce the amount of sedimentation. The amount of traffic on a road can affect the FS ability to properly maintain the road.

AQ(3): How and where does the road system affect mass wasting?

The incidence of mass wasting due to roads on the Coronado National Forest is limited. Concentration and diversion of flow into headwater areas can cause incision of previously unchanneled portions of the landscape and initiate slides in colluvial hollows. Diversion of stream flow at road-stream crossings, road proximity next to stream channels, and the culvert placements and frequencies are key factors contributing to road failure and other landscape erosional consequences during large flood events. Another potential factor would be the

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unusually high antecedent moisture content in the soils as a result of above normal wet years or heavy snow pack allowing increased risk for slumping or small landslides along, usually, cutbanks and less often on fillslopes.

AQ(4): How and where do road-stream crossings influence local stream channels and water quality?

Road stream crossings can be a major source of sediment to streams, resulting from channel fill around culverts, subsequent road-crossing failures, and subtle or major changes in stream morphology caused by aggradations such as the increased number of point bars in stream channels. Greater road density will have a greater number of road-stream crossings and thereby increase the likelihood of impact on stream water quality as a result of increasing amount of fine sediment or sand entering streams at those juncture points. Stream crossings such as ford crossings allow greater sediment delivery to streams because of the direct connection from a road to a stream as compared to culvert crossings or bridges. The greater number of traffic or higher road density of non-paved roads will have a greater propensity for sedimentation to streams and potentially increasing the impact to water quality, fishes, and/or macro-invertebrates.

AQ(5): How and where does the road system create potential for pollutants, such as chemical spills, oils, de-icing salts, or herbicides, to enter surface waters?

Clear and open pathways for pollutants to enter surface waters are either at road crossings such as fords and roadside culverts that pipe near or directly into surface waters. The potential for pollutants to enter surface waters is also based upon the design of the road system such as out-sloped vs. in-sloped road designs, the incorporation of broad road dips, and the number of culvert installations along road-side ditches. Other factors are the roads' proximity to streams and the amount of vegetation such as grasses that can serve as "pollutant traps" between the road and stream water. If the road is designed poorly or there is a lack of vegetation materials to serve as a "buffer strip" between the road and stream water, movement of pollutants into surface waters is likely to occur. Proximity of the road to a stream is the strongest controlling variable in determining problems on water quality in streams. Paved road systems are likely to be pollution source areas due to the higher public vehicular use, greater attention on road maintenance requirements, and accidental spills. Unpaved road systems are likely to be the source for sedimentation problems to nearby streams.

AQ(6): How and where is the road system "hydrologically connected" to the stream system? How do the connections affect water quality and quantity (such as, the delivery of sediments and chemicals, thermal increases, elevated peak flows)?

See AQ (1), (2), (3), and (4) for additional information. Roads that closely parallel stream systems have the potential to affect riparian plant. Trees on stream banks have the potential to fall into channels due to the undermining or undercutting action of floods where weakened stream banks or fillslope areas slump into streams. These actions can reduce shade coverage and expose surface waters to more sunlight and potentially increase water temperature.

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Recreational uses, water diversions for agriculture and range uses, drinking water, stock ponds, and impoundments are the beneficial uses. Perennial stream systems support aquatic and wildlife species, and riparian plant species. Intermittent streams may support these as well during wetter seasons.

AQ(7): What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

The continued increase in population in the west in communities in and around the Coronado National Forest has been observed and will likely generate an increase in recreational and transportation needs as result. These increases will likely cause additional impact to both paved and non-paved road systems throughout the National Forest. Impact to roads from pollutants and the mobilization of sediments to streams will likely occur thereby increasing the potential for additional strain to aquatic systems and degradation of water quality. This may be due in part to erosion, changes in sediment loads to streams, changes in water chemistry, acidity or pH, temperature, turbidity, and conductance as a result of the higher road maintenance requirements and increased road uses by public and private sectors.

Lands administered by the CNF include watersheds that provide domestic and agricultural water for all of the communities located within or near the Forest. Use of water from these watersheds for domestic purposes is expected to increase over time. Road-derived pollutants might include hydrocarbons, salts, mineral sediments, or anything spilled from a hauling vehicle. These pollutants, if present in enough quantity, could affect the drinking water and the health of the people using that water, or could affect wildlife and plants, especially and most directly aquatic species.

AQ(8): How and where does the road system affect wetlands?

Wetlands on the Coronado National Forest are few and far between, and are rarely found near roads. In the few instances where roads are found in or near wetlands, low gradients, high water tables, and poorly defined drainages result in problems unique to wetland areas. Compaction and the consequent interruption of subsurface water movement could impact wetlands by causing some parts of the wetland to dry out.

AQ(9): How does the road system alter physical channel dynamics, including isolation of floodplains: constraints on channel migration; and the movement of large wood, fine organic matter, and sediment?

Roads affect geomorphic and channel dynamics from four different mechanisms: 1) accelerating erosion from the road surface and prism itself by both mass and surface erosion processes that adds or changes the equilibrium dynamics in a channel through sediment loading and erosional processes; 2) directly affecting channel structure and geometry by constraints to the floodplain or stream that have a natural tendency for lateral (or vertical) migration; 3) altering of surface flow paths and increasing stream density, leading to increased landscape dissection or channelization onto previously unchannelized portions of the landscape; and 4)

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causing complex interactions among water, sediment, and woody materials (see question #5 also about woody materials and roads) where an increase in sediment movements, road side failures, slumpings, stream bank failures, landslides, and changes in streamflow dynamics will occur. These mechanisms involve different physical processes, have varying effects on erosion rates, and are not uniformly distributed either within or among landscapes or watersheds. As variable as climatic results will occur, so will the responses of a watershed or landscape containing a road system.

AQ(10): How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what extent?

Road systems affect the migration and movement of aquatic organisms by blocking access to spawning grounds or suitable habitats through inappropriately installed culverts, poorly designed low water crossings, or changes in water velocities in a stream. Movement of fish within a stream system is equally important to resident fish, such as those on the Coronado, as it may be to migrating Steelhead or Salmon in the Pacific Northwest. An inappropriately installed culvert is likely to pose a movement barrier to resident fish attempting to move to headwaters to spawn. This same culvert may also affect juvenile fish attempting to move to rearing habitat or cooler waters by increasing water velocities through the culvert and prohibiting movement within a stream. Culverts and low water crossings can also affect habitat links between different streams and stream systems within a watershed or multiple watersheds. If culverts or low water crossings close off habitat links, then genetic exchange between fish populations is reduced or eliminated, resulting in isolated populations and inbreeding. The probability of losing these isolated populations to disease and extirpation increases with time.

On the Coronado National Forest, it is currently not known where restriction of migration and movement of aquatic organisms occurs. No surveys of culverts or low water crossings have been conducted to determine where conflicts with aquatic organisms exist. This information still needs to be obtained.

It is currently not known to what extent barriers to migration and movement affect aquatic organisms on the Coronado National Forest. The aquatic organisms on the Coronado National Forest that could potentially be affected by barriers include: Sonora tiger salamander, Chiricahua Leopard frog, Tarahumara frog, Yaqui catfish, Apache trout, Gila chub, Gila topminnow, Yaqui chub, and Sonora chub.

Channel crossings by roads and culverts designed to allow uninterrupted stream flow might also affect the morphology of small tributary streams, as well as limit or eliminate fish passage due to incorrect culvert placement and slope angle. Indirect effects of roads on channel morphology include the contributions of sediment and altered streamflow that can alter channel width, depth, local gradients, and habitat features (pools, riffles) for aquatic organisms.

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AQ(11): How does the road system affect shading, litterfall, and riparian plant communities?

See AQ(5). The nature, frequency, and intensity of organic or non-organic materials inputs in different zones between road and riparian areas occur as a result in the introduction of a road system in a natural setting. A road ecosystem does exist and may provide ecological niche areas for plant communities in some locations as a result. A road system can exacerbate conditions by altering an already dynamic environment. For example, road systems can increase noxious weeds or non-native plants into riparian areas introduced via vehicles or people. Or cause a change in the nature of lateral migration in a channel affecting riparian plant communities.

AQ(12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?

The existing road system on the Coronado National Forest is currently more than adequate to allow access to fishing waters by sportsmen. During normal rain years, sportsmen access forest service system roads for fishing at Rose Canyon Lake, Riggs Flat Lake, Pena Blanca Lake, Arivaca Lake, and Parker Canyon Lake.

It is unknown how much poaching of fish occurs on the Coronado National Forest. Due to the amount of fish bearing streams on the Coronado National Forest and the availability of other larger fishing bearing waters, such as Patagonia Lake, the amount of poaching on lands managed by the Forest Service is likely very low. Poaching of deer is more prevalent on the Coronado than poaching of fish. However, fish bearing streams where road networks loop or interconnect with other roads have a higher potential for poaching than roads that dead-end at a lake or stream. Poachers tend to favor roads that loop or interconnect with other roads in order to enter an area one way and then exit the same area in a totally different direction. Poachers tend not to favor roads where the exit route is the same route that they came in on.

Habitat loss for at-risk aquatic species occurs where the road prism results in direct or indirect loss of habitat. Direct loss of habitat results from the placement of roads in or near streams and riparian areas. For example, loss of stream habitat can occur by the placement of culverts in a stream, where a culvert and associated fill replaces native streambed materials. Encroachment of the road prism along streams also indirectly affects habitat by reducing riparian habitat that provides food, and shade that helps cool stream waters. In addition, added silt from roads that run parallel to streams affects spawning habitat by covering gravel beds and suffocating eggs and larvae. Roads that rank as a high risk for watershed values will likely be a high risk for aquatic species as well.

AQ(13): How and where does the road facilitate the introduction of non-native aquatic species?

The introduction of non-native aquatic species will likely be greater where access to waters is made easier. The introduction of non-natives, such as bullfrogs, gold fish, and bait bucket minnows often occurs where access is made easier and faster. Waters located along passenger

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roads are more likely to receive non-native introduced species than waters located in back country areas or along more rugged high clearance roads. In addition, waters with high recreational fishing use will tend to receive more bait bucket introductions that waters located in back country areas where access is limited to foot travel. The status of non-native aquatic species has not been fully assessed on the Coronado.

AQ(14): To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity, or areas containing rare or unique aquatic species or species of interest?

Analyses as to the extent in which roads overlap with areas of exceptionally high aquatic diversity or productivity have not been conducted to date on the Coronado National Forest.

Terrestrial Wildlife (TW)

TW(1): What are the direct affects of the road system on terrestrial species habitat?

Direct affects to terrestrial species habitat from the Coronado National Forest road system include: 1) loss of habitat due to conversion of native vegetation to a particular road surface (paved, gravel, dirt), 2) fragmentation of habitats due to road system development, 3) interruption in migratory patterns of wildlife to reach breeding habitat or winter range habitat, and 4) lack of habitat use by wildlife due to disturbance caused by use of the road system.

Lack of wildlife use in habitats along roads can also be correlated to the level of use a road receives over a period of time. Low use roads may tend to have wildlife using road- side habitats more frequently than roads with high traffic volume.

TW(2): How does the road system facilitate human activities that affect habitat?

Human activities that affect habitat and are facilitated by the existing road system include; 1) Off road vehicle travel, 2) Dispersed shooting or target practice, 3) Dispersed camping, 4) Large group special uses, 5) Forest Service commodity production (i.e. livestock, timber and mining).

Off-road vehicle travel on undesignated routes (i.e. cross country) is facilitated from existing roads, whether it's a level 2 or a level 5 road. Off-road vehicle travel affects habitat through trampling of vegetation, compaction of soil, loss of vegetation and soil, and contributing sediment to stream waters. Impacts to habitat can either be short term or long term. Short term impacts maybe where an off-road vehicle makes one pass across a stream and the resulting sediments clear up in a few minutes. Long term impacts are where multiple passes occur across the stream resulting in eroded banks and loss of vegetation and soils for an extended period of time (i.e. years).

Recreational uses such as dispersed shooting areas, camping or large group events also impact wildlife habitat to varying degrees. For example, large group events occur periodically and

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over a short period of time. Most often, they occur over a weekend and result in trampling of vegetation in a meadow. The effects of such an activity are likely to last only a short period of time, a few days or a week. In contrast, dispersed shooting areas, such as the one in Dry Canyon, off Highway 82, receives continued use that has evidently occurred over a long period of time. At this site, affects to wildlife habitat are seen in loss of vegetation and soil from target shooting. Areas void of vegetation are evident where target practice has occurred over an extended period of time. Loss of soil at this site is also evident from off-road activities associated with target shooting (i.e. placement of targets, separation from other shooters, etc.). Other affects include displacement of wildlife due to noise associated with the discharge of firearms.

Past Forest Service commodity production has resulted in large part to the existing road system and network present today. Human activities such as timber harvest and livestock management affect wildlife to varying degrees. Wildlife forage, nesting, and thermal cover habitat are affected by these activities to varying degrees, depending on the degree of timber and forage extraction that occurs.

TW(3): How does the road system affect legal and illegal human activities (including trapping, hunting, poaching, harassment, road kill, or illegal kill levels)? What are the affects on wildlife species?

The existing road system being analyzed in this document influences both legal and illegal human activities. Legal activities such as hunting and trapping are facilitated by the existing road system. The road system facilitates hunting and trapping by making access to areas easier and faster, and also helps distribute road hunters (sportsmen who hunt from their vehicles or along road ways) over a greater area. In addition, level 2 roads and above also facilitate access for sportsmen with disabilities. In contrast, the same benefits of roads for legal activities such as hunting and trapping also help facilitate some illegal activities such as poaching. Poachers benefit and find it easier to take wildlife in areas with a well established road system. Poachers prefer road systems with loops or interconnected road networks, and tend not to use "dead end" roads or roads with no secondary outlet (i.e. one way in, one way out).

Higher maintenance level roads, particularly roads that are paved, allow vehicles to travel at higher speeds. Higher speeds may result in more deaths and injuries to animals from direct hits by vehicles.

Illegal motorized vehicle use off road has become a major problem that is possibly linked to road systems. New roads/trails are constantly being created on the Forest by illegal use of off-road vehicles.

TW(4): How does the road system directly affect unique communities or special features in the area?

Unique communities or special features for wildlife that may be affected by the road system include riparian areas, caves, and Research Natural Areas.

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Riparian areas, and their associated plants and wildlife, may be affected by the road system several ways. Riparian areas with roads intersecting them may experience increased turbidity and sedimentation from vehicle driving through stream crossings. Riparian areas with roads along the edges may show increased erosion from crumbling banks or sedimentation from runoff. There may also be an increase in the amount of trash thrown from vehicles in these areas.

Several caves on the Coronado National Forest provide roosting and nesting sites for bats, including the federal endangered lesser long-nosed bat, and birds, including swallows, swifts, wrens and the federal threatened Mexican spotted owl. Easy access to caves by roads, resulting in intentional or unintentional harassment of their inhabitants, may cause these animals to abandon them.
Research Natural Areas are special features on the Coronado that are set aside to provide and protect natural diversity in all its forms for non-manipulative research, observation and study. Close proximity of roads to these areas may cause disruption in the natural systems affecting research studies. On the other hand, roads facilitate access to these areas for researchers conducting studies which may ultimately result in improved management of these and other areas.

Economics (EC)

EC(1): How does the road system affect the agency's direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both?

At the Forest scale, this question can be answered in broad terms as a detailed cost/benefit economic assessment is not feasible. The IDT for the Coronado National Forest RAP addressed this question by using the Road Value versus Risk matrix as a tool to determine what roads fell into which Road Management Category. The IDT identified four road management categories for this forest scale roads analysis.

The Coronado National Forest RAP only considered passenger car routes or maintenance level 3, 4, and 5 roads. The IDT determined early in the process that most of these roads form our "backbone" road system and would be kept open for obvious reasons—they access private property, administration and recreation sites or are arterial or collector roads. Most of these roads were developed over the years for a variety of access needs, and considerable capital investments were incurred to construct these roads. Most of these roads were analyzed in some form, which likely included use needs, construction design standards, environmental considerations, and economic assessment.

The IDT's challenge was to develop a process to sort out those level 2, 3, 4, and 5 roads that might not be meeting current and future access and land management needs, at least not at their current maintenance levels. This process helps identify opportunities to reduce road maintenance costs on some roads. The IDT also determined that even if funding was shifted from low value to high value roads, the annual road maintenance funding for this forest was

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still significantly less than needed for the entire forest.

EC(2): How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

This is a project-level question, not a forest scale question.

EC(3): How does the road system affect the distribution of benefits and costs among affected people?

This is a project-level question, not a forest scale question.

Commodity Production

Timber Management (TM)

TM(1): How does road spacing and location affect logging system feasibility?

There is no commercial timber management program on the Coronado National Forest. Logging system feasibility is not an issue.

TM(2): How does the road system affect managing the suitable timber base and other lands?

When the Forest Plan was signed in 1986, 13,729 acres were identified as lands suitable for timber production from the tentatively suitable land base of 23,073 acres. Suitable and tentatively suitable lands were comprised of Mixed Conifer, Ponderosa Pine and Aspen species capable of growing 20 cubic feet per acre per year. The allowable Sale Quantity was calculated from growth and yield projections based on these areas only.

Since 1986, the Plan has been amended to reduce the suitable timber production land base to 5,000 acres.

When the Coronado National Forest prepares their forest plan revision, the suitable timberland and transportation plan will be reanalyzed.

The Coronado National Forest has an active program of planned precommercial treatment (harvesting trees less than 9 inches DBH) for the purpose of reducing fire hazard. These treatments, mainly within the Wildland Urban Interface (WUI), need to be continued and the material thinned (biomass) needs to be removed and utilized if possible. This activity will require use and maintenance of existing roads, and may require construction of new access roads.

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TM(3): How does the road system affect access to timber stands needing silvicultural treatment?

In addition to the above discussion concerning acres of suitable timberlands for logging, there is a new emphasis on management of the woodland component. This zone includes oak, juniper, some pinyon pine and other shrubby species. Historically, this area has been neglected in regard to road construction and transportation planning. Future transportation planning must address this area in addition to the above commercial lands.

Minerals Management (MM)

MM(1): How does the road system affect access to locatable, leasable, and salable minerals?

The maintenance level 3, 4 and 5 roads in this analysis serve as access to general areas and provide adequate access. Most mineral operations easily occur on maintenance level 1 or 2 roads.

Range Management (RM)

RM(1): How does the road system affect access to range allotments?

The road system is vital for efficient administration and management of permitted grazing allotments. Forest Service personnel must be able to monitor, inspect and evaluate range conditions on a regular basis to effectively administer existing grazing permits. The current road system allows for rapid access to allotments to react to the numerous public issues challenging the range program today.

Grazing permittees need reasonable vehicular access within allotments to maintain existing range improvements and to manage and care for permitted livestock. Care for livestock often includes transporting large trailers and truck loads of livestock on Forest Service roads.

Water Production (WP)

WP(1): How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

There are only a few of these situations on the forest but certainly the level 3, 4 and 5 roads on the forest provide the needed access to administer these facilities.
Poorly designed roads or roads having close proximity to streams can affect road access where problem roads can wash out. Poorly designed roads in geologically unstable areas, areas prone to erosional problems, inadequate number of culverts, or problem culverts can increase difficulty for access when roads are regularly affected during intense rainfall events

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WP(2): How does road development and use affect water quality in municipal watersheds?

Road development can impact nearby streams when newly constructed roads are required. Temporary impact to stream waters can be seen from ground disturbing activities during road development. Road development has the potential to impact water quality in a municipal watershed. Its significance in impact to water quality is dependent on the amount of road use, seasonal weather events, and road density values.

Municipal watersheds that have high road densities and whose roads are unpaved can increase the potential for sedimentation and turbidity to streams and impounded waters such as dams. This is due in part to the greater acreage of exposed roads that are subject to erosion and vehicle use releasing sediment or fines into stream waters during heavy precipitation events. During dry periods where roads are accessed often by the public where swirls of dust from passing vehicles settle out on nearby plants and are subsequently released into the streams during rainfall events.

Watersheds with high road densities can also increase the timing and flow of stream waters increasing the potential for sedimentation impact from the scouring effects of flowing stream waters against banks and greater carrying capacity of sedimentation by streams. This may increase the need for dredging of sediments from dams or increased filtration requirements for drinking water supply. Roads in close proximity to streams have increased risk in the introduction of sedimentation and fines into stream channels. Paved roads may contribute water quality problems from oils from passing cars and the increased risk of accidents due to higher speed limits where cars, trucks, or tractor trailers may contribute the release of harmful liquids into nearby streams.

WP(3) How does the road system affect access to hydroelectric power generation?

There is no hydroelectric power existing or planned.

Special Forest Products (SP)

SP(1): How does the road system affect access for collecting special forest products?
The current maintenance level 3 and 4 road system provides adequate access for collecting special forest products such as mushrooms, seed cones, transplants, Christmas trees, firewood, etc. If road closure or seasonal closure is considered in a project or watershed analysis, access for special forest products will be considered.

Special-Use Permits (SU)

SU(1): How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)?

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General Public Transportation (GT)

GT(1): How does the road system connect to public roads and provide primary access to communities?

County roads, U.S. and State highways give communities, tourists, and industries access to the National Forest. These roads connect to arterial, collector, and some local FS roads, where traffic is dispersed into the Forest for a variety of uses. Some county roads and state highways traverse into or through the National Forest, as shown on the maps, and listed in the tables.

Roads included in this analysis include the following jurisdictions; County, State, Private and Forest Service.

National Forest system roads connect to numerous public roads managed and operated by the U.S. Department of Transportation, Arizona Department of Transportation, and numerous county governments. Forest Service jurisdiction roads create the sole or primary access to many parcels of private land within the Forest Boundary. No Forest Service jurisdiction roads serve as the primary through-routes that connect the larger communities.

Cooperative maintenance agreements between the Counties and FS help to address our combined road maintenance needs. When larger developments or subdivisions occur and inholding traffic is expected to exceed that generated by the users of the National Forest, agency policy is to pursue turning jurisdiction of the Forest road over to another public road authority such as the county or state.

Traditional road access to the National Forest is being lost by lack of legal right of way through private lands within the Forest. This issue is expected to grow as private land parcels change hands and use of the roads increases. The Forest Service negotiates with landowners to gain public access with varied result. Where these roads create access that is of interest to the County, they may assert jurisdiction and public right-of way on the road, but that is uncommon, even on roads that have been maintained by the County under cooperative agreement.

As population increases, recreation and commercial use of the road system is also expected to increase.

These roads and others are important to and used by smaller communities around the Forest. Many people in these communities rely on access to the Forest for their livelihood as well as for recreation. The Forest is important for recreation, ranching, and mining.

GT(2): How does the road system connect large blocks of land in other ownership to public roads (ad hoc communities, subdivisions, in holdings and so on)?

The amount and dispersion of private and other ownership lands vary across the five Districts. Private lands are widely interspersed with National Forest land. In addition to private ownership, CNF lands are bordered by or surround lands of the National Park Service, Bureau of Land Management, State of Arizona, State of New Mexico, the Department of Defense and

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municipalities.

Much of the private lands are accessed by arterial and collector public roads. However, some are accessed by lower standard local FS roads and some by no roads at all. Access needs to inholdings are addressed on an individual basis as requests are received. Forest Service policy is that access will be provided to a level that is reasonable and suitable for the uses occurring on the land. When landowners desire access, they are asked to apply for a special use or road use permit. The application is then analyzed through the NEPA process to determine possible environmental effects and the level of reasonable access required. When subdivision occurs on larger private parcels, the Forest policy is to request the landowners to create an association or some type of consolidated organization to represent all of the landowner interests. This eliminates the need for the Forest to enter into road use or special use permits with each individual landowner. Responsibilities for improvements and maintenance should be determined through a commensurate share process. If access is being provided by a public road agency such as the county or state, then the Forest Service may not be obligated to provide any additional access over federal lands. When larger developments or subdivisions occur and inholding traffic is expected to exceed that generated by the users of the National Forest, agency policy is to pursue turning jurisdiction of the Forest road over to a public road authority such as the county or state.

GT(3): How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS 2477, cost-share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements?

The amount of private land inside or bordering the CNF and pattern of population growth indicate a need to increase road management cooperation, and refine road jurisdictions and maintenance responsibilities.

Many roads on the CNF call for a higher level of maintenance and construction for the private lands that they access. Use and management of the CNF often requires only access by high clearance vehicle, while access to private lands may dictate a need for passenger car access.

Numerous roads crossing the National Forest fall under the jurisdiction of State, County or private organizations. When desirable, cooperative agreements should be established to share road improvement and maintenance responsibilities when all partners can benefit.

The Forest Service, Federal Highway Administration and the Arizona State Department of Transportation have Memorandum of Understanding (MOU). This document set forth general procedures for planning, programming, environmental studies, design, construction and maintenance of highways.

Coronado National Forest has cooperative road maintenance agreements with two of the six counties that it lies in. These agreements need to be revisited and revised as they are dated. Agreements need to be drawn up with counties where none exist.

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The CNF has several road use and maintenance agreements with special use permit holders and private landowners on the Forest.

Rights of access by law, reciprocal rights, or easements are recorded in Forest files and county courthouse documents. The Forest recognizes these rights and works with the owners to preserve access while protecting the natural resources and facilities on adjacent National Forest Lands. There is also an understanding by the Forest Service that individuals or entities may have established valid rights, unknown to the Forest Service at this time, to occupy and use National Forest lands and roads. The courts have established that such valid outstanding rights may be subject to some federal regulation. See *Sierra Club v. Hodel,* 848 F 2d. 1068 (10 th Circuit, 1988). This analysis recognizes that such valid outstanding rights may exist and the Forest Service will certainly honor such rights when it is subsequently determined that the specific facts surrounding any claim to such rights meet the criteria set forth in any respective statute granting such occupancy and use (see *Washington County v. The United States,* 903 F. Supp. 40 [D. Utah, 1955]).

GT(4): How does the road system address the safety of road users?

In 1975, the Forest Service developed a Memorandum of Understanding with the Federal Highway Administration that required the Forest Service to apply the requirements of the National Highway safety program, established by the Highway Safety Act, to all roads open to public travel. In 1982, this agreement was modified to define "open to public travel" as "those roads passable by four-wheeled standard passenger cars and open to general public use without restrictive gates, prohibitive signs…" Most roads maintained at level 3, 4, and 5 meet this definition. Design, maintenance, and traffic control on these roads emphasizes user safety and economic efficiency.

The largest proportion of road maintenance and improvement funds allocated to the Forest is spent on these higher standard roads. Safety work such as surface maintenance, roadside clearing and installation and maintenance of warning and regulatory signs are performed on an annual basis. Traffic control signing follows standards set forth in the Manual on Uniform Traffic Control Devices (MUTCD).

Road condition surveys conducted in 1999 through 2002 reveal a total maintenance backlog of $8.45 million, $2.31 million of that is critical health and safety items on ML 3,4 and 5 roads. The condition surveys document a need of about $5.18 million annually to maintain all roads in the CNF system, of this $1.09 million is safety related. This data is being refined every year though verification efforts. INFRA cost estimates are being refined and updated using Regional Cost Guides. As work continues these estimates will become more refined. However, Coronado records over the past 7 years indicate that our road surface reconstruction program using the mobile crusher and roto-trimmer, is approximately 10% of the costs calculated in INFRA using contractor estimates ($5K/mile versus $50K/mile). Our unique ability to reconstruct at far lower cost suggests that our road maintenance budget is close to meeting Forest needs for Annual Maintenance. Annual funding for road maintenance on the CNF ranges from about $600,000 to $800,000. Addressing maintenance backlogs (Deferred

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Maintenance) will require additional funding or more efficient strategies, such as the Public Forest Service Road Program.

When accidents occur on Forest roads, often the Forest Service may not be immediately informed. Accidents are usually reported to the local sheriff or state patrol, if reported at all. When the Forest becomes aware of an accident, an investigation is initiated to attempt to identify the cause. If a feature of the road is found to be unsafe, addressing the condition becomes a high priority. Presently, there is no comprehensive program on the Coronado National Forest for identifying or tracking accident locations and for maintaining surveillance of those locations having high accident rates or losses as is required by Highway Safety Act. The Forest needs to address this area of non-compliance.

With increased use by more urbanized visitors, expectations have changed. Forest users expect to be safe, to have ready access to emergency medical services and evacuation routes.

Administrative Use (AU)

AU(1): How does the road system affect access needed for research, inventory, and monitoring?

On all five districts of the Coronado, the road system appears to provide adequate access for research, inventory, and monitoring.

AU(2): How does the road system affect investigative or enforcement activities?

The level 3, 4, and 5 road system on the Coronado Forest generally provides good access for investigative and enforcement activities. These roads provide access to developed and dispersed recreation sites where many common violations occur. These roads also provide access to the many developed trailhead-parking areas for the trail system that provides backcountry access. While the road system provides access to perform investigative and enforcement activities, it also provided access for increasing public use of the National Forest System lands, hence, the Forest is experiencing an increase of criminal activities. Border issues put added pressure on forest roads as the roads are used for illegal trafficking of narcotics and undocumented workers entering the country. Border patrol needs are requiring more roads than are part of our system and requiring some roads be maintained at higher level than our management needs.

Protection (PT)

PT(1): How does the road system affect fuels management?

Road maintenance levels 3, 4 and 5 in this analysis generally provide adequate access to the majority of the fuels management activity areas. Maintenance level 2 is the minimum required for the majority of our fuels management activities. To access areas for efficient fuels management, roads closed occasionally are opened for limited access to complete the project. Many of the most critical fuels management project areas are in the Wildland Urban Interface

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(WUI), and access to these areas is gained through private lands. Road use agreements with private lands owners are negotiated on a project-by-project basis.

PT(2): How does the road system affect the capacity of the Forest Service and cooperators to suppress wildfires?

In current drought conditions, minimizing response time to suppress wildland fires is very important in reducing the size of the burned area and resource damage. Road conditions affect the response times to wildland fires and wear and tear on the suppression equipment.

Areas of the Coronado adjacent to private lands have only one access route (dead end road). It is possible that a wildfire burning close to these single access routes could delay response times to the area or prevent a more aggressive response, resulting in a longer duration fire, with potential of increased resource damage. Additionally, in the event of an evacuation, a single access area may delay the suppression action and increases risk to firefighters, the public, and structures.

PT(3): How does the road system affect risk to firefighters and to public safety?

Condition and access of the road system determines risk to firefighters and to the public.

Coronado jurisdiction roads provide the main access to several occupied private lands. Fire location, rate of spread, direction of travel, and inadequate road conditions combine to create a dangerous situation for the safety of occupants of private lands and the firefighters responding.

Evacuation routes for growing communities can be provided by existing or new roads on the Coronado. These roads need to be in such condition that a passenger car can travel over them without damage, but may also be classified as maintenance level 1 (closed). Example of this are the community of Madera Canyon, which is limited to a single access, and Turkey Flat, Summerhaven, and other areas on the Coronado where the evacuation routes could be accomplished by improving existing roads.

PT(4): How does the road system contribute to airborne dust emissions resulting in reduced visibility and human health concerns?

Unpaved roads whether native soil or graveled can contribute airborne dust during times of dry weather conditions, especially during extended drought periods. Dust emissions also increase with traffic and vehicle weight. Winds can pick up fine dust from unpaved roads and release them whenever winds die out. Winds can also transport fine dust at appreciable distances close to active road use areas such as nearby resident houses or campgrounds affecting those who are particularly sensitive to the fine dust. Reduced visibility may result from unpaved roads, especially graveled roads, during windy periods. Higher road density values of graveled roads have the potential to reduce visibility and, in some cases, increase health concerns in localized

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areas.
Some FS jurisdiction roads on the CNF also provide primary access to private land. With subdivision of these lands, traffic may increase significantly on these Forest roads, increasing the dust emissions. Dust emissions can be reduced with dust abatement, or paving unpaved roads.

Recreation

Unroaded Recreation (UR)

UR(1): I s there now or will there be in the future excess supply or excess demand for unroaded recreation opportunities?

The Coronado National Forest established existing and desired recreation opportunity spectrum (ROS) conditions for the Forest in 1999. Several significant factors were identified during this process. First, most existing unroaded areas are unroaded due to steep, inaccessible terrain. These unroaded areas will most likely remain so. Second, the Forest has an acceptable existing ROS condition. This means that an appropriate ratio of primitive and semi-primitive non-motorized (unroaded) areas in relationship to semi-primitive motorized, roaded natural, rural and urban (roaded) areas currently exists on the Forest. Recreation planners consider the existing condition to be the desired condition, also. This also supports the premise that presently unroaded areas will remain unroaded, and roaded areas will remain roaded. As populations of surrounding communities increase, the demand for both roaded and unroaded recreational experiences will increase, while the Forest ROS condition (supply) will remain the same. At some time in the future, there most likely will be an excess demand for unroaded opportunities.

UR(2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded recreation opportunities?

The Coronado National Forest established existing and desired recreation opportunity spectrum (ROS) conditions for the Forest in 1999. Several significant factors were identified during this process. First, most existing unroaded areas are unroaded due to steep, inaccessible terrain. These unroaded areas will most likely remain so. Second, the Forest has an acceptable existing ROS condition. This means that an appropriate ratio of primitive and semi-primitive non-motorized (unroaded) areas in relationship to semi-primitive motorized, roaded natural, rural and urban (roaded) areas currently exists on the Forest. Recreation planners consider the existing condition to be the desired condition, also. This also supports the premise that presently unroaded areas will remain unroaded, and roaded areas will remain roaded. As populations of surrounding communities increase, the demand for both roaded and unroaded recreational experiences will increase, while the Forest ROS condition (supply) will remain the same. At some time in the future, there most likely will be an excess demand for unroaded opportunities.

UR(3): What are the adverse effects of noise and other disturbances caused by

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developing, using, and maintaining roads, on the quantity, quality, and type of unroaded recreation opportunities?

Unroaded areas, as defined by the ROS spectrum, have a built-in buffer that mitigates the effects of dust, noise, and associated travel conditions. Areas that are designated primitive or semi-primitive non-motorized would not be affected directly or indirectly by roads.

UR(4): Who participates in unroaded recreation in the areas affected by constructing, maintaining, and decommissioning roads?

Most unroaded areas are so because of steep terrain. These areas are almost always the steep and rugged canyons, ridges, crests, and wilderness areas of the Forest. Most users are backcountry hikers, backpackers, hunters, wildlife viewers, and others who invest the time and energy to get into remote areas. The National Visitor Use Monitoring project conducted in the Coronado National Forest between October, 2000, and September, 2001, estimated that, of the approximately 2.8 million site visits in the national forest during that 12-month period, approximately 0.4 million of those visits were to a wilderness area. Of the remaining 2.4 million site visits, an undetermined portion were to unroaded non-Wilderness areas of the Forest, known as "general forest areas." Because the Coronado National Forest is not building roads in unroaded areas, these users are not being affected.

UR(5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

Backcountry visitors to the Forest have strong attachments to the unroaded places. The "sky island" character of the Forest also heightens the appreciation that visitors feel, since the mountains and canyons afford such dramatic contrast in scenery and climate from the surrounding desert areas. No other high elevation, remote areas occur in southeastern Arizona besides the sky islands of the Coronado NF, Saguaro National Park, and Chiricahua National Monument.

UR(6): How is developing new roads into unroaded areas affecting the Scenic Integrity Objective, SIO(s)? Note: Some forests are still using the Visual Management System (VMS). If that is the case, substitute Visual Quality Objective (VQO) for SIO. (Region 2 added this question. There is no corresponding National direction).

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Road-Related Recreation (RR)

RR(1): Is there nor or will there be in the future excess supply or excess demand for roaded recreation opportunities?

Refer to Question UR (1) above. Little new road construction is expected to occur on the Forest to change unroaded areas to roaded areas. This means that as populations of surrounding communities increase, the supply of roaded recreation opportunities will remain the same. There will be an excess of demand for roaded recreation opportunities in the future.

RR(2): Is developing new roads into unroaded areas, decommissioning of existing roads, or changing maintenance of existing roads causing substantial changes in the quantity, quality, or type of roaded recreation opportunities?

New road construction in roaded areas on the Forest has been minimal in recent years. Most decommissioning of roads to occur on the Forest will occur in areas where the road densities do not conform to the Forest plan. This will not significantly change the roaded recreation opportunities, as access will still occur by other nearby roads. Improvements in maintenance, especially on level 3 roads that have deteriorated to level 2 condition, have, in a few situations, brought about increased use of already roaded recreational areas. The Forest has developed an innovative system utilizing specialized equipment that crushes and planes bedrock in place. This has had a profound effect in stabilizing erosion and minimizing road maintenance. This equipment is used on existing roads and has improved access to roaded recreation areas for some visitors who otherwise would not attempt the roads.

RR(3): What are the adverse effects of noise and other disturbances caused by constructing, using, and maintaining roads on the quantity, quality, or type of roaded recreation opportunities?

In the arid Southwest, a big issue is dust abatement. Road speeds are usually slow enough to minimize the effects of excessive noise. Road maintenance is intermittent, is usually performed during weekdays, and has little effect on recreation use, which is highest on weekends.

RR(4): Who participates in roaded recreation in the areas affected by road construction, changes in road maintenance, or road decommissioning?

Many recreational activities are based on traveling. The Forest has a significant number of visitors who drive for scenic pleasure. Much of the driving occurs on level 3, 4 and 5 roads. OHV enthusiasts use many of the level 2 and 3 roads throughout the Forest. Nearly all visitors to the Forest must use a vehicle to access the Forest in some way or another. Hikers, backpackers, and wilderness explorers use roads to access the trailheads, and picnickers and campers use roads to get to developed facilities. The National Visitor Use Monitoring project conducted in the Coronado National Forest estimated that, of the approximately 2.8 million site visits in the national forest during a 12-month period in 2000-2001, approximately 2.4 million site visits were to areas outside of designated Wilderness. Road construction and

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decommissioning have not been occurring to any appreciable extent, so visitors are not affected by those activities. As road maintenance improves, recreation visitors have better access to roaded areas.

RR(5): What are these participants' attachments to the area, how strong are their feelings, and are alternative opportunities and locations available?

"Arizona Trails 2000," the State Motorized and Nonmotorized Trails Plan (Arizona State Parks, Oct. 1999), provides information and recommendations to guide Arizona State Parks and other agencies in Arizona in their management of motorized and nonmotorized recreational trail and road resources. A survey of 10,000 adult Arizona residents and a series of sixteen public workshops were conducted. Not surprisingly, the priority recommendations for motorized trail users included the preservation of existing trails and protecting access to them. Recreation visitors who are not off-highway vehicle users but who need roads to get to areas in the national forest for recreation also want those areas to remain open. If roads were decommissioned or maintenance levels reduced, alternative locations and opportunities would be available in southern Arizona, but the recreation experiences would be different.

Passive-Use Value (PV)

PV(1): Do areas planned for road constructing, closure, or decommissioning have unique physical or biological characteristics, such as unique features and threatened or endangered species?

Most of the roads on the Coronado National Forest pass through or near one or more of the habitats of federal endangered or listed species, Forest sensitive species, riparian areas or other unique biological or physical features. No plans for road construction, closure or decommissioning are being considered at this time. If any of these activities are planned for the future the unique biological or physical features will be evaluated.

PV(2): Do areas planned for road construction, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance?

PV(3): What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for area planned for road entry or road closure?

PV(4): Will constructing, closing, or decommissioning roads substantially affect passive-use value?

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Social Issues (SI)

SI(1): What are people's perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

The maintenance level 3, 4 and 5 roads in this analysis serve as general access to "areas" that lead to maintenance level 1 and 2 roads that are adequate for management and administration of special use permits.

SI(2): What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?

People's needs and values for access are diverse. It ranges from people who want to be able to access all areas of the National Forest on motorized vehicles to people who want no (human) access at all. Most people's needs or values fall somewhere in the middle, valuing a mix of motorized and non-motorized access. Many people hold deep and strong feelings about roads and road management. Change in road management is often upsetting to some people if it results in a change in any one's previous behavior.

SI(3): How does the road system affect access to paleontological, archaeological, and historical sites?

The existing road system of the Coronado National Forest increases access to both identified and unidentified paleontological, archaeological, and historical sites. Increased or improved access occasionally results in vandalism, illegal collection activities, and illegal excavation of paleontological, archaeological, and historical resources. Conversely, the road system also provides increased access for archaeologists who transport materials used in the documentation and preservation of cultural resources.

SI(4): How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites) and American Indian treaty rights?

The road system of the Coronado National Forest provides many opportunities for gathering traditional forest resources, such as acorns, manzanita branches, leaves, berries, mushrooms, bear grass, and fuelwood. In early historic times, the mountains of southeast Arizona were used by the Sobaipuri, Tohono O'Odham, and other Piman groups and by the Western and Chiricahua Apache, for plant collecting, hunting, and refuge. Current Native American use of the Forest appears limited.

SI(5): How are roads that constitute historic sites affected by road management?

Several roads within the Coronado National Forest have been recorded as historic sites, having been constructed over 50 years ago. Many of these roads were originally constructed to provide access to various activity areas, such as mines, mills, businesses, and houses. Some of these roads have been maintained through the years and are currently used as Forest Roads.

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Other historic roads have been razed, abandoned, used in part, or completely realigned in an adjacent location. Road management within existing alignments helps to preserve the integrity of location and use of historic roads, which is used in determinations of eligibility for inclusion on the National Register of Historic Places. Therefore, road management can have either adverse or positive effects on historic road sites.

SI(6): How is community social and economic health affected by road management (for example, lifestyles, businesses, tourism industry, infrastructure maintenance)?

Road management is subtle, yet necessary to forest management. Use of the Coronado National Forest is dependent on proper, timely road management. Commodity users rely on the existing road system, just as pleasure seekers do. For many communities in the West, the road system is the backbone of commerce, providing for the movement of products, services, and people through the Forest. Most of the roads on the Forest were built to facilitate log hauling or accessing homesteads. Today, recreation traffic is added to the importance of these roads.

Access to the CNF by tourists is an amenity advertised by the chamber of commerce departments of local communities and is important to economic health. Recreation traffic includes local and non-local users, many of whom are sight seeing. Across the National Forest system, managers have indicated that nearly 40% of Forest use is by people who never get out of their vehicles.

In addition to increasing uses, the demographics in the U.S. indicate an ever-increasing urban population (NRSE 2001). These travelers expect to go long distances in short amounts of time and to be able to get through the Forest in comfort. With the exception of state highways, the only paved roads on the Forest are in association with developed recreation sites. Maintenance is increasingly important to facilitating the demands of these users, who are replacing commodity production in the overall economic health of the local communities.

SI(7): What is the perceived social and economic dependency of a community on an unroaded area versus the value of that unroaded area for its intrinsic existence and symbolic values?

Unroaded areas within the Coronado National Forest have a variety of social values. Some people value natural resources existing in unroaded areas for the economic contribution that could be afforded by their extraction such as timber, minerals, and roaded access. Other people value roadless areas for the contributions they provide in an undeveloped state such as increased solitude, quiet, and refugia for plants and animals.

SI(8): How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

Possible effects are dust and unauthorized motorized use facilitated by the road system. There is no information that shows the maintenance level 3-5 roads have any effect on wilderness

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attributes.

SI(9): What are traditional uses of animal and plant species in the area of analysis?

Use of animal and plant species on the Coronado National Forest dates back to hunters and gathers that occupied these areas. Evidence of hunting and gathering camps is common throughout the forest. Hunter-gatherer groups used upland and riparian areas where they could find a variety of edible plants and wildlife habitats within a relatively small area. With the advent of more permanent settlements and the advent of agriculture, people supplemented their crops by hunting local game.

SI(10): How does road management affect people's sense of place?

People's sense of place is directly tied to the aspects of an area, including the area within a road corridor, that invoke a special feeling or attachment to the area. Factors include the area's vegetation, the amount of sunlight available, the views, the solitude, the opportunities that make it a destination, and the overall familiarity. The road itself facilitates a person's enjoyment of the area by providing for driving comfort, the amount and type of use, and any number of aesthetic attributes visible alongside the road. These attributes are directly related to road management. Any change in road management of the development of a road without taking these things into consideration will create a change in current use.

Examples of these effects include those used in the discussion in recreation. If a road is managed as a Level 3 and the decision is made to upgrade it, more and different users might begin to use the area. This will change the character for users who consider the area to be special; it will change their experience and may displace current users to other areas for their recreation. Likewise, if a road is currently managed as a Level 5 and the decision is made to downgrade maintenance, the road will not be drivable, and the area becomes inaccessible for some current users. This problem is especially evident for the elderly, a group that has used the area for years. Rough roads are hard on bones, and users have to be considered in these decisions. Because a variety of different people use the existing road system, they need to be considered before changing road management.

This question is best answered at the watershed scale.

SI(11): How does road location and road maintenance affect historic sites? (question added by the Forest)

Forest roads often pass through cultural resources resulting in direct impacts to both prehistoric and historic sites. Road maintenance within the boundary of cultural sites has the potential to directly affect these resources; conversely, the lack of maintenance within site boundaries can also result in site damage due to water erosion.

Civil Rights and Environmental Justice (CR)

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CR(1): How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?

The road system is used by all groups of people. There is a lack of known data to document effects of different groups of people. It is possible that closing a road, if it is then used (legally or illegally) a motorized trail, provides forest access to people with more disposable income. Low income groups who can not afford to have and use recreational motorized all-terrain vehicles (ATVs) will not enjoy this same level of access to the Forest.