

**Sam Houston National Forests
USDA Forest Service
Southern Region**

**Boswell Creek Watershed
Roads Analysis Report**

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Vicinity Map - Hard copy available upon request.

Boswell Creek Watershed Roads Analysis Report

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Boswell Creek Watershed Roads Analysis Report

Background

In August 1999, the Washington Office of the USDA Forest Service published Miscellaneous Report FS-643 Roads Analysis: Informing Decisions About Managing the National Forest Transportation System. The objective of a roads analysis is to provide decision makers with critical information to develop road systems that are safe and responsive to public need and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land and are in balance with available funding for needed management actions.

On January 12, 2001, the National Forest System Road Management Rule was published in the Federal Register. The adoption of the Final Rule revised the regulations concerning the management, use, and maintenance of the National Forest Transportation System.

The purpose of this roads analysis is to provide Line Officers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

A roads analysis is developed through a six-step process designed to be sequential with possible feedback and iteration over time as the process matures. The process provides a set of possible issues and analysis questions for which the answers can help managers make choices about road system management. The following are the six steps:

1. Setting up the analysis.
2. Describing the situation.
3. Identifying issues.
4. Assessing benefits, problems and risks.
5. Describing opportunities and setting priorities.
6. Reporting.

Step 1. Setting Up the Analysis

Scope

On August 22, 2002, President Bush announced the Healthy Forest Initiative (HFI) for Wildfire Prevention and Stronger Communities. The Healthy Forest Initiative implements core components of the consensus 10-year Implementation Plan agreed to by States, Tribes, and Stakeholders. These proposed treatments further the goals of the President's Initiative. They will reduce the threat of catastrophic wildfires to protect communities, firefighters, and wildlife and forest health. The Boswell Creek Watershed on the Sam Houston National Forest (NF) is a part of that Initiative. Our analysis will cover approximately 15,155 acres within the project.

The Sam Houston NF is proposing management activities in Compartments 69, 70, 72, 73, 74, 75, 76, 77, and 83 in the Boswell Creek Watershed. The proposed management activities are consistent with management direction in the 1996 Revised Land and Resource Management Plan (the *Plan*). The proposals are to:

1. Implement dormant and growing season prescribed burning on approximately 9,000 acres every 2-5 years to reduce risk from destructive fires.
2. Thin approximately 4895 acres of pine stands to reduce Southern Pine Beetle (SPB) hazard.

This is a watershed scale analysis for the Sam Houston NF. Although Maintenance Level (ML) 3, 4 and 5 roads are considered in the analysis, this report will concentrate on ML-1 and 2 roads. Maintenance Level 3, 4 and 5 roads are addressed in the Forest Scale Roads Analysis.

Per Forest Service Manual (FSM) 7712.12b (Road Management Project Planning), three types of road activities require a roads analysis: a) new road construction; b) road reconstruction; and c) road decommissioning. Implementation of road maintenance activities does not require a roads analysis before proceeding.

This analysis is being done to provide supporting information for the analysis of a proposal for hazardous fuels reduction and integrated pest (SPB hazard reduction) management activities within this project area.

Key Analysis Recommendations

1. Reconstruct or improve:
 - A. 22.47 mile of maintenance level 3 roads
 - B. 4.61 miles of maintenance level 2 roads
 - C. 10.34 miles of maintenance level 1 roads

Reconstruction or road improvement can be accomplished by pre-project maintenance or specified road reconstruction. See Appendix A for a list of those roads

2. Add to the road system 7.80 miles of unclassified roads. These roads will require improvement prior to project implementation. See Appendix E for a list of those roads.
3. Decommission 6.33 miles of unclassified roads. See Appendix E for a list of those roads.
4. Decommission existing roads 200G and 200S. Decommission road 206A from milepost 3.41 to 4.10. Decommission 0.46 miles of Rd. 213 from milepost 3.00 to 3.46.

Objectives

The general objective of this roads analysis is to provide the Line Officer with critical information to develop road systems that are safe and responsive to the public's needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land and are in balance with available funding for needed management actions.

The main objectives of this road analysis are to:

- Identify the need for changes by comparing the current road system to the desired conditions.
- Inform the Line Officer of important ecological, social, and economic issues related to roads within the analysis area.
- Identification of needed and unneeded roads.
- Identification of site-specific priorities and opportunities for road improvements and decommissioning.
- Identification and disposition of unclassified roads.

Interdisciplinary Team (IDT) Members/Participants and their duties are:

- | | |
|--------------------|---------------------------|
| 1. Keith Baker | NEPA Planner |
| 2. Steven Lewis | Transportation Planner |
| 3. Cheryl Prewitt | Silviculturist |
| 4. Glenn Elms | Silviculturist |
| 5. Cheryl Wagley | Engineering Technician |
| 6. Duane Wiechman | Timber Sale Administrator |
| 7. Craig Wheeler | Forestry Technician |
| 8. Rodney Peters | Soil Scientist |
| 9. Dave Peterson | Fisheries Biologist |
| 10. Bill Floyd | Watershed Specialist |
| 11. John Ippolitto | Archaeologist |

- 12. Nancy Snoberger Landscape Architect
- 13. Eddie Taylor Wildlife Biologist
- 14. Dawn Carrie Wildlife Biologist

Step 2. Describing the Situation

Existing Road System Conditions

The *Plan’s* Final Environment Impact Statement (FEIS) says, “With State, County, and Forest Service routes, a transportation system now exists that meets the need for access into most areas.... The local road system is still being developed in response to various resource needs including timber harvest, minerals management, and recreation development.”

Local roads exist in a variety of conditions ranging from recently constructed roads to primitive roads. This includes roads that existed prior to Forest Service acquisition and those developed over the years to various standards. Many roads exist at a standard that is not appropriate for its intended use. Reconstruction will be recommended for these roads. Those roads identified as not being needed for site-specific resource management at any time now and in the future, will be recommended for decommissioning.

This analysis used existing sources of information specifically Infrastructure (INFRA) tabular reports, Geographic Information System (GIS) maps, and meetings with district personnel. Existing information was supplemented by on-site visits. Table 1 displays the miles of Forest Service roads in the Boswell Creek Watershed.

Table 1. Miles of Forest Service Roads

| | Total Road Miles | Open Road Miles |
|---------------------------|------------------|-----------------|
| Forest Service | 40.01 | 16.97 |
| Unclassified Roads | 16.07 | - |
| Combined | 56.08 | 16.97 |

Unclassified roads are roads that are not constructed, maintained or intended for long-term highway vehicle use, such as roads built for temporary access and other remnants of short-term-use roads associated with fire suppression; timber harvest; and oil, gas, or mineral activities; as well as travel-ways resulting from off-road vehicle use. See Appendix E for a list of unclassified roads.

A **classified** road is a road constructed or maintained for long-term highway vehicle use. Classified roads may be public, private, or forest development.

A **public** road is a road open to public travel under the jurisdiction of and maintained by a public authority such as states, counties, and local communities.

A **private** road is a road under private ownership authorized by an easement to a private party, or a road that provides access pursuant to a reserved or private right.

A **Forest Development Road (FDR)** is a road wholly or partially within or adjacent to a national forest boundary and necessary for protecting, administering, and using national forest lands, which the Forest Service has authorized and over which the agency maintains jurisdiction.

Temporary roads are authorized by contract, permit, lease or other written authorization, or emergency operation, not intended to be a part of the forest transportation system and not necessary for long-term resource management.

Collector roads are typically two-lane gravel roads connected to state highways or public highways.

Local roads connect facilities or activities (e.g., compounds, trailheads and logging sites) with collector roads, state roads or highways. Most local roads are built for high clearance vehicles. To protect the public and/or the environment and to reduce maintenance costs, local roads may be closed to traffic or obliterated after the principal use is completed. In addition, timber purchasers may build temporary road to meet their needs for harvesting and removing timber. Table 2 displays the miles of Forest Service roads in the Boswell Creek Watershed by Functional Classification.

Table 2. Miles of Forest Service Roads by Functional Classification

| Functional Classification | Miles |
|---------------------------|-------|
| C- Collector | 6.66 |
| L- Local | 33.35 |
| Total | 40.01 |

Table 3 displays how the roads in the project area are currently being maintained. This operational maintenance level is divided into five levels.

Table 3. Miles of Forest Service Roads by Operational Maintenance Level

| Operational Maintenance Level | Miles |
|------------------------------------|-------|
| 1- Basic Custodial Care (Closed) | 12.24 |
| 2- High Clearance Vehicles | 5.30 |
| 3- Suitable for Passenger Cars | 22.47 |
| 4- Moderate Degree of User Comfort | 0 |
| 5- High Degree of User Comfort | 0 |
| Total | 40.01 |

Closely related to operational maintenance level, is the type of surfacing found on forest roads. All Level 5 roads have a paved or bituminous surface, while the majority of Level 2 roads are surfaced with native materials. Level 3 roads have a variety of surfaces, but are predominately aggregate surfaced. Table 4 displays the miles of Forest Service roads in the Boswell Creek Watershed by Surfacing Type.

Table 4. Miles of Forest Service Roads by Surfacing Type

| Surface Type | Miles |
|----------------------------------|-------|
| AGG- Crushed aggregate or gravel | 18.37 |
| BIT- Bituminous Treatment | 0 |
| CON - Concrete | 0 |
| IMP- Improved Native Material | 8.64 |
| NAT- Native Material | 13.00 |
| P- Paved | 0 |
| Total | 40.01 |

Another way to consider the road system in the project area is by Traffic Service Level. Traffic Service Levels describe a road's significant traffic characteristics, such as speed, travel time, traffic interruptions, freedom to maneuver, safety, driver comfort, convenience. These characteristics, in turn, influence the road's design, operating conditions, and maintenance. Table 5 displays the miles of Forest Service roads in the Boswell Creek Watershed by Traffic Service Level.

Table 5. Miles of Forest Service Roads by Traffic Service Level

| Traffic Service Level | Miles |
|-----------------------------------|-------|
| A- Free Flowing Mixed Traffic | 0 |
| B- Congested During Heavy Traffic | 0 |
| C- Flow Interrupted – Use Limited | 14.77 |
| D- Slow Flow or May Be Blocked | 25.24 |
| Total | 40.01 |

The open road density for Forest Service land is comparable to other watersheds across the forest.

The Forest Service road system is planned, operated and maintained on the basis of Road Management Objectives (RMO) established for each road. Road Management Objectives (RMOs) are based on resource management objectives and user needs, approved by Line Officers and provide the basis for the planning, construction, reconstruction, operation and maintenance of roads. Road Management Objectives establish the specific standards of a road, based on resource management needs as determined through land and resource management planning and user needs and contain design criteria for planned roads as well as operation and maintenance criteria for existing roads.

The RMO establishes how we will endeavor to manage a road in the future. The objectives are based upon resource management needs. There are four generic RMOs that have been established by the Forest. However, a RMO is developed for each road based on site-specific resource requirements and may differ from generic RMO standards. The generic RMO is based on the maintenance level of the road. See Appendix F for the generic RMOs based on maintenance level.

Road Management Objectives (RMOs) will be reviewed and re-evaluated during this analysis.

Unless otherwise noted, the roads described in the following text are in good condition relative to their service level.

Level 5 Roads

Farm-to-Market (FM) 1375 and FM 2693 roads are Levels 5 roads that are not in the watershed, but are the main access routes to the watershed. Both roads are maintained by the State and are under State jurisdiction. The Forest Service would have no opportunity to conduct any management activities on these roads.

Farm-to-Market (FM) 1375 is a 15-mile double lane, asphalt-surfaced road under State jurisdiction and maintenance. It is a major arterial for the area. This road serves a variety of local and non-local traffic. In addition to use by locals for residential access, it is used for commercial timber harvest, and as the main access to the Bela Karolyi Gymnastics Camp.

The other arterial, FM 2693, is 6-mile double lane, asphalt-surfaced road also under State jurisdiction.

Level 4 Roads

There are three Level 4 roads in the project area. Walker County 06 (WLK-06 or the Four Notch Road) is a double lane, aggregate and bituminous-surfaced road under Walker County jurisdiction. The Forest Service has entered into a Cooperative Agreement with Walker County that allows the Forest Service to conduct maintenance or reconstruction activities on the road to meet Forest Service objectives. The road is one of the main access roads to the watershed. At the present time, the road receives heavy use from tour buses going to the Bela Karolyi Gymnastics Camp. The road currently washboards severely and has some drainage problems.

Walker County 10 (WLK-10 also known as the Ray Thompson or Three Notch Road) is a double lane, aggregate and bituminous-surface road under County jurisdiction. It is one of the main access routes to the watershed and also one of the access routes to Forest Glen Church Camp. The road is under a Cooperative Agreement with the Forest Service. At present time, it has some ditch erosion problems. Sedimentation of wing and lead off ditches has occurred.

San Jacinto County 02 (JAC-02 or Pine Valley Road) is a double lane, aggregate-surfaced road under County jurisdiction. It is one of the main access routes to the southeast portion of the watershed.

Level 3 Roads

A Public Forest Service Road (PFSR) is a designated road under Forest Service jurisdiction that meets the definition of 23 United States Code (U.S.C.) Section 101. These roads will be open to public traffic on a regular and consistent basis and provide critical access to recreation sites and areas. The PFSR program estimates specific needs and funding for individual roads to bring the roads up to safe, environmentally sound standards. Roads 200, 206, 207, 213 and 223 in the watershed are potential PFSRs.

Road 200 is a single lane, aggregate-surfaced road under Forest Service jurisdiction. The road is six miles long. It is the primary access to the Bela Karolyi Gymnastics Camp and one of the main access routes to the watershed. The road receives heavy use (particularly during gymnastic competitions). Starting at the junction of FM 1375 and Four Notch Road to Boswell Creek

Bridge, the road washboards severely. The lack of ditches causes water to channel down the road resulting in a continual loss of surfacing. There is some ditch erosion creating creek sedimentation at Boswell and Briar Creek bridges. The road is a potential PFSR.

Road 206 is a single lane, aggregate-surfaced road under Forest Service jurisdiction. The road has wing and lead-off ditches that have silted up. It has had some loss of surfacing. Culverts have been damaged and silted. This road is a potential PFSR.

Road 246 is a double lane, aggregate-surfaced road under Forest Service jurisdiction. The county is the primary maintainer on this road.

Road 223 is a double lane, aggregate-surfaced road under Forest Service jurisdiction. The road has two large damaged culverts. Roadside and wing ditches channel into stream crossings creating erosion and gullies. Water begins head-cutting at wing ditches. The grade is a flat road with no drainage. It is open year round and available for hunter access. There is evidence of trash dumping at bridges and some turnout areas of woods roads. Milepost 0.90 (48-inch culvert) exhibited a degradation in water clarity and quality below the culvert as a direct result of trash and animal dumping. Excessive nutrients, toxic solvents, acid oils and structural impediments are some of the impacts resulting from household dumping.

Road 213 is a heavily used hunter camp road. Drainage problems keep water in the road. It is a special-use road to private property

Road 269 is a closed, single lane aggregate-surfaced road. At present, this road is in good condition. The road has one large creek crossing Briar Creek with a vented low water ford.

Road 207 is a double lane, aggregate-surface road. Roadside ditches and wing ditches channel into stream crossings.

Road 207A is a gated crowned and ditched road. It presently has aggregate and surfacing issues which create severe erosion and drainage problems. The road is listed as ML-3, Traffic Service Level D. A lack of cross drains and wing ditches has already resulted in the loss of one culvert. Water channels down the center of the road into culverts and wing ditches. It does not appear that the road is being maintained at its currently designated operational maintenance level.

Level 2 Roads

The following Level 2 roads are used by hunters, commercial loggers, sightseers, hikers, equestrian riders, and forest administration.

Road 2113 is a closed, crowned and ditched road. At milepost 0.70, the traveled way changes from crowned to dipped and drained.

Road 206A is a gated, crowned and ditched aggregate surfaced road. The road is opened during hunting season. The road is in good condition to rd. 2062. At 2062, the road becomes a two track woods road. The road has one major crossing at Briar Creek. It has various surfacing types including: Milepost 0.0-1.60 aggregate surfaced; Milepost 1.6-2.2 improved native material; Milepost 2.2-3.1 native material; and Milepost 3.1-4.4 improved native material. From Briar Creek to Road 206, 206A is incised with no way to relieve water. It appears that the road was used as a fire lane. The road parallels Briar Creek for 200 feet at a point within 20 feet of the creek and there are steep grade pitches.

Road 2061 is a dipped and drained, spot-surfaced road.

Road 207A1 is a crown and ditched aggregate-surfaced road. The road serves private property.

Roads 223A, and 2231 are drained and dipped, single lane roads with native surfacing.

Level 1 Roads

The following Level 1 roads are in the project area:

Roads 213B, 213D, 2086, 2231, 2232 and 2027, 2062 and 246A are grown up native surfaced roads.

Road 206B is a closed, aggregate-surfaced road. It is crowned and ditched. The wing ditches drain into stream crossings.

Roads 200A, 200B and 200J are closed, dipped and drained roads.

Road 2083 is a special-use road serving private property. The road is a crown and ditched aggregate-surfaced road with good drainage and surfacing.

Road 2071 is a dipped and drained road with no ditches.

Roads 213A, 2012, and 207A1 are crowned and ditched roads with spot surfacing.

In addition, the watershed has 16.07 miles of unclassified roads (see Appendix E). These are roads that could have existed prior to Forest Service acquisition or could have been temporary roads at one time. Most are two-track, grown up woods roads. This analysis will determine the future status of these roads. Decisions will be based on resource management objectives for these roads now and in the future, and a requirement for

implementing the project proposed for the watershed. The status of roads required for future resource management objectives will be changed from unclassified and an appropriate classification will be assigned. Unclassified roads not required for the current project or future activities will be recommended for decommissioning.

Step 3. Identifying Issues

Desired Road System Conditions

The desired conditions are to provide a road system that is safe, responsive to public needs, meets the needs for forest management, is affordable, and has minimal ecological effects.

The watershed is located in Management Area 2 (MA-2) and shown in the *Plan*. Standard MA-2-12 on page 103 of the *Plan* says,

“All system roads shall be planned, located, designed, constructed and reconstructed to provide the road density necessary to meet resource management and commodity production.”

Standard MA-2-13 says,

“Develop a total road density including temporary roads, for timber sales using a maximum skid distance of 1300 feet.”

For clarification, a system road is synonymous with a Forest Development Road (FDR).

Key Issues

The key issues related to road construction, relocation, decommissioning, closures, and other road management actions are:

- Improvement of access for local residents and water quality related issues.
- Providing a road system adequate for management while minimizing impacts to water quality.
- Improvement of fish passage habitat.
- Addressing sedimentation and erosion potential at stream crossings.

These issues arise from *Plan* direction. Forest-wide (FW) Standards and Guidelines pertaining to these issues are on page 61 of the *Plan*. They include:

FW-051 – Develop the Forest Road System, as needed, to respond to resource and travel management objectives while providing for the appropriate movement of people and products to and through the National Forest System lands.

FW-052 – Establish and maintain vegetative cover on slopes and areas outside the driving surface or trail head that were disturbed during road and trail construction and reconstruction activities.

FW-053 – Design and construct roads and trails to minimize siltation and maintain to provide surface water drainage away from streams and into vegetated buffer strips or other filtering system.

FW-055 – Provide road and trail design and construction that allows unrestricted fish passage.

FW-056 – Provide appropriate maintenance, operational management and reconstruction of existing dams, roads and trails.

FW-057 – Maintain Forest Development Roads to appropriate maintenance level standards for the planned use and traffic.

FW-058 – Obliterate existing roads not needed for current or future use and have vegetative cover reestablished on all disturbed soils.

Step 4. Assessing Benefits, Problems, Risks

Analysis Questions

| <p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions are better addressed in a Forest Scale Road Analysis. Those questions have been eliminated. Some of the remaining questions may not be addressed because they are irrelevant or are appropriate only if there are extraordinary issues specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p>Question</p> | <p>Relevant to this analysis area?</p> | <p>Specific to this analysis area?</p> | <p>Addressed in this Analysis?</p> |
|--|---|---|---|
| AQ (2): How and where does the road system generate surface erosion? | Y | Y | Y |
| AQ (4): How and where do road-stream crossings influence local stream channels and water quality? | Y | Y | Y |
| AQ(8): How and where does the road system affect wetlands (and riparian areas)? | Y | Y | Y |
| AQ(10): How and where does the road system restrict the migration and movement of aquatic organisms? What species are affected and to what extent? | Y | Y | Y |
| AQ (12): How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species? | Y | Y | Y |
| TW (1): What are direct effects of the road system on terrestrial species habitat? | Y | Y | Y |
| MM (1): How does the road system affect access to locatable, leasable, and salable minerals? | Y | Y | Y |
| WP (2): How does road development and use affect water quality in municipal watersheds? | Y | Y | Y |
| SP (1): How does the road system affect access for collecting special forest products? | Y | Y | Y |
| SU (1): How does the road system affect managing special-use permit sites (concessionaires, communications sites, utility corridors, and so on)? | Y | Y | Y |
| AU (2): How does the road system affect investigative or enforcement activities? | Y | Y | Y |
| 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 road-related recreation opportunities? | Y | N | N |
| RR (4): Who participates in roaded recreation in the areas affected by road constructing, changes in road maintenance, or road decommissioning? | Y | N | N |
| RR (5): What are these participants attachments to the area, how strong are their feelings, and are alternative opportunities and locations available? | Y | N | N |
| PV (1): Do areas planned for road building, closure, or decommissioning have unique physical or biological characteristics, such as unique natural features and threatened or endangered species? | Y | Y | Y |
| PV (2): Do areas planned for road building, closure, or decommissioning have unique cultural, traditional, symbolic, sacred, spiritual, or religious significance? | Y | Y | Y |
| PV (3): What, if any, groups of people (ethnic groups, subcultures, and so on) hold cultural, symbolic, spiritual, sacred, traditional, or religious values for areas planned for road entry or road closure? | Y | Y | Y |

| <p>Pages 25-30 of FS-643, Roads Analysis: Informing Decisions About Managing the National Forest Transportation System (FS-643) lists 72 questions to be used as a checklist to identify potential benefits, problems, or risks. Some of these questions are better addressed in a Forest Scale Road Analysis. Those questions have been eliminated. Some of the remaining questions may not be addressed because they are irrelevant or are appropriate only if there are extraordinary issues specific to the analysis area (some questions would be answered the same for any road or road system around the forest and are therefore beyond the scope of this analysis). This analysis will only address those questions that are both relevant and specific to the roads within the analysis area.</p> <p>Question (continued)</p> | <p>Relevant to this analysis area?</p> | <p>Specific to this analysis area?</p> | <p>Addressed in this Analysis?</p> |
|--|---|---|---|
| <p>PV (4): Will building, closing, or decommissioning roads substantially affect passive-use value?</p> | <p>Y</p> | <p>Y</p> | <p>Y</p> |
| <p>SI(3): How does the road system affect access to paleontological, archaeological, and historical sites?</p> | <p>Y</p> | <p>Y</p> | <p>Y</p> |
| <p>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?</p> | <p>Y</p> | <p>Y</p> | <p>Y</p> |
| <p>SI(6/7): How are community, social, and economic health affected by road management and management of unroaded areas (for example lifestyles, businesses, tourism industry, infrastructure).</p> | <p>Y</p> | <p>Y</p> | <p>Y</p> |
| <p>SI(9): What are traditional uses of animal and plant species in the area of analysis?</p> | <p>Y</p> | <p>N</p> | <p>N</p> |

Questions from the preceding tables that are both relevant and specific to the roads in this analysis area are discussed below.

AQ2: Native surfaced roads or roads that receive inadequate maintenance may develop ruts or rill erosion. Ruts can cause water to channel down the road instead of running off. This can lead to gully formation and increase sediment yield to streams at crossings.

Native surfaced roads are primarily ML-1 and 2 roads. Maintenance Level 2 roads may be opened or closed per road management objectives. Maintenance level 1 roads are closed. Roads that are closed and grown up will not increase sediment yield. Some of those roads will be opened during project implementation increasing sediment yield. 1.2 miles of ML-2 and 9.24 miles of ML-1 roads will be required for project implementation.

Unclassified roads in the watershed are primarily grown up woods roads producing little sediment yield. There are currently 16.43 miles of unclassified roads in the watershed. 7.9 miles will be required for project implementation. These roads will increase sediment yield during project implementation and road reconstruction. These roads will be seeded and put to bed after use. Sedimentation production will decrease at that time.

When there are inadequate crossdrains or wing ditches, the road ditch will accelerate erosion. Where wing ditches are not hooked, runoff will bypass the wing ditch creating gullies at stream crossings

Roads identified to have erosion problems are 200, WLK-06, 206, WLK-10, 246, 2012, 207A, 2071, 2012, 2113, 206A and 223.

Recommendation – Road segments with ruts, gullies and/or inadequate crossdrains or wing ditches should be repaired prior to harvest activities. Additional wing ditches and cross-over drains should be constructed as necessary. All culvert repairs should be made or replaced as necessary. Fish passage should be considered in replacement design of any culverts at stream crossings with fisheries.

During reconstruction, erosion control measures such as hay bales or silt fences should be used to prevent sediment travel. Crushed aggregate surfacing should be used to facilitate project implementation and to reduce sediment disposal particularly on Level 1 and 2 roads. All stream crossings and steep grade pitches should be surfaced. Culverts should be placed in all stream crossings. Level 1 roads should be closed and put to bed at project culmination.

AQ4: Stream crossings serve as a direct conduit for erosion from the road or road ditch directly into the channel. Active ditch erosion is indicative of inadequate crossdrain frequency and/or layout. The following roads exhibit active ditch erosion: 200, WLK-06, 206, WLK-10, 246, 2012, 207A, 2071, 2012, 2113, 206A and 223.

AQ8: No jurisdictional wetlands are known to occur within this watershed.

AQ10: Restrictions to migration of fish species primarily occur at stream crossings. On Road 200 at MP 1.69 is a 24-inch corrugated metal pipe. The culvert is installed at a grade that would prohibit fish migration thru the culvert.

Road 206, 48-inch culverts at MP 1.15 and 1.30 require fish passage design. Active erosion upstream and downstream of both culverts.

Recommendation – Correct these crossings for fish migration. Recommend fish passage design at these locations and stream restoration and enhancement structures as needed.

AQ12: The road system provides fishing access that is within easy walking distance to much of the stream system. In this watershed, this is a minor issue. There is little interest in fishing the streams in the watershed and few desirable game fish.

TW1: Development of roads converts wildlife habitat to a cover type (usually gravel roads) that is of little use to most species of wildlife. However, the actual acreage that would be occupied by roads would represent but a fraction of a percent of the total land area in the Boswell Creek drainage, and would thus be relatively insignificant.

Development of roads creates additional edge habitat, which can favor some species and be neutral or potentially harmful to others. Species that would potentially benefit from road construction include turkeys, which use roads and roadsides for strutting, bugging, and feeding. The Boswell Creek area has little open and/or early successional habitat, and thus the development and maintenance of the planned roads would benefit turkeys throughout the area by creating additional edge habitat. However, roads and their associated edge can attract nest parasites such as Brown-headed Cowbirds, which can be extremely detrimental to songbirds, leading to high rates of nest failure. Cowbirds pose the greatest threat within several miles of livestock. There are a number of farms and ranches, with large numbers of cattle, surrounding the Boswell Creek area, and thus cowbird parasitism may pose a threat in this portion of the Forest. The effects of road construction would be relatively neutral for most species of wildlife and their habitat, given the small percentage of the area that would be directly impacted.

MM (1): The scope of the Healthy Forest Initiative is to provide for reducing the risk of wildfire and Southern Pine Beetle infestation. There are, however, two minerals special use projects in the Boswell Creek Watershed. The roads to these projects exist. Road 206B is used to access R.P. Small #4 well in Compartment 73. Road 206 will be used to access R.P. Small #2 and 3 wells. Both wells will be located east of Road 206, just off the road. A temporary road will provide access.

WP (2): Few roads need to be developed. Most of the road system is already in place. Roadwork would consist of reconstructing existing roads prior to project implementation. Road use in watersheds may affect domestic water supplies by introducing sediment and other pollutants to the water. Boswell Creek is a tributary of Winter's Bayou. Winter's Bayou is a tributary of the San Jacinto River.

| |
|---|
| <p>SP (1): The watershed has a well-developed system of roads that make access to the forest to collect special forest products easy. Reconstructing existing roads prior to project implementation will make more of the forest area available for collection post project implementation. Most of these roads will be closed and access would be by foot traffic. One activity that can be affected by roads and roadless areas is mushroom hunting. Roads provide access for mushroom hunters, but construction of new roads could conceivably reduce mushroom availability. The destruction of timber from road building might reduce mushroom abundance. The same is true for wildflower viewers. Roads provide access to those areas. To the extent that road building increases light at ground level, it can increase the number and change the species composition of herbaceous flowering plants. Those herbaceous flowering plants that grow only under a forest canopy will have their habitat reduced, and some will be destroyed by road construction. No new road construction is anticipated.</p> |
| <p>SU(1): Roads in the water shed under special-use permit are to access private tracts of land. They are 2083, 207A1 and 2232.</p> |
| <p>AU (2): Not an issue specific to this watershed. The same roads used for illegal activities are the roads used by law enforcement to enforce these activities.</p> |
| <p>RR (2): Not specific to this watershed and will not be addressed.</p> |
| <p>RR (4): Not specific to this watershed and will not be addressed.</p> |
| <p>RR (5): Not specific to this watershed and will not be addressed.</p> |
| <p>PV (1): There are no unique natural features in the areas planned for road work. The only threatened or endangered species with potential to occur in the area is the Red-cockaded Woodpecker (RCW). A number of inactive clusters and recruitment stands are present throughout the Boswell Creek watershed, but no active clusters are known. No roads are planned to be built in RCW clusters, consistent with direction in the 1996 Revised Land and Resource Management Plan.</p> |
| <p>PV (2)/PV (3): Will be addressed when brought up as an issue during scoping. Complete responses will not be available until an evaluation has been made of all scoping comments. Formal consultation with federally recognized tribes will provide the data necessary to address those issues.</p> |
| <p>PV (4): No new road development is anticipated. Construction will consist of reconstruction of existing Level 1 and 2 roads for project implementation, as well as reconstruction of unclassified roads. Roads recommended for decommissioning are also grown up woods roads that are not being used at this time and will no longer be needed. We do not anticipate these activities to affect passive use value, as the current system of Level 3, 4 and 5 roads will remain in place. This issue will be addressed further if it arises during scoping.</p> |
| <p>SI (3): In the Boswell Creek watershed, there is one archaeological site (41WA104) in proximity to Road 200. The eligibility of this site for the National Register of Historic Places is presently undetermined. Until its eligibility is determined, it must be treated as if it is eligible, and any undertaking implemented must be designed to ensure its integrity and context are not adversely affected.</p> |
| <p>Recommendation: Consult with Forest Archaeologist before design/ construction in this area.</p> |
| <p>SI(4): See PV(3)/PV(4) above.</p> |
| <p>SI (6/7): Road 200 provides access to the Bela Karolyi Gymnastics Camp that has been designated as a U.S. Olympic Training Facility. This road is a Maintenance Level 3 road that receives heavy traffic use to the facility. The road is a PFSR. The road is subject to washboarding from surface runoff. The maintenance of the road has always been an issue for the Bela Karolyi camp. The condition of this road affects traffic to the site.</p> <p>Roads 246 and 207 provide access to the Forest Glen Church Camp Subdivision and church camp. Both road are in good condition and receive regular maintenance. Walker County is the Primary Maintainer for Road 246.</p> |
| <p>Recommendation: Transfer jurisdiction of 246 to the County. Begin efforts to transfer Road 200 to the State or County for possible upgrade to Farm-to-Market or paved County Road.</p> |

SI (9): This issue is not specific to the analysis area and will be addressed further if it arises through scoping.

Other questions that are specific to this analysis area that can be addressed are as follows:

1. Are there opportunities to reconstruct, relocate, close, or decommission roads on the forest roads system to solve problems or be more consistent with *Plan* direction?

Yes, see Appendix A for a list of existing roads to be reconstructed. Recommend decommissioning Rds. 200S and 200G. Decommission Rd. 206A from milepost 3.41 to 4.10. Decommission Rd. 213 from milepost 3.00 to 3.46. See Appendix E for a list of unclassified roads to be reconstructed or decommissioned.

2. Are there opportunities to change road maintenance practices to better care for natural resources?

All roads are currently being maintained at level consistent with their service except for the following recommendations.

Seven and nine-tenths (7.9) miles of unclassified roads are recommended to become classified roads. These roads would become forest development roads. Recommend these roads be at operational maintenance level 1 roads.

Recommend reducing the Operational Maintenance Level of Road 207A 2 to Maintenance Level 2.

3. Are there opportunities to improve County road on the forest roads system under Cooperative Agreements?

The Four Notch Road has some roadside ditch erosion and some ditch repair needed. Recommend we take advantage of the County Cooperative Agreements to do the repair work prior to management activities.

4. Are there opportunities to transfer jurisdiction of Forest Service roads to the County?

Yes. A section of Rd. 206 from WLK-Four Notch Road to Rd. 246 is already maintained by Walker County. This section of Rd. 206 should be transferred to the Walker County.

5. Should any roads be considered for designation as Forest Highways? Are there opportunities to transfer the jurisdiction of any Forest Highways to the State?

Forest Service (FS) 200 is a heavily used road. It is the main route to the Bela Karolyi Gymnastics Camp and the Forest Glen Church Camp. It is a potential PFSR. Recommend the road be included in the State transportation system as a potential Farm-to-Market road.

6. Are some existing roads no longer needed to meet projected access needs?

There are 41 (6.4 miles) of unclassified road that will not be needed at this time or at no point in the future. Recommend that these roads be decommissioned.

7. Are additional roads or improved roads needed to improve access for forest users, resource management or protection?

No additional roads will be needed. Some roads will be improved for resource management objectives. See Appendices A and E for a list of those roads.

8. If new roads are proposed, what are the expected benefits and costs?

Seven and nine-tenths (7.9) miles of unclassified roads will be converted to classified roads. These roads are required for project implementation and future resource management objectives. This will meet the objective of FW – 051 to provide for the appropriate movement of people and products to and through National Forest Lands. Since these roads already exist, work required on these roads prior to project implementation would consist of reconstruction activities such as dip and drain reconstruction with spot surfacing where necessary. Road reconstruction cost for this level road can average approximately \$6,000.00 to \$10,000.00 per mile depending on the amount of surfacing required. Spot surfacing can approach 50 percent of the cost of the road reconstruction. After project implementation, these roads will be closed and revegetated.

9. Are road right-of-ways needed to provide access to national forest lands for use, management or protection?

No rights-of-ways are needed.

10. Should there be and adjustments or changes to road management objectives as a result of this analysis?

All existing roads are consistent with their road management objectives except for the following. The operational maintenance level for Rd. 207A is being recommended to be reduced to maintenance level 2. Rd. 207A will, therefore, be assigned to the generic road management objectives for maintenance level 2 roads.

11. What are the effects of roads on fire starts and fire suppression efforts?

No new road construction is being proposed. 7.80 miles of unclassified road are proposed to be added to the road system. These are existing woods roads. Opening up these roads will provide better access for fire suppression efforts. These roads, however, will only be used for project implementation and put to bed and closed afterward. The potential for fire starts then will be, as it currently exists since no new roads are proposed. Assuming most fire starts occur from road use, that potential would increase during project implementation through the addition of unclassified roads. That potential would then reduce to its current state.

Step 5. Describing Opportunities and Setting Priorities

Summary and Recommendations

No areas of special sensitivity or special resource values have been identified within the analysis area. Other than those listed below, existing roads within the analysis area are needed and should be maintained at the current level.

Based on the existing road system, the desired conditions, key issues, and the analysis questions and answers, the analysis team recommends the following actions:

Road wing ditches concentrate water flows. The run-off from one wing ditch can combine with the run-off from other wing ditches to further concentrate water flows in natural drainages thru vegetated buffer strips. Wing ditches and crossdrain culverts culverts not adjacent to intermittent or perennial streams often start downcuts and gulying on ephemeral stream courses. On-the-ground inspections reveal that the run-off from road wing ditches can start down-cuts and gulying where the run-off reaches stream banks. Review and establish standard road construction designs, drawings, and specifications to implement the *Plan* FW-053 Standard, “to provide surface water drainage away from streams and into vegetated buffer strips or other filtering system”. To reduce water flows and run-off from wing ditches, consider,

- 1. Spacing wing ditches closer together, and**
- 2. Reducing the run-off from wing ditches by constructing a “J” hook at the end of wing ditches to slow water flow and provide for percolation in a settling basin.**

High Priority

Reconstruct Road 200 by shaping and blading the existing roadway. Reshape roadway ditches to provide for proper drainage and to decrease siltation. Provide erosion control measures such as riprap placement at roadway ditches emptying into Boswell and Briar Creek. Provide additional surfacing materials as necessary. Reconstruct wing ditches using J-hook construction and/or sediment basins for 24-inch culverts at milepost 1.69 and 2.55.

Reconstruct Road 206 to provide proper ditch drainage. Reconstruct existing wing ditches with J-hook constructions as per above particularly 48-inch culverts at milepost 1.15 and 1.30. Forty-eight inch culverts should be redesigned for fish passage. Install oversize culverts to allow appropriate fish passage. Provide for stream restoration and enhancement. Consult with the Fisheries Biologist prior to construction. Provide spot surfacing as necessary for project implementation.

Road 206A is a road with beginning terminus and ending terminus at Road 206. Recommend decommissioning the section of road from the Briar Creek crossing to the ending terminus (milepost 3.41 to 4.10). The road parallels Briar Creek. Has steep grade pitches and is incised in sections. Spot surface as necessary from milepost 0.00 – 1.60.

Road 207 – Reconstruct existing wing ditches with J-hook construction particularly at 36-inch culvert at milepost 3.82 and 3.70. Re-size and replace, if necessary, 36-inch culvert at milepost 259. Add surfacing, as necessary, to facilitate project. Construct additional wing ditches for surface runoff.

Reconstruct Road 207A by providing for proper drainage. Construct additional wing ditches to allow for surface run-off. Reconstruct existing wing ditches with J-hook construction. Re-size and replace 18-inch culvert at milepost 1.30. Replace 36-inch culvert at milepost 2.90. Provide additional surfacing for project implementation. Road 207A is a TSL-D road with an operational and objective of ML-3. It is a closed road. The road has not been maintained at Level 3. Road was initially built as TSL-C. Recommend to road continue as TSL-D and Maintenance Level be reduced to 2. The generic road management objective for maintenance level 2 roads should be assigned to Rd. 207A.

Provide additional surfacing on Road 213. Decommission rd. 213 from milepost 3.00 to 3.46.

Reconstruct Road 223 to provide proper drainage. Reconstruct existing wing ditches with J-hook construction particularly 48-inch culverts at milepost 0.70 and 0.90. Replace 24-inch culvert at milepost 1.13. Replace and re-size 18-inch culvert at milepost 1.80. Replace 36-inch culvert at milepost 2.00. Replace and re-size 36-inch culvert at milepost 2.10. Construct additional wing ditches to allow for surface runoff. Wing ditches should use J-hook construction.

Reconstruct Road 246 by blading existing road surface. Provide additional surfacing material. Clean existing culverts to provide proper drainage.

One and two-tenths (1.20) miles of ML-2 roads will be needed for access to timber. These roads exist and will be intermittent low standard roads. The roads should be reconstructed or receive pre-haul maintenance prior to project implementation. Wing and lead off ditches should be constructed to avoid stream crossings.

Nine and twenty-four hundredths (10.34) miles of ML-1 roads will be needed for access to stands requiring thinning per the initiative. These will be low standard roads that will be closed after use. The roads should be reconstructed or receive pre-haul maintenance prior to project implementation. Wing and lead off ditches should be constructed to avoid stream crossings.

Road. 200S and 200G will not be needed for this project or future management objectives. Recommend decommissioning.

The watershed has 75 (16.43 miles) unclassified roads. Seven and nine-tenths (7.9) miles (25 roads) of these roads will be required for project implementation and future management objectives. These will be Level 1 roads that will be closed after use. During construction, erosion control measures such as hay bales or silt fences should be used to control sediment movement.

Six and forty-four hundredths (6.44) miles of unclassified roads will not be needed for the current project or future management objectives. These roads will be decommissioned. See the Appendices for a list of these roads and a map indicating their location.

Two and six one-hundredths (2.06) miles of unclassified roads access private land and should be placed on the system. They are not needed for project implementation. They are 200I (Pvt.), 200N (Pvt.), 200N1 (Pvt.), 223C (Pvt.), 223C1 (Pvt.) and 213E.

Medium Priority

Consider transfer of a section of Road 206 to the County. The segment would be from Four Notch Road to Road 246. Walker County is the Primary Maintainer on Road 246 and the Four Notch Rd.

Road 200 is a heavily used road particularly during activities at the Bela Karolyi Gymnastics Camp. It is also a potential PFSR. Consider transfer to State for potential Farm-to-Market construction.

Bibliography

USDA Forest Service, Washington Office. 1999. FS-643 Roads Analysis: Informing Decisions About Managing the National Forest Transportation System.

Appendices and Maps

1. Appendix A – Boswell Creek Watershed Roads by Maintenance Level
2. Appendix B – Boswell Creek Watershed Roads by Traffic Service Level
3. Appendix C - Boswell Creek Watershed Roads by Functional Classification
4. Appendix D – Boswell Creek Watershed Roads By Surfacing Type
5. Appendix E – Boswell Creek Watershed Unclassified Roads
6. Appendix F – Road Maintenance Objectives in Texas
7. Appendix G – Maps of Forest Roads-State, County and Maintenance Levels 1 and 2 Forest Service Roads

Appendix A. Boswell Creek Watershed Roads by Maintenance Level

| Road No. | Road Name | Length | Road Reconst. Miles | Remarks | Objective Maintenance Level (ML) |
|-------------------------|---------------|--------------|---------------------|--|----------------------------------|
| ML-3 Roads | | | | | |
| 200 | Boswell Creek | 4.4 | 4.4 | Road has drainage problems. Heavy use road. Erosion at bridges. | |
| 206 | Phelps | 2.26 | 2.26 | ML-3 could go to ML-4. Ditch erosion on north end. Needs 18" culvert replacements. | |
| 207 | Dodge | 4.71 | 4.71 | | |
| 207A | Pea Creek | 3.0 | 3.0 | Has drainage problems. Culvert resizing. Needs surfacing. | 2 |
| 213 | Four Notch | 3.5 | 3.5 | Main access for area needs thinning. Fiber mat grid near the surface. | |
| 223 | Chatham | 2.6 | 2.6 | Road has drainage problems. Two large culverts to replace. Consider fish passage. | |
| 246 | Watergate | 0.8 | 0.80 | Might consider transfer of 206 and 246 to County. | 2 |
| 269 | Brandy Creek | 1.2 | 1.20 | Good road. | |
| Total ML-3 Miles | | 22.47 | 22.47 | | |
| 206A | Briar Creek | 4.10 | 3.41 | | |
| 223A | | 0.90 | 0.90 | | |
| 223B | | 0.30 | 0.30 | | |
| Total ML-2 Miles | | 5.3 | 4.61 | | |
| ML-1 Roads | | | | | |
| 200A | | 0.4 | 0.4 | Needs spot surfacing. | |
| 200B | | 0.2 | 0.2 | | |
| 200D | | 0.2 | 0.2 | | |
| 200G | | 0.1 | | | |
| 200H | | 0.1 | | | |
| 200J | | 0.8 | | | |
| 200S | | 0.4 | 0.4 | | |
| 2012 | Morse Rd. | 0.94 | 0.94 | Has erosion problems, needs spot surfacing. | |
| 2027 | | 0.3 | 0.3 | ML=1, Native Material | |
| 206B | Service Pad | 0.2 | 0.2 | Agg., Obj MI=2, Opr MI=1 | 2 |
| 2061 | | 0.7 | 0.7 | Spot surfaced with no ditches. Will need reconstruction for project. | 2 |
| 2062 | | 0.4 | 0.4 | OBJ ML=2, Opr ML=1, Native Material | 2 |
| 2071 | Beany | 0.3 | | Grown up woods road. | |
| 207A1 | | 0.2 | 0.2 | Crown and ditched. Needs surfacing. | |
| 2083 | | 0.3 | | Good road to Private. | |
| 2086 | | 0.3 | | Unsurfaced woods road. | |

Appendix A. (continued)

| Road No. | Road Name | Length | Road Reconst. Miles | Remarks | Objective Maintenance Level (ML) |
|--|-----------|--------------|---------------------|---|----------------------------------|
| ML-1 Roads (continued) | | | | | |
| 213A | | 1.10 | 1.10 | | |
| 213B | | 1.3 | 1.3 | Grown up woods road. | |
| 213D | | 0.5 | 0.5 | Grown up woods road. | |
| 2113 | Ralph | 1.7 | 1.7 | Needs upgrading for project. Has drainage problems. | 2 |
| 2231 | | 0.5 | 0.50 | Single lane road, native surfacing. | 2 |
| 2232 | | 0.6 | 0.50 | Single lane road, native surfacing. | |
| 246A | | 0.7 | 0.7 | ML=1, Native Material. | |
| Total ML-1 | | 12.24 | 10.34 | | |
| Total Miles Road Reconstruction | | | 37.42 | | |
| Total Watershed Miles | | 40.01 | | | |

Appendix B. Boswell Creek Watershed Roads by Traffic Service Level

| Road No. | Road Name | Length | Traffic Service Level (TSL) |
|--------------------------|---------------|--------------|-----------------------------|
| 200 | Boswell Creek | 4.4 | C |
| 206 | Phelps | 2.26 | C |
| 207 | Dodge | 4.71 | C |
| 223 | Chatham | 2.6 | C |
| 246 | Watergate | 0.8 | C |
| Total TSL-C Miles | | 14.77 | |
| 200A | | 0.4 | D |
| 200B | | 0.2 | D |
| 200D | | 0.2 | D |
| 200G | | 0.1 | D |
| 200H | | 0.1 | D |
| 200J | | 0.8 | D |
| 200S | | 0.4 | D |
| 2012 | Morse Rd. | 0.94 | D |
| 2027 | | 0.3 | D |
| 206A | Briar Creek | 4.1 | D |
| 206B | Service Pad | 0.2 | D |
| 2061 | | 0.7 | D |
| 2062 | | 0.4 | D |
| 207A | Pea Creek | 3 | D |
| 207A1 | | 0.2 | D |
| 2071 | Beany | 0.3 | D |
| 2083 | | 0.3 | D |
| 2086 | | 0.3 | D |
| 213 | Four Notch | 3.5 | D |
| 213A | | 1.1 | D |
| 213B | | 1.3 | D |
| 213D | | 0.5 | D |
| 2113 | Ralph | 1.7 | D |
| 223A | | 0.9 | D |
| 223B | | 0.3 | D |
| 2231 | | 0.5 | D |
| 2232 | | 0.6 | D |
| 246A | | 0.7 | D |
| 269 | Brandy Creek | 1.2 | D |
| Total TSL-D Miles | | 25.24 | |
| Total Miles | | 40.01 | |

Appendix C. Boswell Creek Watershed Roads by Functional Classification

| | Road No. | Road Name | Length | Functional Classification |
|------------------------------|----------|---------------|--------------|---------------------------|
| 1 | 200 | Boswell Creek | 4.4 | C |
| 2 | 206 | Phelps | 2.26 | C |
| Total Collector Miles | | | 6.66 | |
| 3 | 200A | | 0.7 | L |
| 4 | 200B | | 0.2 | L |
| 5 | 200D | | 0.2 | L |
| 6 | 200G | | 0.1 | L |
| 7 | 200H | | 0.1 | L |
| 8 | 200J | | 0.8 | L |
| 9 | 200S | | 0.4 | L |
| 10 | 2027 | | 0.3 | L |
| 11 | 206A | Briar Creek | 4.1 | L |
| 12 | 206B | Service Pad | 0.2 | L |
| 13 | 2061 | | 0.7 | L |
| 14 | 2012 | Morse Rd. | 0.94 | L |
| 15 | 2062 | | 0.4 | L |
| 16 | 207 | Dodge | 4.71 | L |
| 17 | 207A | Pea Creek | 3 | L |
| 18 | 207A1 | | 0.2 | L |
| 19 | 2071 | Beany | 0.3 | L |
| 20 | 2086 | | 0.3 | L |
| 21 | 213 | Four Notch | 3.5 | L |
| 22 | 213A | | 1.1 | L |
| 23 | 213B | | 1.3 | L |
| 24 | 213D | | 0.5 | L |
| 25 | 2113 | Ralph | 1.7 | L |
| 26 | 223 | Chatham | 2.6 | L |
| 27 | 223A | | 0.9 | L |
| 28 | 223B | | 0.3 | L |
| 29 | 2231 | | 0.5 | L |
| 30 | 2232 | | 0.6 | L |
| 31 | 246 | Watergate | 0.8 | L |
| 32 | 246A | | 0.7 | L |
| 33 | 269 | Brandy Creek | 1.2 | L |
| Total Local Miles | | | 33.35 | |
| Total Miles | | | 40.01 | |

Appendix D. Boswell Creek Watershed Roads By Surfacing Type

| Road No. | Road Name | Length | Surface Type |
|--------------------------|---------------|--------------|--------------|
| 200 | Boswell Creek | 4.4 | AGG |
| 206 | Phelps | 2.26 | AGG |
| 206A | Briar Creek | 1.6 | AGG |
| 206B | Service Pad | 0.2 | AGG |
| 207 | Dodge | 4.71 | AGG |
| 207A | Pea Creek | 3 | AGG |
| 2113 | Ralph | 0.6 | AGG |
| Total AGG Surface | | 18.37 | |
| 2012 | Morse Rd. | 0.94 | IMP |
| 206A | | 1.6 | IMP |
| 213A | | 1.1 | IMP |
| 213B | | 1.3 | IMP |
| 223 | Chatham | 2.6 | IMP |
| 2113 | | 1.1 | IMP |
| Total IMP Surface | | 8.64 | |
| 200A | | 0.4 | NAT |
| 200B | | 0.2 | NAT |
| 200D | | 0.2 | NAT |
| 200G | | 0.1 | NAT |
| 200H | | 0.1 | NAT |
| 200J | | 0.8 | NAT |
| 200S | | 0.4 | NAT |
| 2027 | | 0.3 | NAT |
| 206A | | 0.9 | NAT |
| 2061 | | 0.7 | NAT |
| 2062 | | 0.4 | NAT |
| 2071 | Beany | 0.3 | NAT |
| 207A1 | | 0.2 | NAT |
| 2083 | | 0.3 | NAT |
| 2086 | | 0.3 | NAT |
| 213 | Four Notch | 3.5 | NAT |
| 213D | | 0.5 | NAT |
| 223A | | 0.9 | NAT |

Appendix D. (continued)

| Road No. | Road Name | Length | Surface Type |
|--------------------------|------------------|---------------|---------------------|
| 223B | | 0.3 | NAT |
| 2231 | | 0.5 | NAT |
| 2232 | | 0.6 | NAT |
| 246A | | 0.7 | NAT |
| 269 | | 0.4 | NAT |
| Total NAT Surface | | 13 | |
| Total Miles | | 40.01 | |

Appendix E. Boswell Creek Watershed Unclassified Roads

| | LENGTH FT. | LENGTH MI. | RD_NAME | RD_STATUS | ROUTE NUMBER |
|----|------------|------------|---------|--------------|--------------|
| 1 | 2422.647 | 0.459 | BCW-9 | Decommission | 213 |
| 2 | 300.967 | 0.057 | BCW-9 | Decommission | 200M |
| 3 | 126.032 | 0.024 | BCW-9 | Decommission | 206N |
| 4 | 247.599 | 0.047 | BCW-9 | Decommission | 2012A |
| 5 | 442.075 | 0.084 | BCW-9 | Decommission | 2012B |
| 6 | 326.619 | 0.062 | BCW-9 | Decommission | 2012D |
| 7 | 384.208 | 0.073 | BCW-9 | Decommission | 2012E |
| 8 | 709.368 | 0.134 | BCW-9 | Decommission | 2012F |
| 9 | 2679.256 | 0.507 | BCW-9 | Decommission | 2061A |
| 10 | 327.514 | 0.062 | BCW-9 | Decommission | 2061A1 |
| 11 | 256.699 | 0.049 | BCW-9 | Decommission | 206A1A |
| 12 | 299.174 | 0.057 | BCW-9 | Decommission | 206A2 |
| 13 | 1193.667 | 0.226 | BCW-9 | Decommission | 206B1 |
| 14 | 359.314 | 0.068 | BCW-9 | Decommission | 206B1A |
| 15 | 1281.100 | 0.243 | BCW-9 | Decommission | 206D |
| 16 | 219.720 | 0.042 | BCW-9 | Decommission | 206D1 |
| 17 | 381.124 | 0.072 | BCW-9 | Decommission | 206E |
| 18 | 747.576 | 0.142 | BCW-9 | Decommission | 206F |
| 19 | 1750.676 | 0.332 | BCW-9 | Decommission | 206G |
| 20 | 278.857 | 0.053 | BCW-9 | Decommission | 206I |
| 21 | 108.965 | 0.021 | BCW-9 | Decommission | 206J |
| 22 | 864.237 | 0.164 | BCW-9 | Decommission | 206M |
| 23 | 485.646 | 0.092 | BCW-9 | Decommission | 207A4 |
| 24 | 1111.022 | 0.210 | BCW-9 | Decommission | 207A5A |
| 25 | 713.612 | 0.135 | BCW-9 | Decommission | 207A7 |
| 26 | 1321.036 | 0.250 | BCW-9 | Decommission | 2113A |
| 27 | 553.093 | 0.105 | BCW-9 | Decommission | 2113B |
| 28 | 457.129 | 0.087 | BCW-9 | Decommission | 2113C |
| 29 | 144.704 | 0.027 | BCW-9 | Decommission | 2113C1 |
| 30 | 497.233 | 0.094 | BCW-9 | Decommission | 2113D |
| 31 | 441.003 | 0.084 | BCW-9 | Decommission | 2113E |
| 32 | 1663.401 | 0.315 | BCW-9 | Decommission | 2113F |
| 33 | 1936.914 | 0.367 | BCW-9 | Decommission | 2113G |
| 34 | 2722.012 | 0.516 | BCW-9 | Decommission | 213E |
| 35 | 1626.882 | 0.308 | BCW-9 | Decommission | 213E1 |
| 36 | 704.152 | 0.133 | BCW-9 | Decommission | 213F |
| 37 | 358.365 | 0.068 | BCW-9 | Decommission | 213G |
| 38 | 416.289 | 0.079 | BCW-9 | Decommission | 213H1 |
| 39 | 460.107 | 0.087 | BCW-9 | Decommission | 269A |
| 40 | 1221.505 | 0.231 | BCW-9 | Decommission | 269B |
| 41 | 928.657 | 0.176 | BCW-9 | Decommission | 269C |

Appendix E. (continued)

| | LENGTH FT. | LENGTH MI. | RD_NAME | RD_STATUS | ROUTE NUMBER |
|-------------------------------------|------------------|---------------|-------------|------------------|------------------|
| 38 | 416.289 | 0.079 | BCW-9 | Decommission | 213H1 |
| 39 | 460.107 | 0.087 | BCW-9 | Decommission | 269A |
| 40 | 1221.505 | 0.231 | BCW-9 | Decommission | 269B |
| 41 | 928.657 | 0.176 | BCW-9 | Decommission | 269C |
| Total Decommission Miles | 33470.156 | 6.339 | | | |
| 42 | 1167.199 | 0.221 | BCW-9 | Make system road | 200L |
| 43 | 3612.089 | 0.684 | BCW-9 | Make system road | 2012C |
| 44 | 918.063 | 0.174 | BCW-9 | Make system road | 2061B |
| 45 | 2241.604 | 0.425 | BCW-9 | Make system road | 206A1 |
| 46 | 945.742 | 0.179 | BCW-9 | Make system road | 206H |
| 47 | 2461.828 | 0.466 | BCW-9 | Make system road | 206K |
| 48 | 1131.175 | 0.214 | BCW-9 | Make system road | 206L |
| 49 | 2138.067 | 0.405 | BCW-9 | Make system road | 207A (Extension) |
| 50 | 2467.403 | 0.467 | BCW-9 | Make system road | 207A5 |
| 51 | 913.727 | 0.173 | BCW-9 | Make system road | 207A5A |
| 52 | 1189.479 | 0.225 | BCW-9 | Make system road | 207A5A1 |
| 53 | 1866.782 | 0.354 | BCW-9 | Make system road | 207A6 |
| 54 | 1491.931 | 0.283 | BCW-9 | Make system road | 207G |
| 55 | 2449.632 | 0.464 | BCW-9 | Make system road | 2113H |
| 56 | 842.726 | 0.160 | BCW-9 | Make system road | 213A1 |
| 57 | 1128.396 | 0.214 | BCW-9 | Make system road | 213B1 |
| 58 | 2879.601 | 0.545 | BCW-9 | Make system road | 213H |
| 59 | 476.028 | 0.090 | BCW-9 | Make system road | 213I |
| 60 | 757.405 | 0.143 | BCW-9 | Make system road | 213J |
| 61 | 1584.794 | 0.436 | BCW-9 | Make system road | 2231A |
| 62 | 1366.525 | 0.259 | BCW-9 | Make system road | 2231A1 |
| 63 | 2457.461 | 0.465 | BCW-9 | Make system road | 223B |
| 64 | 995.021 | 0.188 | BCW-9 | Make system road | 223D |
| 65 | 3011.577 | 0.570 | BCW-9 | Make system road | 269B |
| Total Miles to Add to System | 41213.712 | 7.806 | | | |
| 67 | 4785.977 | 0.906 | BCW-9 (Pvt) | Private Road | 206N (Pvt) |
| 68 | 1900.956 | 0.360 | BCW-9 (Pvt) | Private Road | 206N1 (Pvt.) |
| 69 | 1309.846 | 0.248 | BCW-9 (Pvt) | Private Road | 213E |
| 70 | 890.728 | 0.169 | BCW-9 | Access Road | 223C |
| 71 | 454.019 | 0.086 | BCW-9 (Pvt) | Private Road | 223C (Pvt.) |
| 72 | 837.151 | 0.159 | BCW-9 (Pvt) | Private Road | 223C1 (Pvt.) |
| Total Private Rd. Miles | 10178.677 | 1.928 | | | |
| Total Miles | 84862.545 | 16.072 | | | |

Appendix F. Road Maintenance Objectives in Texas
NATIONAL FORESTS & GRASSLANDS IN TEXAS
ROAD MANAGEMENT OBJECTIVES (RMO)
Maintenance Level 3 Roads

I. DESIGN, OPERATION AND MAINTENANCE CRITERIA

MAINTENANCE LEVEL 3: Suitable for passenger cars

TRAFFIC SERVICE LEVEL: TSL C

FUNCTIONAL CLASS: Local – 231 miles
Collector – 201 miles
Arterial – 37 miles

A. Design Criteria

Primary Road Users:

Mixed traffic including public, recreational, commercial and other National Forest resources, suburban, mail routes, medical and law enforcement travel needs.

B. Traffic Requirements – Traffic consists of cars, pickups, log trucks, oil and gas heavy duty trucks, school buses, mail carriers, local law enforcement and rescue squad vehicles and local farming equipment and trucks.

1. Design Vehicle – Cars and tractor-trailers operating at the maximum legal weight of 85,000 pounds.
2. Design Speed – Speed limits should be determined based upon road alignment and geometry and meeting state requirements.
3. Safety – Provide for surfacing material to support design vehicles within the approved design speed limit for each road. Signing shall conform to the latest edition of the TX MUTCD.
4. Environmental – Design criteria and standards are consistent with the Standards and Guidelines contained in the Revised Forest Land and Resource Management Plan, 1996. A project Environmental Analysis and Decision Memo shall be consistent with the Forest Land Management Plan and the RMO.
5. Economics – The cost of the proposed road project should be evaluated with environmental requirements and its value to the overall transportation system. Service life for crushed aggregate surfacing should be a minimum of 10 years. Culverts should provide a service life of 20 years.

II. DESIGN STANDARDS

- A. Design Class – Single lane, with turnouts, includes some double lane roads.
- B. Right-of-way – 40 feet
- C. Design width – 14 foot riding surface with 1 foot shoulders

- D. Design Profile & Grade – Road cross section includes cut and fill sections with ditches and drainage structures. Maximum centerline grade of 6% with short road sections of up to 10% for distance of 500 feet or less.
- E. Slopes – 3:1
- F. Surfacing – Roads shall maintain a minimum of 4 inch depth of crushed aggregate surfacing with improved sub-grade.
- G. Drainage Structures – Designed to meet minimum 25 year flood events, structural and environmental needs. Provide for protection of culvert and bridge inlets and outlets, including rip rap or reinforced concrete protection.
- H. Sign – Provide warning, directional and regulatory signs complying with the TX MUTCD.
- I. Erosion Control – Provide temporary and permanent erosion control to minimize loss and damage of roadway and areas.

III. OPERATION AND MAINTENANCE STANDARDS

- A. Operation – Maintenance Level 3 roads can be closed. They are subject to the Highway Safety Act. Emergency repairs of damaged roads and signs must be completed in a timely manner to respond to public traffic needs. Use proper closure devices and signing, meeting Texas MUTCD and Forest Service requirements.
Maintenance – Current and Preventative
Provide routine maintenance activities necessary to prevent damage to the roadway and surrounding s. Frequent maintenance repairs are needed to ensure the safety of the traveling public and Forest Service employees. Monitor frequently and provide as a minimum road maintenance inspection on roads that have a high ADT and accident history. Take corrective action on any critical safety need.
- B. The Maintenance Level 3 roads listed in the NFGT Infra Transportation System are subject to the design criteria, standards and operation and maintenance requirements of this “RMO – Maintenance Level 3”.

| | | |
|--------------|------------------------------------|----------------|
| PREPARED BY: | <u>s/ <i>Richard Graves</i></u> | <u>6/29/99</u> |
| | Richard Graves | Date |
| REVIEWED BY: | <u>s/ <i>Glenn P. Donnahoe</i></u> | <u>7-6-99</u> |
| | Glenn Donnahoe | Date |
| APPROVED BY: | <u>s/ <i>Ronnie Raum</i></u> | <u>7/7/99</u> |
| | Ronnie Raum, Forest Supervisor | Date |

NATIONAL FORESTS & GRASSLANDS IN TEXAS
ROAD MANAGEMENT OBJECTIVES (RMO)
Maintenance Level 2 Roads

I. DESIGN, OPERATION AND MAINTENANCE CRITERIA

MAINTENANCE LEVEL 2: High Clearance Vehicles

TRAFFIC SERVICE LEVEL: TSL C and TSL D

FUNCTIONAL CLASS: Local - 1483 miles

A. Design Criteria

Primary Road Users:

- Commercial Timber Haul
- Dispersed Recreation
- Hunting and Trails
- Forest Service Administration
- Contact Administration
- Environmental Monitoring
- Resource Protection

B. Traffic Requirements

Traffic primarily consists of commercial haul vehicles with related high clearance service and administrative type vehicles.

1. Design Vehicle – Tractor trailers operating at the maximum legal weight of 85,000 pounds.
2. Safety – Provide for structural materials (riprap, geotech fabric) to reinforce poor subgrades, minimize rutting and to increase traction on grades greater than 6%. Provide for proper signing.
3. Environmental – Design criteria and standards are consistent with the Standards and Guidelines contained in the Revised Forest Land and Resource Management Plan, 1996. A project Environmental Analysis and Decision Memo shall be consistent with the Forest Land Management Plan and the RMO.
4. Economics – The cost of the proposed road project should be evaluated with environmental requirements and its value to the overall transportation system. Service life for crushed aggregate surfacing should be a minimum of 10 years. Culverts should provide a service life of 20 years.

II. DESIGN STANDARDS

- A. Design Class – Single lane with turnouts and curve widening as needed for safety.
- B. Right-of-way (ROW) – 20 to 28 feet
- C. Design width – 12 foot riding surface with 1 foot shoulders.

- D. Design Profile & Grade – Road cross section includes cut and fill sections with ditches and drainage structures. Maximum centerline grade of 8% with short road sections of up to 14% for distances to 500 feet or less.
- E. Slopes – 3:1
- F. Surfacing – Spot surfacing and surfacing of sections of roads or entire lengths of roads depending upon volume and type of traffic, soil type and strength and erosion control requirements. Some roads with existing native surfacing that prevents rutting do not need crushed aggregate.
- G. Drainage Structures – Design to meet minimum 10 year flood events, structural and environmental needs.
- H. Erosion Control – Provide temporary and permanent erosion control to minimize loss of surfacing, roadbed, and roadway components.

III. OPERATION AND MAINTENANCE STANDARDS

- A. Operation – Maintenance Level 2 roads can be closed. Use proper closure devices and signing meeting Texas MUTCD and Forest Service requirements.

Maintenance Level 2 roads are not subject to the Highway Safety Act.

- B. Maintenance – Provide maintenance activities necessary to protect the environment and resources that the transportation facility serves. Provide for spot surfacing and erosion control repair or replacement as needed. Utilize a road maintenance condition survey to identify maintenance needs.
- C. The Maintenance Level 2 roads listed in the NFGT Infra Transportation System are subject to the design criteria, standards and operation and maintenance requirements of this “RMO – Maintenance Level 2”.

| | | |
|--------------|--------------------------------|----------------|
| PREPARED BY: | s/ <u>Richard Graves</u> | <u>6/29/99</u> |
| | Richard Graves | Date |
| REVIEWED BY: | s/ <u>Glenn P. Donnahoe</u> | <u>7-6-99</u> |
| | Glenn Donnahoe | Date |
| APPROVED BY: | s/ <u>Ronnie Raum</u> | <u>7/7/99</u> |
| | Ronnie Raum, Forest Supervisor | Date |

NATIONAL FORESTS & GRASSLANDS IN TEXAS
ROAD MANAGEMENT OBJECTIVES (RMO)
Maintenance Level 1 Roads

I. DESIGN, OPERATION AND MAINTENANCE CRITERIA

MAINTENANCE LEVEL 1: Basic Custodial Care

Road Closed

TRAFFIC SERVICE LEVEL: TSL D

FUNCTIONAL CLASS: Local – 444 miles

A. Design Criteria

Primary Road Users:

Commercial Haul

Dispersed Recreation

Hunting and Trails

Forest Service Administration

Contact Administration

Environmental Monitoring

Resource Protection

B. Traffic Requirements – Traffic primarily consists of commercial haul vehicles with related high clearance service and administrative type vehicles.

1. Design Vehicle – Tractor-trailers operating at the maximum legal weight 85,000 pounds.
2. Safety – Provide for structural materials (riprap, geotech fabric) to reinforce poor subgrades, minimize rutting and to increase traction on grades greater than 8%. Provide for proper signing.
3. Environmental – Design criteria and standards are consistent with the Standards and Guidelines contained in the Revised Forest Land and Resource Management Plan, 1996. A project Environmental Analysis and Decision Memo shall be consistent with the Forest Land Management Plan and the RMO.
4. Economics – The cost of the proposed road project should be evaluated with environmental requirements and its value to the overall transportation system. Service life for crushed aggregate surfacing should be a minimum of 10 years. Culverts should provide a service life of 20 years.

II. DESIGN STANDARDS

A. Design Class – Single lane, only add turnouts where needed for safety.

B. Right-of-way – 20 feet.

C. Design width – 12-foot travelway.

- D. Design Profile & Grade – Usually flat grades with dips and ditches as needed to reduce sediment runoff. Pitch grades can be between 8% and 15% for distances of 500 feet or less. Use culverts in perennial streams and intermittent streams.
- E. Slopes – 3:1
- F. Surfacing – Provide surfacing to protect resources including stream approaches, dips and other drainage structures.
- G. Drainage Structures – Design to meet structural and environmental needs. Provide for a minimum hydraulic design for a 10-year flood event.
- H. Erosion Control – Provide temporary and permanent erosion control to minimize loss of soil.

III. OPERATION AND MAINTENANCE STANDARDS

- A. Operation – Maintenance Level 1 roads will be closed permanently or seasonally. Use proper closure devices and signing meeting Texas MUTCD and Forest Service manual requirements.

Maintenance Level 1 roads are not subject to the Highway Safety Act.

- B. Maintenance – Provide maintenance activities necessary to protect the environment and resources that the transportation facility serves. Annual and routine maintenance is not required. Repair washed out road sections to prevent further loss of roadway and drainage structures. Road condition surveys should be performed to identify maintenance needs.
- C. The Maintenance Level 1 roads listed in the NFGT Infra Transportation System are subject to the design criteria, standards and operation and maintenance requirements of this “RMO – Maintenance Level 1”.

| | | |
|--------------|------------------------------------|----------------|
| PREPARED BY: | <u>s/ <i>Richard Graves</i></u> | <u>6/29/99</u> |
| | Richard Graves | Date |
| REVIEWED BY: | <u>s/ <i>Glenn P. Donnahoe</i></u> | <u>7-6-99</u> |
| | Glenn Donnahoe | Date |
| APPROVED BY: | <u>s/ <i>Ronnie Raum</i></u> | <u>7/7/99</u> |
| | Ronnie Raum | Date |
| | Forest Supervisor | |

Appendix G. Maps of Forest Roads-State, County and ML-1 and 2

Hard copies of maps are available upon request.

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Sheet 8 of 8 goes here.



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