

(3.13) Scenery Management

(3.13a) Resource-Specific Information

Landscape Character Elements

Landscape character is a combination of physical, biological, and cultural attributes that give a geographic area its visual and cultural image, and often, unique character. Landscape character represents distinct attributes of landform, vegetation, surface water features, and cultural features that exist throughout the area of interest.

The Project Area consists primarily of glacial outwash plains. Historically, wildfire has played a major role; fires were frequent, and ranged in size and intensity. Fire played a role in savannas by maintaining open conditions where herbaceous species could flourish. The role of wildfire in pine and oak forests served to reduce surface litter and maintain open understory conditions, or less frequently, more intense fires helped to regenerate forests of these species. The less fire-prone sites, including river bottomlands, were less influenced by wildfire, and more by windstorms and flooding as a means of maintaining and regenerating the natural vegetation of maple, pines, and oaks.

Starting in the 1800s, the cutting of the native forests, the establishment of agriculture, and alteration of the natural drainage systems have affected the vegetative patterns in these areas. Red and white pine planting, fire suppression, and the harvest of forests became commonplace after the National Forest was established in the 1930's; private and public land ownership became intermingled. Management of National Forest lands focused on maintaining high amounts of forest cover, and private lands were developed for agriculture. In addition, other elements, such as utility rights-of-way, gas and oil wells, and roads became part of the landscape character.

Classification of Landscape Characteristics

Scenic attractiveness is a way to measure landscape characteristics based on human perception of the intrinsic beauty of landform, water characteristics, vegetative patterns, and cultural land-use. A combination of Landtype Associations (LTA's) and Fire Regimes is useful in classifying scenic attractiveness because there is a high correlation between individual LTA's and the role that fire contributes to the vegetation patterns across large areas. This relationship can be used to assign initial scenic attractiveness into one of three broad scenic attractiveness classes:

Distinctive: Landscapes associated with water features which experienced infrequent to very infrequent stand replacing or community maintenance fires. Examples include the White River, large lakes, and wetland areas.

Typical: Landscapes with some topographical features which experienced relatively infrequent to very infrequent stand replacement or community maintenance fires. Examples include hemlock and white pine forests adjacent to large areas of jack and red pines and savanna.

Indistinctive: Landscapes with level topography which experienced frequent to very frequent stand replacement fires. Examples include extensive areas of jack pine and jack-red-white pine forests, and barrens and savannas.

Measures of Scenic Integrity

Scenic integrity indicates the state of naturalness, or disturbance created by human activities, and is classified as the degree of deviation from the existing condition. There are six scenic integrity levels used to measure scenic integrity in Management Areas (MA) 6.1 and 9.2:

- **Very High:** Landscapes are unaltered with no deviation from the landscape character; landscape character is fully expressed.
- **High:** Landscape appears unaltered, with deviations subtle and not evident; landscape character is largely expressed.
- **Moderate:** Landscape appears slightly altered, with deviations beginning to dominate; landscape character is moderately expressed.
- **Low:** Landscape appears moderately altered, and deviations may be strongly dominant; low expression of landscape character.
- **Very Low:** Landscape appears heavily altered, and deviations may be strongly dominant; very low expression of landscape character.
- **Unacceptably Low:** Landscape is extremely altered, with deviations extremely dominant; landscape character is unrecognizable.

Scenic integrity is also measured using a scenic class index that indicates the value of scenery using a combination of attractiveness, viewing distance, and concern for visibility. There are seven scenic classes used to express scenic integrity in MA 4.4:

- **Scenic Classes 1 and 2:** High public value
- **Scenic Classes 3 to 5:** Moderate public value
- **Scenic Classes 6 and 7:** Low public value

Both methods of measuring scenic integrity are evaluated from existing travel-ways and use areas, using typical on-the-ground observations as the reference and are assessed from four perspectives: historic, existing, interim, and long-term.

(3.13b) Existing Condition

Landscape Characteristics

In relationship to historic fire frequency and intensity, the glacial outwash plains are described in the Forest Plan as:

"landscape ecosystems historically experiencing frequent, large, catastrophic, stand-replacing fires. These ecosystems typically occur within very dry, flat outwash plains underlain by coarse textured sandy soils. The dominant forest-type, prior to the mid to late 1800s were short-lived jack pine forests and pine barrens."

These portions of the Project Area are illustrative of *Indistinctive and Typical* scenic attractiveness classes. They are typical of flatter terrain and are dominated by conifer species.

The Project Area also includes some areas that are influenced by the presence of surface water. In relationship to historic fire frequency and intensity, these areas are described in the Forest Plan as:

"landscape ecosystems historically experiencing very infrequent stand-replacing or community maintenance (ground) fires. These ecosystems typically occur within wetlands embedded within or adjacent to fire-sensitive, hence fire protected landscapes. The dominant forest types, prior to the mid to late 1800s, were wetland hardwoods and mixed hardwood-conifer forests including black and green ash, silver maple, elm and cedar."

These portions of the Project Area are illustrative of *Distinctive* scenic attractiveness. For this project, this includes the areas immediately adjacent to the White River and several isolated wetlands areas.

Scenic Integrity

The existing scenic integrity provides the baseline to develop and transition to long-term scenic goals. The Management Area (MA) standards and guidelines are general descriptors of these goals. Within MA 6.1 (Semiprimitive Nonmotorized), vegetation management is used for improving visual quality, reducing hazard fuels, and maintaining a diversity of wildlife habitats, including old-growth forest development and occupied Karner Blue butterfly habitat. Within MA 4.4 (Rural), vegetation management is used for reducing hazard fuels and managing permanent opening to meet species viability needs, including occupied Karner Blue butterfly habitat.

The pattern of vegetation disturbance, or age-class distribution, is also an indicator of the existing scenic integrity. In general, Table 3.1: Acres of Forest Types by Age Class, 2009, shows that there is a wide variety of upland vegetation diversity, while lowland cover types tend to be older. The 15,000 acres of National Forest System lands represented in Table 3.1 are comprised of approximately 550 unique stands (areas managed for a predominant cover type), averaging 25-30 acres each.

Two additional elements are pertinent to the existing scenic integrity:

- 1) The frequency/type of roads. These serve as indicators of disturbance, general population, management, and recreational use levels. There are several permanent Forest Service and County roads, and additional closed Forest Service roads with the Project Area.
- 2) The influence of private land uses within the surrounding National Forest System lands private land holdings. These are also numerous, with the predominant land uses being residential and seasonal residences in forested and woodland settings.

Table 3.37 displays the existing scenic values within the Project Area by MA and Township.

Table 3.37: Existing Scenic Classes

Management Area	Scenic Class	% of Area in Scenic Class
4.4 Rural	1: High	4
4.4 Rural	2: Moderate	8
4.4 Rural	3 to 7: Low	88
6.1 SPNM	1: Very High	4
6.1 SPNM	2: High	10
6.1 SPNM	3 to 5: Moderate to Very Low	88
9.2 Study W&SR	1: Very High	88
9.2 Study W&SR	2 to 5: High to Very Low	12

(3.13c) Area of Analysis

Direct and Indirect Effects: The proposed conversion of forested areas to savannas, and other treatments to forested lands, would produce a noticeable difference in the scenery within and adjacent to the Project Area, and be distinctly different from the forested, agricultural, and rural landscapes. The immediate effects of these proposals are limited to National Forest System lands; therefore, the analysis area for direct and indirect effects from vegetation and transportation treatments is National Forest System land within the Project Area.

Cumulative Effects: All lands within the Project Area are a part of the landscape scenery, although some features are more prominent than others; ownership boundaries are often difficult to distinguish for many visitors. Therefore, all lands within the Project Area are included in the cumulative effects analysis.

(3.13d) Direct and Indirect Effects

Alternative 1

The interim scenic integrity of National Forest System lands would change slowly, affected only by natural events and the three vegetation treatments that are currently active within the Project Area. These treatments include:

- Approximately 50 acres in Greenwood Township that will be converted from plantation red pine to an upland opening and the supplemental prescribed burning, seeding, and planting to restore barren and savanna conditions;
- Approximately 78 acres in Greenwood Township have been converted from red pine and oak to upland openings to evaluate combinations of mechanical and prescribed fire treatments on herbaceous and nectar species; and

- Approximately 346 acres in other upland opening locations within the Project Area will be treated between 2009 and 2011 to maintain open conditions and improve herbaceous diversity.

With the exception of the red pine plantation, all of these treatments are in locations where the tree density is already low. These treatments represent ~3% of the Project Area. The majority of these locations are adjacent to County and Forest Service roads, where the alteration of the landscape is in the foreground. These areas are in MA 4.4 in Otto Township and MA 6.1 in Greenwood Township. Full expression of the reduced tree density and increase in herbaceous ground cover will be not be obvious for 5 – 10 years, but the treatments are essential to restoring savanna conditions and Karner Blue butterfly habitats. Table 3.38 displays the *interim* scenic outcomes within the Project Area by MA and Township.

Table 3.38: Alternative 1: Interim Scenic Class and Scenic Integrity

Management Area	Scenic Class	Scenic Integrity	Township
4.4 Rural	1: High	NA	Greenwood & Otto
4.4 Rural	2: Moderate	NA	Greenwood & Otto
4.4 Rural	3 to 7: Low	NA	Greenwood & Otto
6.1 SPNM	NA	Low - Moderate	Greenwood & Otto
9.2 Study W&SR	NA	High	Greenwood & Otto

Beyond 10 years, the scenic classes (value/interest of scenery) in MA 4.4 would continue to have the existing variety of scenic interest to visitors. The pattern of spatial and temporal disturbances from past tree planting, aspen clearcuts, upland opening maintenance, and road developments would generally provide a landscape of moderate to low interest. Scenic classes of lower interest would predominate where dense, un-thinned plantations and even-aged oak and aspen forests are abundant, and would be interspersed with areas of higher scenic class value where small non-forest areas or larger diameter trees occur. Foreground landscape views would remain fragmented, and opportunities to view desired scenic elements would be infrequent, except where recent savanna creation and restoration treatments were completed. A low expression level of scenic characteristics, such as intermixed forests of oaks, white pine, and other hardwoods, would be common across the landscape. Oak-pine barrens would be small in size and discontinuous, and the potential to provide this distinctive characteristic would decline as tree encroachment overwhelms small non-forest areas.

MA 6.1 would continue to have a limited range of scenic interest to visitors, and the pattern of spatial and temporal disturbance from past tree harvesting and planting, upland opening maintenance, and road developments, would indicate a fragmented, disturbed landscape. The existing scenic integrity of low to moderate would continue, dominated by foreground views of dense, older red pine plantations, younger oak and red pine forests, and even-aged oak forests, interspersed with non-forested areas 3–15 acres in size. Background landscape views would be uncommon, and scenes of the effects of different vegetative treatments and characteristics would be limited to where recent savanna creation and restoration treatments were completed. Forest cover would appear slightly or moderately altered, with a range of age classes occurring mainly in red pine cover types. Deviations or changes in cover types would be abrupt and evident. A low to moderate expression of landscape characteristics (such as oak-pine barrens and areas of intermixed large white pines and oaks) would be infrequent. The potential to

provide distinctive qualities would decline as tree encroachment overwhelms smaller non-forest areas.

The scenic integrity of MA 9.2 would not be affected by this alternative.

Alternatives 2 and 3

Within 5 - 10 years, the proposed actions for savanna restoration, regeneration, thinning, and the management of the transportation system would be completed, along with the on-going treatments. To promote the regeneration of aspen, all of the trees in these units would be removed, save for those that are left for wildlife den, cavity, and roost trees. The two areas proposed for clearcutting consist of mature or over-mature aspen-oak, located in MA 4.4, and further diversify the range of age classes in this cover type. One of these areas is adjacent to the foreground along a permanent Forest Service road; the other is not. Over the course of ten years, these areas would go through three stages: 1) fully stocked mature forest (prior to harvesting), 2) clearcut areas with a few reserve trees and no regeneration present (immediately following the harvest), and 3) fully stocked aspen - oak sapling stand (a few years after the harvest).

There are 21 red pine plantations proposed for thinning. In these plantations, more than 60% of the trees would remain to continue growing. The plantations were established 40+ years ago in rows, usually at high densities. Some of these areas have been previously thinned. First thinnings would consist of removing all of selected rows within a plantation (i.e. remove two rows, leave three rows); second thinnings would remove smaller pines more frequently than larger trees, and retain a high proportion of hardwood species. Some of the plantations are also proposed for prescribed fire after the thinnings are completed. The plantations are located in MA 4.4 and 6.1, and most are adjacent to permanent roads and in the landscape foreground. Evidence of harvest disturbances (i.e. slash, landing and road improvements, and prescribed fire) would be evident for several years. Within ten years, these effects would not be noticeable to the casual observer. Over time, the remaining trees would show increased diameter and crown growth, and the natural regeneration of oaks and red maple would begin to dominate the understory.

There are 56 areas of oak and pine forests that are proposed for conversion to non-forest, (create savanna) or savanna restoration, totaling ~3,061 acres. These areas are either mature or immature forested stands, located in MA 4.4 and MA 6.1, with the majority being adjacent to permanent roads and in the landscape foreground. Timber harvests and other activities (including prescribed fires) would retain 20-25% of the pines, oaks, and other woody vegetation to provide partial shade, and be left as either individuals or in small groups. Post harvest and prescribed fire treatments include seeding and planting to supplement the natural regeneration of the desired herbaceous and woody flora. The full expression of the reduced tree density and increase in herbaceous ground cover will not be obvious for 5 - 10 years, but the treatments are essential to restoring savanna conditions and Karner Blue butterfly habitats.

Prescribed burning is proposed for ~ 1,050 acres that are not included in the activities discussed above. Most of these areas are adjacent to permanent roads and in the landscape foreground. Fire scorch would be evident on the larger stems, and smaller diameter woody understory

species would be killed. Prescribed burning would begin to return these areas to the desired Fire Regime class, with forested areas having a reduced understory canopy. Prescribed fire in these areas would facilitate meeting the objectives of restoring savanna and Karner Blue butterfly habitats by increasing treatment efficiency and providing better public and resource protection. Within ten years, different areas would likely have received a different number of prescribed burns of varying intensities.

There are Forest Service roads within the Project Area that are proposed for closure to motor vehicle use by the general public. All county roads would remain open to motor vehicles.. Evidence of the existing roadbeds, clearing limits, gates and barriers, and parking areas would remain in the next 5-10 years in all locations. Some locations would recruit woody vegetation that would reduce the visible effects of past use, but the impression of “ready access” would remain a part of the landscape’s character.

The combination of these activities would result in the interim scenic outcomes displayed in the following table.

Table 3.39: Alternatives 2 and 3: Interim Scenic Class and Scenic Integrity

Management Area	Scenic Class	Scenic Integrity	Township
4.4 Rural	1: High	NA	Greenwood & Otto
4.4 Rural	2: Moderate	NA	Greenwood & Otto
4.4 Rural	3 – 7: Low	NA	Greenwood & Otto
6.1 SPNM	NA	Low - Moderate	Greenwood & Otto
9.2 Study W&SR	NA	High	Greenwood & Otto

The long-term scenic integrity objectives for all MA’s are established in the Forests’ LRMP Standards and Guidelines.

Management Area 4.4: This MA uses scenic class to measure the public value of National Forest scenery, based on a scale of high = 1, to low = 7. Scenic classes are determined by combining scenic attractiveness classes with distance zones and concern levels of the landscapes’ visibility. Thus, in MA 4.4, there is a sensitivity level range of scenic class objectives, indicating that a range of vegetative treatments is expected, and that a range of viewer interest exists. Generally, scenes of the highest interest are the most sensitive to change, such as foreground vegetation clearcuts (i.e. along high use roads and trails). Conversely, scenes of lower interest are less sensitive to change, such as background clearcuts (i.e. visible through other vegetation from high use roads and trails).

Management Areas 6.1 and 9.2: These MA’s are assigned scenic integrity objectives in the Standards and Guidelines, which guide the amount, degree, intensity and distribution of treatments needed to achieve desired scenic conditions.

Beyond 10 years, the scenic classes (value/interest of scenery) in MA 4.4 would have a wider variety of scenic interest to visitors. The pattern of spatial and temporal disturbances from past tree planting, aspen clearcuts, upland opening maintenance, and road developments would be less common, and relatively large oak-pine barrens would provide areas of higher viewer interest along County roads. Fewer areas of dense, un-thinned plantations and even-aged hardwood forests would occur, and would be interspersed with larger areas of different scenic class value. Foreground landscape views would be less fragmented, and opportunities to view

desired scenic elements would be more frequent, as areas of oaks, pines and aspen attain more open conditions. A higher level of expression of desired landscape characteristics, including canopy diversity and larger diameter trees in pine plantations, and a wider variety of herbaceous species in open areas, would be more common across the landscape. Oak-pine barrens would be larger in size and take on natural configurations, and the potential to provide these distinctive characteristics would increase as prescribed fire is more easily and efficiently used.

MA 6.1 would have a wider range of scenic interest to visitors; a more natural appearing landscape would begin to replace the historical pattern of spatial and temporal disturbances. The fragmented landscape of forest and open areas would become consolidated as relatively large areas of oak forests of different age classes attain oak-barren conditions. Fewer areas of dense red pine plantation would occur, and non-native Scots pine would be removed. The scenic integrity would be changed, primarily because the frequency of abrupt cover type boundaries would be reduced. Foreground views of dense, older red pine plantations, younger oak and red pine forests, and older even-aged oak forests, would be interspersed with large non-forest areas. Background landscape views would be common from Forest Service (open to nonmotorized uses) and County roads. Forest cover would appear slightly or moderately altered, with a range of age classes occurring mainly in red pine cover types. Deviations, or changes in cover types would be less abrupt and evident as the oak-pine barrens assume a larger proportion of the landscape. A higher level of expression of landscape characteristics (such as oak-pine barrens and areas of intermixed large red pines and oaks) would be found. The potential to provide these distinctive characteristics would increase as prescribed fire is more easily and efficiently used.

Visual elements of the prescribed fire activities would be evident, and decrease in prominence with each fire application. There would be reductions in the amount of forest litter present and increases in the presence of the native understory species (grasses, forbs, and sedges) in oak-barrens areas. Fire scar on larger trees in these areas would persist and become prominent after each prescribed fire treatment. Therefore, there would be an increase in this characteristic landscape element of LTA 1.

The scenic integrity level would appear moderately to slightly altered following conversion of forested lands to savanna. The roadbeds of County and Forest Service roads would also give the impression of a landscape influenced by human activity. When the proposed activities (i.e. seeding, hand-cutting, prescribed burning, etc.) to establish a diverse herbaceous cover in the restored savannas are completed, the deviations of the existing landscape would be evident, but less dominant, as evidence of the tree cover diminishes and the herbaceous flora matures and becomes more dense. The desired landscape characteristics of prairie grasses and forbs, especially wild lupine, and large oaks would become common, and generate a moderate amount of landscape unity.

The scenic integrity of MA 9.2 would not be affected by this alternative; all proposed treatments are outside of the boundary of the candidate Wild and Scenic River corridor along the White, or so located as to have no effects on its landscape characteristics.

(3.13a) Cumulative Effects

Common to All Alternatives

The scenery of the Project Area is dominated by the vegetation on National Forest System lands, except along Garfield, 116th/Fogg Lake, and Fruitvale roads, where agriculture and recreational/residential development occurs. Privately owned lands adjacent to National Forest System lands proposed for treatment are primarily forested, with some areas of non-forest and low tree cover density.

Implementing the Forests Plan Desired Future Condition would affect the scenic integrity objectives in the Project Area primarily by preserving the corridor of the White River (including the North and South Branches), promoting old-growth forest characteristics in riparian environments, and providing habitat suitable for the Karner Blue butterfly. The latter objective would likely convert additional forest area to savanna, especially in Greenwood Township, Sections 7 and 18 (MA 6.1), and Otto Township Sections 20, 27, 28, 29, 31, 32, 33 (MA 4.4). The conversion of these areas to savanna would include the suite of harvesting, non-commercial woody vegetation control, prescribed fire, and the seeding/planting of herbaceous species proposed in this project. Karner Blue butterfly habitat restoration efforts in the next 10-20 years may create 50% more oak barrens than the amounts proposed in this project. Timber management in pine plantations, aspen, and oak forests may affect several thousand acres over the next 20+ years, through a combination of thinnings and regeneration harvests. The density of County and Forest Service roads, and the maintenance level of Forest Service roads, is anticipated to remain static over the next 20+ years.

Alternative 1

The distinctions between the vegetation patterns of private and National Forest System lands would be relatively small. Approximately 6-7% of the landscape would appear more open and management activities would occur to maintain open canopy conditions. In these areas, prescribed burning activities would serve to stimulate the seedbank of the soil and promote the appearance of new species of grasses, forbs, and sedges, and leave evidence of each treatment (i.e. fire scar, small tree mortality). The forested areas of National Forest System lands in MAs 4.4 and 6.1 would remain in the existing scenic condition, with few expressions of the desired landscape elements. These elements would be fragmented across the Project Area. The scenic objective in MA 9.2 would not be directly affected, and the potential to contrast the characteristic landscape elements among MAs with Alternative 2 would be subdued.

Private land management within the Project Area would reflect landowner objectives, parcel size limitations, and legal requirements. Productive agricultural lands are likely to remain dedicated to this purpose. Smaller parcels, especially in wooded settings or where local zoning authorizes commercial uses, are expected to follow general social-economic trends and would likely be further developed. Under this Alternative, the scenic distinction between private and National Forest System lands would be the greatest.

Conclusion: The duration and magnitude of no action would not incrementally add to past, present, and reasonably foreseeable scenic integrity objectives within the Project Area. Mature oak and aspen forests would be retained, except where non-forest habitats already exist, allowing other hardwood and conifer forests to mature or be replaced by late-seral stages of

forest vegetation. This effect would be most pronounced on National Forest System lands. Private lands are expected to shift towards building site development and recreational uses, woodlands, and upland open uses (i.e. unimproved pasture and game species habitat improvement).

Alternatives 2 and 3

The restored savannas would partially meet the scenic integrity objectives in each MA of the Project Area, and serve to differentiate the habitat goals of private and National Forest System lands. Areas that are now heavily forested would appear more open and management activities would occur to maintain open canopy conditions. Prescribed burning activities would serve to stimulate the seedbank of the soil and promote the appearance of new species of grasses, forbs, and sedges, and leave evidence of each treatment (i.e. fire scar and small tree mortality). The savanna areas of National Forest System lands in MAs 4.4 and 6.1 would produce a moderate degree of the desired scenic condition, with common expressions of the desired landscape elements occurring in some harmony across the Project Area. The forested areas of National Forest System lands in MAs 4.4 and 6.1 would show evidence of other timber harvesting (i.e. plantation thinning and regenerating aspen and oaks). The scenic objective in MA 9.2 would not be directly affected, but there would be a greater contrast in the characteristic landscape elements among MAs with Alternatives 2 and 3. Fewer Forest roads open to motorized uses would further promote a more naturally appearing landscape.

The effects related to private land management within the Project Area would be consistent with those discussed under Alternative 1.

Conclusion: The duration and magnitude of the proposed actions would incrementally add to past, present, and reasonably foreseeable scenic integrity objectives within the Project Area, primarily by converting mature oak and aspen forests to savanna/barrens, and allowing other hardwood and conifer forests to mature or be replaced by late-seral stages of forest vegetation. This effect will be most pronounced on National Forest System lands. Private lands are expected to shift towards building site development and recreational uses, woodlands, and upland open uses (i.e. unimproved pasture and game species habitat improvement).

(3.14) Transportation

(3.14a) Existing Condition and Resource-Specific Information

Historical Context

Roads are intrinsically linked to the presence and use of an area by humans. The location and abundance of roads on a landscape can serve as good indicators for how that particular landscape has been used over time. The transportation system throughout the Project Area is reflective of the historical land use. Because of the proximity of this area to the North, South, and Main Branches of the White River, there was a rich history of land use in this area by Native Americans. There is evidence of this use along and within the river corridor throughout the Project Area. It is likely that there was a system of well-established footpaths associated with the encampments located along the river throughout the Project Area to facilitate this use.

Prior to the establishment of homesteads by settlers, the areas that were capable of supporting timber were logged. With this, came the establishment of a rudimentary road network that allowed the loggers to transport harvested trees to the edge of the river, where they were rolled over the banks to be floated down the river to the mills. Evidence of these rollways still exists in the Project Area. In addition to logging activities, there is also evidence of past agricultural use throughout the Project Area. As a result, the road system within the Project Area became well-established and received increased use from draft animals and, later, motor vehicles as people traveled more frequently outside of the Project Area for the exchange of goods and services. The low soil productivity (in conjunction with external economic factors) led to the eventual abandonment of these farms. The lands (and some of the associated roads) eventually reverted to public ownership and became a part of the Manistee National Forest.

As part of the National Forest System lands, the roads that already existed continued to be utilized for forest management activities (planting, harvesting, etc.). New roads were also developed for these purposes. Most of the Forest roads typically served as a part of former timber hauling road networks, leading from log landing locations to county roads. Because of the infrequent use and maintenance of these roads, many are currently not up to standard and are not suited for use by low-clearance passenger vehicles. There are also several of these roads that are utilized by private property owners to access their property. Until recently, the use of these roads for timber management purposes was periodic (occurring every 10-15 years), with the majority of annual Forest Service use taking place in the form of recreation patrols.

Over the past few decades, motorized vehicles have become increasingly popular with those who use the Forest for recreation. This has led to a reliance on these vehicles to access the Project Area for motorized-dependent camping, horseback riding, hunting and fishing access, snowmobiling, driving for pleasure, wildlife viewing, firewood and mushroom gathering, and more. These activities incorporate the use of all of the accessible roads. In some locations, roads that were originally developed to service forest management activities are now used exclusively for recreational purposes.

Classification

In discussing the management of the transportation system within the Project Area, the IDT has categorized the roads as: 1) county roads, 2) classified roads, or 3) unclassified roads. For this project, county roads are those roads that are claimed, maintained, and under the jurisdiction of either Oceana or Muskegon County. The management of these roads is carried out by the respective Road Commissions. Some of these roads are maintained throughout the year, and some are maintained seasonally (not being plowed during the winter months).

Classified roads are under the jurisdiction of the Forest Service, are wholly or partially within or adjacent to National Forest System lands, have been previously designated as needed for motor vehicle access, and are included on the Huron-Manistee National Forest Motor Vehicle Use Map (MVUM). Typically, these roads have been created by the Forest Service, are seasonally open, and receive minimal to no maintenance. Classified Forest Service roads are utilized during the spring, summer, and fall by recreationists and local traffic. These roads are not plowed in the winter.

Unclassified roads are also under the jurisdiction of the Forest Service and are on National Forest System lands. These include unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail. These may also include roads that were once under a permit or other authorization and were not decommissioned upon the termination of the authorization. These roads have been created through a variety of means. Some were originally developed by the Forest Service to conduct management activities, but were not incorporated into the official road system. Some are roads developed prior to Forest Service ownership by previous landowners. Some have been illegally created by Forest users. Many of these roads are either duplicates (lead to the same location as another road) or dead-end.

Road Density

In Michigan, and within the Project Area, the presence of roads on the landscape has, in some ways, remained more consistent than the landscape itself. As already discussed, some areas have gone from forest to farm and back to forest, while having the same series of roads to provide access to the area. While roads have historically served as important known access routes for both public and administrative use, their potential impacts upon erosion and the delivery of sediment into water systems (i.e. the White River) can exceed that of all other management activities considered in a watershed (Brooks et al., 2003). While frequent and appropriate maintenance of the roads can reduce this impact, this level of maintenance on Forest roads is not common.

Roads also serve to provide the public with their primary means of accessing the Forest for recreation. Currently, most forms of recreational use on the Forest involve some form of motorized vehicle access. Even those who enjoy non-motorized recreational activities (i.e. hunting, fishing, and hiking) use the roads and motorized vehicles to get close to the areas that they enjoy recreating in. As evidenced by the responses to the scoping for this project, there are some people who would be unable to enjoy the use of an area if motorized access was limited or restricted. Likewise, the scoping responses indicated that there are some people who would

prefer the more solitary recreational experience that would be promoted by a decrease in motorized access.

The common unit of measure for the level of roads that are present on a specified land area is referred to as the road density. This is typically expressed as the miles of road per unit of land (i.e. square mile). This measure allows comparisons to be made between the amount of roads that are present in different watersheds and of different areas within the same watershed. As most areas within the boundaries of the Forest are fragmented with private land ownership, there is difficulty in accurately calculating this value and clearly understanding the impacts that this value may represent. For, while there may be relatively accurate measures for the roads that are claimed and maintained by the respective counties and the Forest Service, there are not such records for private lands. Short of gaining access to all of the private lands within a Project Area, the best means currently available for estimating the density of the roads on these lands is using aerial photographs. Therefore, a truly accurate portrayal of the road density that exists on private land is not included in this analysis, but efforts have been made to ascertain an estimate based on this technique.

County roads within the Project Area have been identified by using the Act 51 maps that are produced by the respective counties. These maps reflect the county roads that a particular county claims as part of its official road system. To avoid the double counting of these roads (in future projects adjacent to this Project Area), the IDT has used $\frac{1}{2}$ of the total value of county-claimed roads for the areas where the county roads serve as a Project Area boundary. The total value of county-claimed roads has been used for areas that are completely within the Project Area.

The classified roads that are under the jurisdiction of the Forest Service within the Project Area have been identified through the use of the MVUM. To avoid the double counting of these roads in future road density calculations, the IDT has used $\frac{1}{2}$ of the total value of classified roads for the areas where they serve as Project Area boundaries. Unclassified roads within the Project Area have been identified through the historic roads layer of the Forest Service's Geographical Information System (GIS). Roads that have been previously closed are not included in this value and, as a result of user-created roads, it is likely that more unclassified roads exist within the Project Area than what is included on the GIS layer that has been used for this analysis. Therefore, the values for unclassified roads are likely to be artificially low.

For this analysis, the road densities have been calculated two ways. First, only those county and Forest Service roads on the MVUM or adjacent to the Project Area boundary were counted; boundary roads were counted at $\frac{1}{2}$ value to avoid double-counting. This calculation only considers roads on National Forest System lands and this data is displayed in the first column of Table 3.40. Because the effects relative to the presence of roads is not constrained by jurisdiction or ownership, a second calculation of road density of all roads all ownerships within the Project Area, including unclassified or previously closed roads on National Forest System lands, was completed. This information is shown in column 2 of Table 3.40.

The entire Project Area consists of approximately 26,000 acres or 40.6 square miles. Of this, approximately 15,000 acres (23.4 square miles) are National Forest System lands and 11,000 acres (17.2 square miles) are in private holdings.

Table 3.40: Project Area Road Data

Type	All Roads on National Forest System Lands within the Project Area (Includes County roads adjacent to National Forest System lands and Forest Service roads shown on the MVUM)*			All Roads on All Ownerships within the Project Area (Includes County, Forest Service, Private, and Unclassified/User Created Roads)*		
All Management Areas Within the Project Area						
Road Mileage	45.8			137.3		
Area of Consideration acres/sq miles	15,037			26,048		
	23.4			40.6		
Current Road Density (miles/mi ²)	2.0			3.4		
Acres Impacted by Existing Roadbed (assumes average road width of 12')	67			200		
% of Area Impacted by Existing Roadbed	0.4			0.8		
Management Area 6.1- Semiprimitive Nonmotorized Existing Condition						
Road Mileage	22.0			49.6		
Area (acres)	7,590			8,180		
Current Road Density (miles/square mile)	1.8			3.9		
Acres Impacted by Existing Roadbed (assumes average road width of 12')	24			72		
% of Area Impacted by Existing Roadbed	0.3			0.9		
	Alternative 1	Alternative 2	Alternative 3	Alternative 1	Alternative 2	Alternative 3
Total Miles of Road Left Open	22.0	12.0	12.0	29.1	19.1	19.1
FS MVUM Roads	11.0	1.0	1.0	11.0	1.0	1.0
County and Estimated Private Roads	11.0*	11.0*	11.0*	18.1	18.1	18.1
Unclassified FS Roads	0	0	0	0	0	0
Square Miles of Land	11.9			12.8		
Final Road Density	1.8	1.0	1.0	2.3	1.5	1.5

Table 3.40 (continued): Project Area Road Data

Management Area 4.4 - Rural Existing Condition						
Type	All Roads on National Forest System Lands within the Project Area (Includes County roads adjacent to National Forest System lands and Forest Service roads shown on the MVUM) ¹			All Roads on All Ownerships within the Project Area (Includes County, Forest Service, Private, and Unclassified/User Created Roads) ²		
Road Mileage	24.0			87.8		
Area (acres)	7,447			17,868		
Current Road Density (miles/square mile)	2.0			3.1		
Acres Impacted by Existing Roadbed (assumes average road width of 12')	35			128		
% of Area Impacted by Existing Roadbed	0.5			0.7		
	Alternative 1	Alternative 2	Alternative 3	Alternative 1	Alternative 2	Alternative 3
Total Miles of Road Left Open	24.0	24.3	23.6	78.6	78.9	78.2
FS MVUM Roads	9.4	8.9	8.2	9.4	8.9	8.2
County and Estimated Private Roads	14.6 ³	14.6 ³	14.6 ³	69.2	69.2	69.2
Unclassified FS Roads	0	0.8	0.8	0	0.8	0.8
Square Miles of Land	11.6			27.9		
Final Road Density	2.1	2.1	2.0	2.8	2.8	2.8

¹Roads which serve as Project Area boundaries are multiplied by 0.5 to avoid duplicative counting.

²County roads which are adjacent on only one side of the road or which serve as Project Area boundaries are multiplied by 0.5 to avoid duplicative counting.

³Does not include the estimated roads on private land and includes only those county roads which are adjacent to NFS lands.

Relating Transportation System Management to the Forest Plan

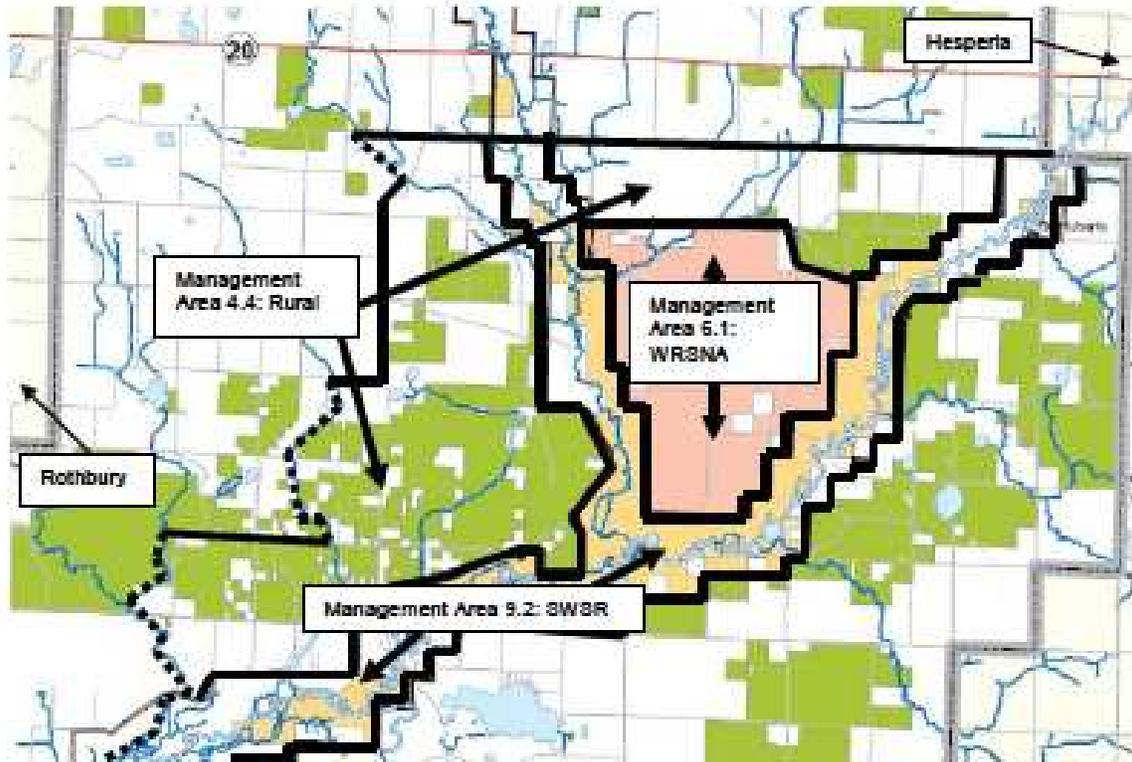
The Forest is divided into different Management Areas (MA), with each area having Standards and Guidelines that apply to the management of the transportation system (Forest Plan 2006). The MAs for this project are 4.4 (Rural), 6.1 (Semiprimitive Nonmotorized), and 9.1 (Study Wild and Scenic River) (see Map 3.14). The following table shows the desired road densities for these MAs.

Table 3.41: Desired Forest Plan Road Densities by Management Area

Average Miles of All Roads per Square Mile:	Applicable Management Area:
0-1	6.1
0-3 Miles	4.4

(No average miles listed for Management Area 9.2)

Map 3.14: Management Areas within the Project Area



Management Area 6.1: Semiprimitive Nonmotorized Area

The National Forest System lands within the Project Area that are included in this Management Area (MA) occur south of Arthur Road, east of the North Branch of the White River, and west of the South Branch of the White River. This area consists of fairly contiguous Federal ownership, with some private parcels interspersed. The White River was designated as a Semiprimitive Nonmotorized Area (WRSNA) in 1986 under the Huron-Manistee National Forests' Land and Resource Management Plan (Forest Plan). This designation was not modified by the 2006 Forest Plan update. At the time of the initial designation, the area was used primarily for motorized-dependent recreation (i.e. camping) and to provide access for non-motorized forms of recreation (i.e. hunting and fishing). Much of this recreation was directly related to the large block of contiguous public land and the presence of the North and South Branches of the White River, with many dispersed camping and day use-sites located along the banks. Since the time of designation, many of the roads that had previously provided access to these areas have been closed through a combination of barrier posts and gates. Barrier posts were used on the roads that were considered not needed for administrative use. Gates were used in locations that were either identified as needed for administrative use or that were to be opened seasonally to allow hunter access, per the Settlement Agreement for the 1986 Forest Plan.

Due to historic and continued high levels of motorized-dependent recreation occurring throughout the White River Area, many of the road closures have been breached by those accessing these areas with vehicles. Gates were pulled out, rammed into, or driven over and

barrier posts and signs were pulled out or cut down. Maintaining these road closures has meant continual monitoring and the re-enforcement of closures at breached locations. Where closures have held, the old roadbeds are beginning to naturalize. At most of the dispersed river access points, restoration projects following road closures have been successful in restoring a more natural setting. There is still evidence of the motorized use that occurred previously at these locations, but this is gradually becoming less.

The road system that has remained open includes a combination of county roads (Oceana) and classified Forest Service system roads. The county roads in this area include Arthur and Winston Roads, and 168th, 160th, 152nd, and 148th Avenues. The Forest Service roads that are currently open (seasonally or year round) include: FR5306, FR5637, FR9045, FR5295, FR7992, FR5315, and FR9353. This network of roads provides public and administrative access throughout the area. This access is limited to the spring, summer, and fall seasons, as none of the roads are maintained during the winter months. Use of the road system by the public is primarily for recreational access, as the area remains very popular for camping, horseback riding, hunting, fishing, and driving for pleasure. Due to previous closures, those utilizing this area for motorized-dependent recreation have been channeled onto the road system that has remained open. Features associated with this road network include dispersed campsites, historic footpaths to the river, and non-designated parking areas. In addition, the existing road system provides access to the private property within the area.

The administrative use of the roads in this area has changed over time. Previously, these roads were used primarily by staff for conducting recreational patrols (law enforcement), timber management, and to aid in the suppression of the occasional wildfire. With the identification of occupied Karner blue butterfly (KBB) habitat in the White River, the administrative use of these roads has increased in order to conduct butterfly and vegetative surveys, identify locations of suitable habitat, and (most recently) to conduct management activities that support the restoration and maintenance of the habitat for this endangered species.

Within the WRSNA, there are occupied KBB sites with roads through them and sites adjacent to roads. While some roads are necessary for administrative access for the management of this species, there are locations where the roads (and their associated features) have been blocked to prevent impacts to habitat and individuals from motor vehicle traffic.

The majority of roads in this area range in width from 8-16' and are passable with a low-clearance passenger vehicle. The roadbeds are well-established, consisting mainly of sand. The sand is compacted on the level straight-aways, but loose at the bottom of slopes and on the tighter corners. There are a number of locations where the combination of high sand content and slope can make passage with passenger motor vehicles difficult. These factors also currently limit the size of camping/horse rigs that are capable of accessing some areas in the southern and western portions. As a result, there is a disproportionate amount of this use occurring in the northern and eastern portions of the WRSNA. There is adequate vegetative clearing along all of the open roads to allow for vehicle passage.

Management Area 4.4: Rural

The Otto portion of the Project Area is in this Management Area and is west and north of the WRSNA. The southern portion is bordered by water, with the Main Branch of the White River forming the southern boundary, the North Branch of the White River forming the eastern boundary, and Sand Creek forming the western boundary. In the north, the Management Area expands to the east with 128th Avenue forming the western boundary, Garfield Road forming the northern boundary, Arthur Road forming the southern boundary, and the South Branch of the White River forming the eastern boundary. While the character of this part of the Project Area differs from that of the WRSNA, recreational use and access to private in-holdings have shaped the development and use of the road system in this area.

The presence and use of the roads in this area is the heaviest leading up to, and adjacent to, the Main and North Branches of the White River, respectively. Both county (Oceana and Muskegon) and Forest Service roads serve as a means of access for camping and recreational day use. The amount of use that occurs varies considerably by season, with campers being most frequent throughout the summer months and the use of the roads by hunters and anglers increasing late summer and fall.

Comparative to the efforts to manage the transportation system in the WRSNA, there has been reduced levels of maintenance and control of the development of user-created roads in this portion of the Project Area in the recent past. With the development of the Motor Vehicle Use Map (MVUM), some of the unclassified roads that were being used to access the Main Branch of the White River are not part of the official transportation system. Of these roads, few were designed to any standards and as they deteriorated many new user-created spur roads were created. Road closures in the WRSNA displaced some users to the Otto portion of the Project Area. This is particularly evident in the areas providing public access to either the North or Main Branches of the White River. These factors have contributed to recent increases in the creation of both unclassified roads and dispersed camping areas. These are most evident off of Sand Road/FR9310 along the Main Branch of the White River in the south and off of FR5107 along the North Branch of the White River in the north.

Roads not on MVUM are not recognized as part of the official Forest transportation system and are subject to closure at any time. Roads that are identified to be included on the updated MVUM must go through the project level NEPA process unless they were existing Forest roads that were mistakenly not identified as such during the creation of the MVUM. These roads may be added to the map as part of the annual MVUM review. In reviewing this Project Area for updates to the MVUM, the Interdisciplinary Team identified two changes that would be incorporated under Alternatives 2 and 3.

1. FR9301 (0.4 miles): This is a north/south road that runs north of Skeels Road and lies west of Sand Creek. All of the property bordering Sand Creek in this area is in private holdings where the road dead-ends and on-going management activities are in conflict with the existing location of the road. Under Alternatives 2 and 3, this road would be eliminated from MVUM, gated, and put under a Special-Use Permit.
2. FR9320 (0.8 miles): This is an east/west road that runs east off of 128th Avenue, before connecting with Kent Road on private property to the east. A field review determined

that it had been previously improved with gravel and a culvert. It provides access to private property and is utilized as a connector to 142nd Avenue. Under Alternatives 2 and 3 the portion of this road on National Forest System lands would be added to the MVUM (see *Otto Metapopulation Area: Alternatives 2 and 3 Recreation Management maps at the end of Chapter 2*).

In addition to these, there is one location within this Management Area where there would be a conflict between an open Forest road (the eastern portion of FR9310) and the objectives of implementing the KBB Recovery Plan. Under Alternative 3 this portion of this road would be closed to motor vehicles and the traffic from this road would be re-routed onto segments of FR9870 and FR9311. This closure would be included as a change to the MVUM. Under Alternative 2, the eastern portion of FR9310 would remain open to motor vehicles and efforts would be made to protect the habitat with barrier posts. Under all of the alternatives, this portion of the FR9310 would remain open as part of the West Shore Snowmobile Trail, December 1 - March 15.

The fragmented land ownership is common in Management Areas 4.4 - Rural. Within the Project Area, 93% of the ownership in the WRSNA is National Forest System lands. This compares with only 42% within the Otto portion of the Project Area. With this fragmentation in ownership, there is typically an increase in the amount of local traffic that utilizes the Forest Road system for accessing their property and travels to and from the area. Typically, these areas also see increased motorized/dispersed recreation, firewood gathering, and illegal activities (i.e. ORVs and trash dumping) over those MAs with fewer roads. Based on location and ownership patterns, Rural Management Areas are typically heavily utilized by the public for a wide variety of reasons. This use is true for the existing transportation system and its associated features in this area.

Management Area 9.2: Study Wild and Scenic River

This designation includes those areas that are within ¼ mile (1,320') on either side of the North, South, and Main Branches of the White River. For this Project Area and analysis, the portions of this Management Area that are considered include both sides of the North Branch and the northern side of the South and Main Branches of the White River. The objective within this area is to maintain the integrity of this corridor for the characteristics that the river is being considered for designation under the Wild and Scenic Rivers Act. In the case of the White River, these characteristics are the recreational and cultural attributes (FEIS, 2006).

The road system within the Project Area currently supports a variety of recreational uses within this Management Area. There are areas in the southern and eastern portions of the WRSNA where the roads provide motorized access within ¼ mile of the South Branch of the White River. In the western areas of the WRSNA, while the roads do not allow for motorized public access to the corridor, they do allow users to get closer to the corridor for non-motorized recreational use (i.e. hunting and fishing).

In the Otto portion of the Project Area, the existing road system provides motorized access up to and within the Study Wild and Scenic River corridor. The majority of this access occurs just west of where the North and South Branches come together to form the Main Branch of the

White River. Here the road system has been historically utilized for motorized-dependent dispersed camping. At some locations (i.e. FR9309), existing roads lead right to the banks of the river. There are also areas where unclassified roads (not on MVUM) exist and have historically provided motorized access within the corridor. Of these, few were developed to any standard or been maintained. There are five such sites within the corridor that will be restored through a State of Michigan ORV grant. North of this area (along the North Branch of the White River), there are fewer roads and, thus, fewer access point to provide motorized access. However, two classified Forest Roads (FR9859 and FR5107) do serve as popular sites for both dispersed camping and fishing access. The southwestern portion of the Study Wild and Scenic River corridor consists almost exclusively of private lands. The Forest Service has no jurisdiction over the roads in these areas.

There is a distinction between areas that are designated as old growth and areas that are within the Study Wild and Scenic River corridor. While there are portions within this corridor that carry the old growth designation, the entire corridor is not designated as such (FEIS, III-45). The entire corridor (including both sides of the North, South and Main Branches) is comprised of approximately 14,300 acres. Of this, only 4,200 (29%) are National Forest System lands (HMNF GIS Layer, 2010). The remaining 10,100 acres are under other ownership.

(3.14b) Area of Analysis

The activities affecting the transportation system that are proposed with this project pertain only to those roads that are under the jurisdiction of the Forest Service on National Forest System lands. Therefore, it is these lands within the Project Area that make up the area of analysis for the direct and indirect effects. As the transportation system throughout this area consists of a matrix of Forest, county, and private roads, all three jurisdictions within the Project Area make up the area of analysis for the cumulative effects.

(3.14c) Direct and Indirect Effects

Alternative 1

Management Area 6.1: Semiprimitive Nonmotorized Area

Under this alternative, the county roads and the existing classified Forest Roads (as shown on the MVUM) would remain open within the WRSNA. Any unclassified roads (not shown on the MVUM) would be subject to closure at any time. Leaving the existing classified Forest Service roads open would not be in compliance with Forest Plan (2006) direction for the White River Semiprimitive Nonmotorized area.

The existing road system would continue to provide access for motor vehicles within the WRSNA. Monitoring, maintenance, and re-enforcement of the existing closures would continue. The roadbeds of the existing closures and the locations where restoration efforts took place along the river would continue to be restored through natural processes. Evidence of motorized use would remain on the open Forest roads, county roads, and the gated roads that are open seasonally or for administrative purposes.

Motorized access throughout this area would continue to be limited to the spring, summer, and fall seasons. Use of the road system by the public would likely continue to be primarily for recreational access related to the North and South Branches of the White River. This use would increase if the area becomes more popular for camping, horseback riding, hunting, fishing, and driving for pleasure. This would also apply to other associated features of the transportation system, which includes: dispersed campsites, historic footpaths to the river, and non-designated parking areas. In addition, the existing roads would continue to provide access to the private property within the area.

Portions of this Management Area would be managed as part of the White River Metapopulation Area for the Karner blue butterfly. As a result, the administrative use of the open Forest Service roads (and some that are gated) would continue to conduct butterfly and vegetative surveys, identify locations of suitable habitat, and (relative to the on-going projects) to conduct management activities that support the restoration of habitat for this species.

Existing roads would go through, or would be adjacent to, sites that are currently occupied by the Karner blue butterfly. The continued use of some roads that are currently gated would be necessary to provide administrative access for the management of this species. In addition to the locations where the roads (and their associated features) have already been blocked to prevent impacts to KBB habitat, protection measures would likely be necessary where open roads intersect with existing occupied sites.

The width of the roads would not likely change from what currently exists. If habitat protection measures along roads were found to be necessary, then the width of the roads would be defined more clearly and the expansion of the road would be limited. Most roads would continue to be passable with a low-clearance passenger vehicle, though this would be compromised at the locations where loose sand continued to accumulate at the bottom of slopes and on the tighter corners. In these areas, there would likely be limitations on low-clearance vehicles and specialized recreational vehicles (i.e. horse rigs, campers, etc.). As a result, the roads that would allow for the passage of these vehicles would determine where these recreational activities would occur at a higher frequency. The current trends in use would indicate that this would be in the northern and eastern portions of the WRSNA. As a result of continued administrative and public use, the roadbeds would continue to be well-established and there would be adequate vegetative clearing along all of the open roads for vehicle passage.

In comparison: This alternative would provide the maximum amount of motorized public access throughout the WRSNA. The resulting road density within the WRSNA (1.8 miles/square mile) would be greater than Alternatives 2 and 3 and above the Forest Plan desired road density for Management Area 6.1 (0-1 miles/square mile) and would not comply with the Forest Plan Guideline to: "Close all Forest Service roads to motorized vehicles except for emergency and administrative use."

Management Area 4.4: Rural

Recreational use and access to private in-holdings would continue to shape the development and use of the road system in this area. The densities and use of existing roads on National Forest System lands would remain the highest in the areas that lead up to, and are adjacent to, the Main and North Branches of the White River. Both county and Forest Service roads would

serve as a means of access for camping and recreational day use. There would be no anticipated change in the maintenance level of these roads, so the amount and type of use would continue to vary by season, with campers being most frequent throughout the summer months, the use of the roads by hunters and fisherman increasing into late summer and fall, and the use of the roads during the winter months being limited by the amount of snow.

The MVUM identifies which Forest Service roads are part of the official transportation system. The roads that have historically been considered as unclassified roads are no longer considered as open roads. Without the use of the MVUM, the average user in this area may have difficulty in identifying which roads are included as part of the official system. The historic unclassified travel routes that are not shown on MVUM would be subject to closure at any time. Though unclassified roads could be closed, all National Forest System lands would remain open to the public. Varying levels of motorized use occurs on these roads; the physical closure of them will increase the amount of motorized use on open Forest Service and county roads. For those roads that are on the MVUM:

1. This increase would have effects on the physical characteristics of the roads (i.e. soil compaction/displacement, widening, rutting), as well as the social elements relating to the use of the roads (i.e. higher number of motorized-dependent users utilizing fewer roads and features).
2. There would be an increase in the number of features associated with the road system. As the existing roads receive little to no maintenance, the quality of the roads would deteriorate over time. This would lead to an increase in the number of areas where passage by motorized vehicles is difficult and in the number of user-created "go-arounds", pull-offs, undesignated parking areas, and dispersed campsites.

For those travel routes which are not part of the official transportation system:

1. The use of these areas by motor vehicles would be eliminated. The existing roadbeds would gradually be restored, either through planned restoration projects or natural processes. The presence of the existing roadbeds and the associated features would be present on the landscape for many years to come.

Landownership throughout the Otto portion of the Project Area would continue to be fragmented. This means, the existing road system would continue to be utilized by local traffic for private property access and travel to and from the area. By providing the maximum amount of access, this alternative would result in the highest levels of motorized/dispersed recreation, firewood gathering, and have the greatest potential for illegal activities (i.e. ORVs and trash dumping). The use of this area would continue to be evident on the existing transportation system and its associated features.

In comparison: The resulting road density under this alternative would be the same as Alternative 2 (2.1 miles of roads/square mile). This density would be only slightly more (0.1 miles) than Alternative 3. All of the alternatives would be within the Forest Plan desired road density for Management Area 4.4 (0-3 miles/square mile).

Management Area 9.2: Study Wild and Scenic River

Under this alternative, the county roads and existing Forest Service roads that are on the MVUM would remain open and continue to provide access to the Study Wild and Scenic River corridor. As the river is being considered for a Recreational designation, the continued presence of these roads in the corridor would not detract from the values for which the river is being considered. There are no Standards or Guidelines related to transportation for Study Wild and Scenic Rivers.

The road system would continue to support a variety of recreational uses within this Management Area. Roads in the southern and eastern portions of the WRSNA would provide motorized access within ¼ mile of the South Branch of the White River. In the western portion of the WRSNA, the lack of open roads prevent motorized public access directly to the river, however, users can get access by walking from road ends for non-motorized recreational use (i.e. hunting and fishing).

In the Otto portion of the Project Area, the road system would continue to provide motorized access up to and within the Study Wild and Scenic River corridor. The majority of this access would occur just west of where the North and South Branches come together to form the Main Branch of the White River. In this area, some of the unclassified roads (not on MVUM) would be subject to closure at any time. The closure of these roads would limit motorized access to portions of the corridor that have historically been used for motorized-dependent recreation (both day use and dispersed camping). Under this alternative (through the implementation of the MVUM), the motorized access to the river would be limited, with most of the access points being limited to the bluff above the corridor and an unimproved site that allows users direct access to the banks of the river (FR9309). The high recreational use that occurs at this site, coupled with the steep slope and the sandy soils, are contributing to the mass transport of soil into the Main Branch of the White River at this location. This would continue to occur under this alternative and would likely worsen over time due to the anticipated increase in use that would be associated with the channeling of motorized-dependent recreation to fewer areas.

The ORV restoration work at the five sites would occur separate from the Decision for this project. This work would reduce the number of damaged sites that are within the corridor and limit the potential for illegal motorized access into the Study Wild and Scenic River corridor via the unclassified road network. North of this area (along the North Branch of the White River), there would continue to be fewer roads and, thus, fewer access point to provide motorized access. The two classified Forest Roads (FR9859 and FR5107) would continue to serve as access points to the North Branch of the White River. Dispersed camping would likely continue in this area, with the greatest use being associated with fishing and hunting seasons, respectively. The southwestern portion of the Study Wild and Scenic River corridor would continue to consist almost exclusively of private lands. The Forest Service would have no jurisdiction over the roads in these areas.

Under all of the alternatives, there would continue to be a distinction between areas that are designated as old growth and the areas that are within the Study Wild and Scenic River corridor. While there would be portions within this corridor that would carry the old growth designation, the entire corridor would not be designated as such (FEIS, III-45).

In comparison: This alternative would provide more motorized access within the Study Wild and Scenic River corridor than Alternatives 2 and 3, as all of the existing classified Forest Roads would remain open. In considering the transportation system as a whole, none of the alternatives would jeopardize the recreational or cultural attributes for which the river is being considered for designation.

Alternatives 2 and 3
Management Area 6.1: Semiprimitive Nonmotorized Area

Under these alternatives, the remaining classified Forest Service roads within the WRSNA would be closed. These are identified in the following table.

Table 3.41: Alternatives 2 and 3 Road System Proposals in the White River Portion of the Project Area

Road Number	Existing Condition	Description	Alternatives 2 and 3 Desired Condition
FR5306	Open Seasonally	This road is in the southwestern portion. It is currently gated and open for 2 weeks during firearm deer hunting season.	This road would be closed to motorized vehicles and stored for administrative use.
FR5637 (A,B,C)	Open	This paved road serves as the northern boundary and the main road to access the Pines Point Campground.	This road would remain open to motorized vehicles.
FR9045	Open	This is an east/west road that connects 160 th Avenue with FR5306 at the intersection of Winston Road.	This road would be closed to motorized vehicles and stored for administrative use.
FR5295	Open	This road is the main north/south Forest Service road that runs along the South Branch of the White River. This road is currently gated in the south, but a spur (FR9533) leads to an area that has historically been used for dispersed recreation.	This road would be closed to motorized vehicles and stored for administrative use.
FR7992	Open	This road is in the northwestern portion and currently serves as a connector between 148 th and 152 nd Avenues.	This road would be closed to motorized vehicles and stored for administrative use.
FR5315	Open Seasonally	This north/south road is shown as open seasonally on the MVUM; however, there are currently no gates. The road leads into and out of private property, which makes it appear as a segmented road on the MVUM.	This road would be closed to motorized vehicles. The private landowner would retain access through a special-use permit and the road would be stored for administrative use.
FR9353	Open	This road is located in the southeastern portion. It serves as a southern spur off of FR5295 and leads to several dispersed campsites associated with the South Branch of the White River.	This road would be closed to motorized vehicles and stored for administrative use.

Under these alternatives, only the county roads would remain open within the WRSNA. These would include: 148th, 152nd, 160th, and 168th Avenues, and Winston and Arthur Roads (adjacent). These actions would be in accordance with the Forest Plan (2006) management direction for the White River Semiprimitive Nonmotorized Area.

The type of closure of Forest Service roads would be dependent on whether or not there is a need to access areas for administrative purposes (i.e. KBB habitat creation, restoration, and maintenance) or for private land access. Forest Service road closures (old and new) would require monitoring, maintenance, and re-enforcement, especially in locations that are accessible from the open county road system. While the roadbeds of some of these closures would continue to be restored through natural processes, efforts would be made in other areas to restore the roadbed. Whether or not active restoration of the roadbeds occurs would depend on the anticipated future need to utilize the road to conduct management activities. There would be continued evidence of motorized use within the WRSNA on the county roads and on the decommissioned Forest Service roads used administratively to conduct butterfly and vegetative surveys, identify locations of suitable habitat, and to conduct management activities that support the restoration of KBB habitat.

Depending on the level of periodic maintenance, most of the county roads would continue to be passable with a low-clearance passenger vehicle. This would be compromised at locations where loose sand accumulates at the bottom of slopes and on the tighter corners. The roadbeds of the county roads would continue to be well-established and there would be adequate vegetative clearing along all of the open roads to allow for vehicle passage.

Under Alternatives 2 and 3, there would be increased amounts of traffic related to timber harvesting on both the county and the existing Forest Service roads. Road improvements and minor amounts of road development would be necessary in some locations to accommodate this use. These improvements could include leveling, hardening, road clearing, the development of specified entrances, and drainage improvements. There would be temporary disturbances to the primary haul roads, in which rutting, compaction, and soil displacement would occur. These areas would be identified and rehabilitated post-sale. In some instances, user-conflicts would occur in areas where timber harvesting activities take place. This would occur most often in the areas used for recreation by the public. There is no difference in the acres of vegetative treatments between Alternatives 2 and 3 so there would be no discernible difference in the amount of road traffic.

There are two distinct desired outcomes for the forested stands prescribed for treatment: 1) those areas that are currently forested and would likely be managed for timber purposes again in the future (i.e. red pine thinning), and 2) those areas that are currently forested, but would not likely be managed for timber purposes in the future (i.e. savanna creation). While the areas proposed for red pine thinning would remain as part of the commercial timber base for the Forest, the areas proposed for savanna creation would not. The desired future condition of these treatment areas would be very different, but commercial timber harvesting would serve as the initial action under both. As a result, under this project, the effects on the transportation system relating to the removal of timber would be similar.

Many of the treatment areas would be located adjacent to existing county roads. These would serve as the primary haul roads. The level of use on any particular road would vary based on the characteristics of the existing road. Roads needing minimal improvements and capable of withstanding the type of traffic that is commonly associated with harvesting activities (i.e. transporting equipment, loaded timber trucks, etc.) would be preferred. During the period of

hauling, there would be an increase in the amount of traffic on these roads and the quality of the roads would be reduced.

In addition to the initial timber harvesting activities, use of the existing road system for management activities associated with the creation and maintenance of savanna would occur. These include such activities as: additional vegetative treatments (i.e. mechanical and/or chemical), site preparation, prescribed burning, seeding and planting, and conducting surveys. The roads used to conduct these activities would include a combination of the existing county roads and Forest Service roads.

There would be no open Forest Service roads going through or adjacent to sites that are currently considered occupied by the KBB. However, there would continue to be county roads that go through or are adjacent to these sites. In addition to the locations where the roads (and their associated features) have already been blocked to prevent impacts on the KBB, protection measures would likely be necessary along the county roads where they intersect with existing occupied sites. At these locations, the width of the roads would be defined more clearly and the expansion of the road would be limited.

The type of closure to be used on Forest Service roads would be identified at the time of implementation. Those roads identified as necessary for administrative use would be gated to allow access to conduct and monitor management activities associated with the implementation of the KBB Recovery Plan. There would be visible use of these roads and the roadbeds would remain intact; however, the increased inputs of organic material and the reduced use would allow portions to become narrower and partially re-vegetated. Vegetative clearing adjacent to the gated roads would be necessary to accommodate the passage of the vehicles and equipment necessary to conduct management activities.

The Forest Service roads not needed for administrative access would be permanently closed using a variety of methods (i.e. berms, stumps, rocks, barriers posts, etc.). The type of closure and the restoration methods used would vary and be dependent on the proximity of the road to the savanna creation activities or the anticipated need of the road for future management activities. Restored roadbeds would blend with the surrounding vegetation. Those roads adjacent to or within savanna units would be obliterated. The roadbeds not associated with the savanna creation units would be restored naturally through succession. Many of these roadbeds would be visible on the landscape for many years. The length of time would be dependent on the history of use, the surrounding vegetative type, and the localized soil conditions.

Under these alternatives, parts of the county and existing Forest Service roads would also serve as control lines for prescribed burning and would provide access to the burn units. The type and size of a control line that would be required for a particular prescribed burn would vary based on the surrounding vegetation type and the size, objectives, and timing of the burn. The control lines would be prepared prior to each burn. For the existing county roads, little preparation would be necessary, because they are exposed mineral soil and 8-16' in width. The use of county roads as control lines for prescribed burning activities would not impact be the anticipated future use of these roads.

The effects of using the existing Forest Service roads for control lines would depend on the type of closure. Gated roads would continue to receive periodic use from Forest staff. This use would promote the presence of mineral soil, limit the amount of encroaching vegetation, and require less preparation for the road to serve as a control line. The use of gated Forest roads as control lines for prescribed burning activities would not impact future use of these roads.

Closed roads that would not be needed for administrative vehicle use could also be utilized as control lines for prescribed burning activities. Without the periodic use from Forest staff, these roadbeds would slowly accumulate organic matter which would support the establishment and persistence of herbaceous and woody vegetation. The natural restoration of these roadbeds would occur slowly. This process would be set-back by the utilization of these areas for control lines, as mineral soil would be re-exposed and the encroaching vegetation removed. However, not all of the permanently closed roads would be used for control lines. These would go through the processes of natural restoration without further disturbance. Those identified as acceptable and necessary control lines would not go through the natural restoration processes until the prescribed burn sequences are completed. At that time, a determination would be made on the usefulness of keeping these lines in place as fuelbreaks.

The management of the transportation system would provide a 27% reduction in the road densities of the WRSNA. On the open county roads, motorized access would continue to be limited to the spring, summer, and fall seasons. Use of these roads by the public would continue to be primarily for recreational access, though direct motorized access to either the North or South Branches of the White River would be eliminated within the WRSNA. There would also be a reduction in the number of relatively isolated locations that users could access by motor vehicle and limitations on the number of locations for motorized-dependent camping. While the closing of Forest Service roads would reduce the impacts of motorized vehicles in some areas, it would also serve to increase the effects of motorized vehicles on (and adjacent to) the county road network in this area.

Horse travel on National Forest System lands in the WRSNA would be limited to a designated non-motorized trail system under Alternative 2 and prohibited under Alternative 3. As the Forest Service has no jurisdiction over the county roads, neither of these alternatives would exclude the use of horses on the county roads.

Under Alternative 2, all horse use in this area would occur on a designated trail. This trail would include a combination of an existing non-designated foot trail along the South Branch of the White River, existing Forest Service roads (that would be closed to motorized vehicles), and areas where new trail construction would be necessary. Of these, the placement of the trail on existing Forest Service roads would have the least effect. As historical travel routes, the existing Forest Service roads are already compacted, have exposed mineral soil, and have an adequate clearing width to become established as a non-motorized trail capable of withstanding high volumes of horse traffic.

While the horse use in this area is currently dispersed, Alternative 2 would concentrate all of this use onto the designated trail. Without mitigating actions on the existing roads, this concentrated horse use would likely result in portions of these roads becoming impassable to motor vehicles due to the displacement and loosening of the top layer of soil. The effects would

be similar to other locations within the WRSNA where concentrated horse use is occurring (i.e. Knapp Lake (FR5294) and the dispersed parking area off of FR5637). On the gated roads, this would affect accessibility to some areas for administrative use and the ability of some private landowners (under special-use permit) to access their property. On the permanently closed roads this would affect the natural restoration of these roadbeds due to the continued disturbance of the soils in these locations.

As the Forest Service roads would be closed off to motorized vehicles, there would not be conflicts between horses and motor vehicles on these roads under Alternative 2. These conflicts would still occur on the county road system, especially as both user groups would be concentrated. User-conflicts would also exist on the portions of the non-motorized trail system that occurs on the closed Forest Roads where mixed recreational use would be promoted. These conflicts would include horseback riders, hikers, and bikers. Without mitigating actions, there would be locations where the tread (resulting from horse use) and manure would make the designated trail in these locations difficult and/or unappealing for the other user groups.

Under Alternative 3, horse use would be prohibited within the WRSNA (with the exception of county roads) and there would not be a designated non-motorized trail established. All other forms of non-motorized recreation would be allowed throughout the area. As a result, the existing Forest Service roads (gated or permanently closed) would not be impacted by horse use. Gated roads would remain passable for administrative and private land access. Restoration of the permanently closed roads would continue to occur through natural processes. User-conflicts (relating to horse use) would be eliminated on National Forest System lands. These conflicts would be likely to increase on the county roads, as all of the motorized and horse traffic would be channeled on to the same road network. In addition, there would likely be a resulting deteriorating effect on the existing county roads throughout the area due to the combination of these concentrated uses.

In comparison: These alternatives would provide the minimum amount of motorized public access throughout the WRSNA. The resulting road density (1.0 miles/square mile) would be within the Forest Plan desired road density for Management Area 6.1 (0-1 miles/square mile) and would be in accordance with the Forest Plan Guideline to: "Close all Forest Service roads to motorized vehicles except for emergency and administrative use."

Alternatives 2 and 3

Management Area 4.4: Rural

Under these alternatives, there would be changes to three of the roads that are identified as open Forest Roads on the MVUM in the Otto portion of the Project Area. These are identified in the following table.

Table 3.42: Alternatives 2 and 3 Road System Proposals within the Otto Portion of the Project Area

Road Number	Existing Condition	Description	Alternatives 2 and 3 Desired Condition
FR9301	Open	This is a north/south road that runs north of Skeels Road and lies west of Sand Creek. All of the property bordering Sand Creek in this area is in private holdings where the road dead-ends and on-going management activities are in conflict with the existing location of the road.	This road would be eliminated from MVUM, gated, and put under a Special-Use Permit.
FR9320	Closed (not on the MVUM)	This is an east/west road that runs east off of 128 th Avenue, before connecting with Kent Road on private property to the east.	Under Alternatives 2 and 3 the portion of this road on National Forest System lands would be added to the MVUM.
FR9310	Open	The segment of this road that is east of 142 nd Avenue and west of FR9311 bisects areas that are proposed for savanna creation activities.	This segment would remain open to motor vehicles under Alternative 2 and be closed to motor vehicles under Alternative 3. It would remain part of the West Shore Snowmobile Trail, December 1-March 15, under both alternatives.

For Alternatives 2 and 3, the effects on the transportation system that would occur as a result of management activities would be similar to those discussed for Management Area 6.1. This would include the effects related to timber harvesting, savanna creation, and prescribed burning. Unauthorized travel routes (not on the MVUM) would be closed as time and resources allow. The methods of the closures and the resulting effects on the existing roadbeds would be similar to those discussed for Management Area 6.1.

Included in both of these alternatives would be the removal of FR9301 (0.4 miles) from the MVUM and the inclusion of the western portion of FR9320 (0.8 miles) to the MVUM. In addition to the resulting increase of 0.4 miles of open Forest Service road, these actions would also eliminate a dead-end spur that leads to private property (FR9301) and provide a road that would serve as a portion of a thru route from 128th to 142nd Avenue (FR9320). There would effectively be no change to the condition of these roads. A gate would be installed on FR9301 that would provide access for the private landowners to the north and for administrative use. As a result, the condition would be maintained to a similar or slightly better standard than the roads that would be gated under these alternatives in the WRSNA. Though FR9320 is not included on the MVUM as a part of the official transportation system, no efforts have yet been made to close this route. This, combined with past road improvements (i.e. gravel and culvert), have contributed to a high level of use. Incorporating it onto the MVUM would not alter the level of maintenance the road would receive or change the condition of the road; however, it would change its status from an illegal travel route to a classified road.

In the Otto portion of the Project Area, the only difference between Alternatives 2 and 3 would be in the use of the segment of FR9310 that is east of where it intersects with 142nd Avenue and west of where it intersects with FR9311. This portion of the road is a segment of the West Shore Snowmobile Trail. Under Alternative 2, this portion of FR9310 would be left open year-round.

In the spring, summer, and fall it would serve as a high-use road for motor vehicles. During the winter months it would continue to serve as part of the snowmobile trail. The use of this road would likely increase under Alternative 2 as a result of the decreased access within the WRSNA and the eventual closure of existing unclassified travel routes (not on the MVUM) used historically by those recreating in this area. Without mitigating action, this increase in use would lead to road widening, road surface degradation, and increases in noise, dust, and competition for the features associated with the road (i.e. dispersed campsites, parking areas, etc.). Due to the proximity of the savanna restoration activities to this portion of FR9310, protective measures would be taken to prevent road widening and the use of the savanna for motorized-dependent recreation. These measures would reduce, but not eliminate, these effects. There would be no effects associated with the use of this road as a snowmobile trail under Alternative 2.

Under Alternative 3, this portion of FR9310 would be closed to motor vehicles in the spring, summer, and fall. During the winter months it would continue to serve as part of the snowmobile trail. In closing this segment of FR9310 to motor vehicles, traffic in this area would be re-routed on a loop to the south that would include portions of FR9311, FR9870, and FR9309. None of the roads included in this loop were designed for the level of traffic that would be associated with this re-route and they are currently lacking in clearing width, site-distance, and adequate areas to pull-off. Developing this loop as a thru route would require major vegetative clearing, shaping and filling, surface hardening, and the development of adequate pull-offs. Once these improvements were complete, the loop would be susceptible to traffic congestion and the areas of savanna restoration along this route would be at risk from the effects of motorized-dependent recreation due to the topography, localized vegetative and soil conditions, and the existing road layout.

The roads (and their associated features) within Otto would receive increased use under both of the action alternatives. This would be a result of the road closures in the WRSNA and closures of the travel routes not on MVUM. Of the Forest Service roads that would remain open, most were not designed for the high volumes of traffic that would occur under Alternative 2 or 3. With the closure of the Forest Service roads in the WRSNA, displaced motorized users from that area would be likely to attempt to move into this area to fulfill their recreation needs. Likewise, those users that have historically recreated within this area on roads that are no longer open (not on MVUM) would be displaced to new locations to fulfill their recreation needs. The recreational draw to this area is the North, South and Main Branches of the White River. Historical users of this area would be likely to want to stay in relative proximity to these. As a result, there would be an increase in the number of displaced motorized users attempting to utilize a decreasing or available area open for that use. This scenario would put pressures on the road system in this area that the system was not designed to accommodate. Socially, these pressures would lead to increased levels of congestion, noise, and user-conflicts. Physically, these pressures would lead to increases in road width, road braiding, the softening of the road surface, and the presence of features commonly associated with the roads in this area (i.e. dispersed campsites, parking areas, etc).

In comparison: Alternative 2 would provide more total open roads than Alternatives 1 or 3 at 24.3 miles (8.9 miles of Forest Service roads), with a final road density of 2.1 miles/square mile. Alternative 3 would provide the least amount of total open roads at 23.6 miles (8.2 miles of Forests Service roads) with a final

road density of 2.0 miles/square mile. Both alternatives would be within the Forest Plan desired road density for Management Area 4.4 (0-3 miles/square mile).

(3.14d) Cumulative Effects

The management of the transportation system within the Project Area involves a combination of county, federal, and private roads. These roads combine to form a network that provides motorized (and non-motorized) access to both public and private lands throughout the Project Area. This will not change in the reasonably foreseeable future.

The Forest Service has no jurisdiction over the roads that are claimed by either Oceana or Muskegon County. These roads include a combination of seasonal roads and roads that are maintained to varying degrees throughout the year by the Road Commissions. The Project Area encompasses approximately 15,000 acres of National Forest System lands. This represents approximately 23% of the total National Forest System lands within these counties (~65,900 acres) and 1.5% of the total National Forest System lands that make up the HMNF (~978,000 acres).

None of the alternatives for this project would include any proposals for the management of the County road system, including those roads in the WRSNA. However, under Alternatives 2 and 3 there would likely be increased use of the county road system in the semiprimitive area in response to the closure of the remaining Forest Service roads. These closures would also be likely to cause increased use on the County roads in other portions of the Project Area and in the other areas that are outside of, but adjacent to, the Project Area. This increase in use would not only be from motorized vehicles, but there would also likely be increases in the amount of horse traffic that occurs on these roads. This would be higher under Alternative 3, as there would be no other place within the WRSNA that horse traffic would be allowed. Under Alternatives 2 and 3, increased horse use on county roads could also be anticipated in other areas within the Project Area and in areas that are immediately adjacent. As a result of these alternatives, the WRSNA area would eventually be utilized more for non-motorized recreation activities (i.e. hiking, bird watching, etc.), though these experiences would be impacted by the continued presence of the county roads within the area. Within the WRSNA, the decrease in road densities would increase the value of the area for those who prefer less interaction with motorized vehicles.

Within this Project Area, the existing Forest Service road system plays an important role in how people have historically and currently utilize the National Forest. Alternatives 2 and 3 would change this use through implementing changes to this system. With this change, there would be social impacts. The social aspects would be related primarily to the reduction in motorized access to the WRSNA. This would impact not only those who historically and currently have used this area for motorized-dependent recreation (i.e. dispersed camping, driving for pleasure, etc.), but also those who have utilized adjacent areas. It would be anticipated that as a result of Alternatives 2 and 3, there would be an increase in this type of use in the adjacent areas by those who are displaced from the WRSNA. Many of the visitors that currently use this area and prefer or require motorized recreation would be likely to move to other locations if the roads closed under these alternatives impact the areas where they have traditionally recreated. These areas are provided in many of the other Management Areas that are part of the HMNF.

Throughout this Project Area, there is historical evidence of the changes to the transportation system that have occurred over time and the fragmenting effects to the ecosystem that roads have had. These effects range from old roadbeds that are barely visible on the landscape to recent hill-climb areas where the mineral soil is freshly exposed. The development of the road system in this area is a relic of not only past forest management activities (i.e. timber harvesting and hauling, fire suppression, etc.), but also the shifts in motorized use patterns by the public. Throughout the Project Area, these patterns have been consistent with other areas on the Forest. Anecdotal factors that may be contributing to these shifts include: 1) increases in the human population adjacent to the Project Area, 2) decreases in the size of contiguous private ownership, 3) increases in the availability and type of motorized vehicles, and 4) increases in the age of the population and their related dependence on motorized transport.

In the reasonably foreseeable future, the National Forest System lands within the Project Area will continue to be fragmented by both private in-holdings and the presence of roads on the landscape. It is expected that as human population pressures in the adjacent areas increase, the size of individual landholdings will decrease. This will cause an overall increase in private land fragmentation and a diversity of private land uses in and around the Project Area. The result of this trend will likely be an increase in the use of National Forest System lands for recreation. With the current and anticipated use of motor vehicles and ORVs for recreation, there will likely be an increased amount of use by these vehicles on the road systems of National Forest System lands.

The combination of the roads that existed on the landscape prior to becoming part of National Forest System lands, roads that were designed and developed to conduct management activities on the Forest, user-created roads, and roads that are under the jurisdiction of others (i.e. county and private) have resulted in a Project Area where Forest users are rarely greater than ½ mile from some sort of road. This is consistent with other portions of the Forest as the following table illustrates.

Table 3.43: Proximity of HMNF Lands to Existing Roads

Forest Unit	Total Acres	Acres within ¼ Mile of Road	Acres within ½ Mile of Road
Manistee National Forest	538,700	418,300 (78%)	519,500 (96%)
Huron National Forest	439,700	294,700 (67%)	400,300 (91%)
Total	978,400	713,000 (73%)	919,800 (94%)

Forest and county-maintained roads will continue to be utilized to conduct management activities throughout the Project Areas under all of the alternatives. Improvements will be necessary on some of these roads in order to accommodate these management activities. The level of improvements that are maintained will vary based on the existing and anticipated use of the road at the time of improvement. The end result will be an improved transportation system that is in accordance with Forest Plan direction (2006) and that provides for both public and administrative use.

(3.15) Economics

(3.15a) Existing Condition and Resource Specific Information

Unlike other resource areas that are addressed in this assessment, the effects that this project would have on the economy are more difficult to quantify. This is because local economic trends are influenced by a wide variety of factors that extend beyond the local level. While deciding to implement specific activities may have obvious quantifiable economic effects in the short-term (i.e. the amount of timber harvested at the current market rates), how these activities may impact the economy in the long-term (i.e. shifts in preferred recreational use) can only be estimated.

Traditionally, the timber and recreation resources on the Manistee National Forest contribute to the economic well-being of the communities in northwest Michigan. For example, timber harvesting and other associated projects on the National Forest affect the local economy by supplying timber to local mills, providing employment to local contractors to harvest the timber, and employing other contractors to complete reforestation, road work, and wildlife related work.

In addition, the presence of public lands in Oceana and Muskegon counties also generates service related employment and the income that is commonly associated with seasonal resident and tourism spending. This employment ranges from the support businesses (i.e., gas stations and grocery stores) in the local towns and villages (i.e., Hesperia and Whitehall) to the local homeowner that sells firewood to those coming into these areas to recreate.

(3.15b) Area of Analysis

The area of analysis for the direct and indirect effects on the economy is the Project Area, and the adjacent lands within 50 miles of the Project Area. This represents a typical commuting distance for those who may be employed in the implementation of the proposed activities and a reasonable customer base radius for business owners that may be potentially impacted. The area of analysis for the cumulative effects on the economy is northern Lower Michigan. This large area represents the supply of wood raw materials to manufacturers of forest products, and also corresponds to the location of the range of recreational opportunities favored by Forest users and tourists.

(3.15c) Direct and Indirect Effects

Alternative 1

This alternative would not generate revenues for the U.S. Treasury from the sale of timber raw materials. Employment opportunities arising from timber harvesting, wood products, and restorative habitat improvement projects would not occur within the Project Area. There would be continued costs associated with the maintenance of the existing road closures and the implementation of the projects that are already on-going within the Project Area. These projects include two savanna restoration projects that were part of previous decisions and the

restoration of several sites where ORV damage has occurred along the White River in Otto Township. Indirectly, this alternative would contribute to increased costs to the Forest associated with the continued law enforcement and patrol of areas left open to motor-vehicle access within the SPNMA. These costs would not vary between alternatives in other portions of the Project Area, as the existing road system would remain mostly intact.

There would be no direct effects to the existing recreational use within the Project Area under this alternative. The existing transportation system would remain in place (consistent with the MVUM). This system would continue to provide dispersed access points to the river and dispersed campsites along the existing roads. Horse use would continue to be allowed throughout the Project Area. This continued use would contribute to the local economy through the indirect support of local businesses and, to a lesser extent, local private landowners that provide the goods and services related to the tourism and recreational industries.

Alternatives 2 and 3

Under Alternatives 2 and 3, commercial timber harvesting activities would return money from the U.S. Treasury to Oceana and Muskegon Counties for use in education and road maintenance. Timber sale activities have preparation and administration costs, such as employee wages, road construction, and the regeneration of harvested areas that would remain classified as commercial forest land. The amount of income from timber sales is variable based on the type, quality, and quantity of timber. Typically, timber sales produce revenue which is then utilized to conduct other management activities that are within the Project Area. Additional funds that are generated are then returned to the U.S. Treasury.

The timber that is within this Project Area that would be harvested under these alternatives would not be likely to produce enough funds to cover the combined cost of doing this analysis and preparing the sale areas (layout, road improvements, timber marking, etc.). Additional funding would be necessary to accomplish the program of work that would be necessary to accomplish the successful restoration of the savanna ecosystem in this area. Due to the adaptive management approach that is used for these activities, the costs associated with these activities are extremely variable. For example, two adjacent areas would likely require different levels of treatments (both in type and scale) to successfully bring the restoration to completion. While prescribed burning alone may be sufficient at one site, an adjacent site may require tree harvesting, tree and stump removal, prescribed burning, and the seeding in of native vegetation. As a result of the differences in these types of treatments, the costs can vary considerably.

The closing of roads within the SPNMA would cause a shift in the type of recreational use within this area. The majority of existing use in this area is dependent on motorized vehicle access, either directly (i.e. driving for pleasure) or indirectly (i.e. the hauling of campers or horse rigs). Limiting the motorized access in this area to the existing county roads would change the recreational experience in this area. As a result, some of the existing motorized-dependent users would likely make a choice to go to other locations both inside and outside of the Project Area. In the short-term, this shift would likely have minor economic impacts for those that are immediately adjacent to the Project Area; however, these impacts would not be likely to extend beyond the boundaries of this analysis (50 mile radius). These impacts would be more

pronounced under Alternative 3, as horse use would be limited to areas outside of the SPNMA. Again, this use would also be likely to shift to other locations of the Forest and be unlikely to have major economic impacts that would extend beyond the analysis boundary.

In other areas throughout the Project Area, the short-term recreation use on the Forest would be displaced during harvesting operations and periodically thereafter during the follow-up restoration treatments. This displacement would not have lasting economic impacts within the analysis boundary, as users would likely move to other adjacent areas on the Forest during the period of displacement.

Table 3.44 measures financial efficiency, and only includes average FY 2010 Forests' program costs and market-based values (revenues received directly) for Alternatives 2 and 3. The Forests' Plan and DEIS measure economic efficiency using present net value, which compares the discounted benefits and the costs of market and non-market resources. Non-market resource values predominant in the Project Area include hunting, fishing, horseback riding, camping, picnicking, and viewing wildlife; however, a present net value is not calculated because these resources have values assigned at scales larger than the Project Area. In general, non-market values between Alternatives 2 and 3 are equivalent, where a change in scenic attractiveness is offset by restoring recreation sites and early habitat production, which particularly increases game wildlife viewing opportunities.

Table 3.44 displays costs and revenues for Alternatives 2 and 3 for the timber harvesting activities and the required payments of the Project. The values included in this table are estimates based on those areas where timber resources may be of commercial quality and quantity.

Table 3.44: Estimated Revenues and Costs for Harvest Activities

Activity/Unit Cost	Alternatives 2 and 3
Acres Harvested	3015
Sale of Stumpage Revenue	\$799,000
NEPA Development	\$170,000
Timber Sale Preparation	\$400,000
Estimated Road Improvement Costs	\$50,000
Locate Land Lines	\$50,000
Reforestation Surveys	\$500
Total Costs	\$670,500
25% Fund Payment	\$200,000
Net Revenue	\$(71,500)

**Parentheses indicate a negative value.*

In addition to the costs and revenues associated with timber harvesting activities, this project would have costs associated with the creation/restoration of areas to savanna. These activities would be adaptive in nature, meaning that follow-up treatments would be based on the results of previous treatments, based on monitoring. As a result, determining an exact cost for the creation/restoration of savanna is not possible. The values that are shown in Table 3.45: *Non-timber Related Costs for the Savanna Ecosystem Restoration Project* are estimated values based on the initial treatment and do not take into consideration whether the work is carried out by

Forest Service personnel or is accomplished through the use of a private contractor. As a result, the values would likely vary greatly from what is shown. Factors that may affect the cost of implementing these activities are described below:

1. *Savanna Restoration/Creation Site Preparation*: The type and amount of site preparation that would be necessary in any given stand would be dependent on the existing condition of that stand. The types of activities would include, but not be limited to: stump removal, leveling/grading, chipping, masticating, and discing. The purpose of these activities would be to prepare the soil for the establishment of the native seed patches that would not exceed 10% of the treatment areas. The value that is shown for this assumes that no more than 10% of the areas being converted/restored to savanna would require site preparation and that site preparation would only need to occur once.
2. *Prescribed Burning*: The cost-effectiveness of this activity increases with the amount of area that can be incorporated per burn (i.e. larger burns are more cost-effective than smaller burns on a per unit basis). Larger burns can reduce the cost per acre by utilizing already established containment lines (i.e. roads), reducing mobilization (i.e. equipment and personnel), and the number of required individual burn plans. Under Alternatives 2 and 3, all of the units proposed for savanna creation/restoration would include the use of prescribed burning as a tool for establishment and maintenance. Other areas have also been included to meet other management objectives and to reduce the cost/unit of implementing the prescribed burning activities. While it would be expected that many of the areas proposed for savanna creation/restoration would require multiple burns to meet the desired future condition, the costs that are shown for burn activities are reflective of only one burn per unit. This is the minimum that would be required.
3. *Seeding of Native Plants*: Under Alternatives 2 and 3, the seeding of native plants would occur in the same locations as, but following, site-preparation. This area would not be expected to exceed 10% of the total area proposed for savanna restoration/creation. The amount and type of native seed that would be used in these areas is variable and largely dependent on what emerges from the existing soil seedbank. The cost of native seed is also variable. The value of seed displayed in Table 3.45 is intended to be used as an average, with a seeding rate of 10 lb/acre.
4. *Herbicide Non-Woody Vegetation/NNIS*: Under Alternatives 2 and 3, these treatments would occur on the 10% of the areas proposed for savanna creation/restoration and in the control of the NNIS that has already been identified through botanical surveys. It would be likely that the areas where NNIS control would be necessary would increase in the savanna creation/restoration areas due to an increase in sunlight, disturbance to the upper soil profiles, and NNIS seeds present (but currently dormant) in the seed bank. As a result, the cost to contain/control these species would likely increase beyond the level of the initial treatments that are reflected in Table 3.45.
5. *Herbicide Woody Vegetation*: This activity would apply to the areas under Alternatives 2 and 3 where savanna creation and opening restoration would occur. The implementation would consist of spot-treatment of sprouting stumps, with the amount required dependent on the number and type of stumps per acre. For example, it would

be expected that the amount of stumps treated in the pine stands and open areas would be less than that of existing forested oak stands. How much would depend on the existing location and cover type characteristics. The value that is reflected in Table 3.45 assumes that all of the stands would require approximately the same level of treatment and that the treatments would be necessary on every acre that is proposed for treatment.

6. *Road Decommissioning or Gating:* The costs associated with closing and decommissioning roads would vary by the type of closure. For example, at one location a gate may be sufficient, while at another location the gate may need to be re-enforced with barrier posts. For this project, all of the roads that would be closed would also be needed for future administrative purposes (i.e. conducting KBB management activities or special-use access). As a result, locked gates, in conjunction with barrier posts, would be the initial preferred method of closure.
7. *Horse Trail Design and Construction:* The costs associated with the design and construction of a non-motorized trail within the White River Semi-Primitive Non-Motorized Area would only apply to Alternative 2. While portions of the trail would incur little to no expense to implement (i.e. existing trail or roads), the portions of the trail where new construction would be necessary would require economic inputs (i.e. along existing county roads and to avoid existing KBB habitat). The costs that are reflected refer to those portions of the trail where new construction would be necessary.
8. *Parking Lot Development:* Under Alternative 2, economic inputs would be required for the construction of two parking areas. One parking area (south of Arthur Road) would be designed and constructed to facilitate use by those utilizing the White River Semi-Primitive Non-Motorized Area for horseback riding. As such, this parking area would be designed to accommodate multiple large horse rigs. The second parking area (east end of Winston) would be designed to provide adequate parking and use by multiple full size vehicles for recreationists. This parking area would be in close proximity to the river (<1/4 mile). The inputs required for both parking areas would include excavation, surface hardening, and containment. Under Alternative 3, only the Winston Road parking area would be developed. Of the two, the inputs required for the Winston parking area would be less than the parking lot south of Arthur Road.
9. *Campsite Development:* The designation of 11 dispersed campsites within the White River Semi-Primitive Non-Motorized Area would occur under both of the action alternatives. As dispersed campsites, there would be little economic inputs anticipated in the form of improvements. However, there would be costs associated with clearing new sites, installing perimeter and site posts, and signage. The estimated amount necessary to cover these costs are shown in the table.

Table 3.45: Non-timber Related Costs for the Savanna Ecosystem Restoration Project

Activity ¹	Estimated Measure		Estimated Amount per Acre	Total By Alternative	
	Alternative 2	Alternative 3		Alternative 2	Alternative 3
Prescribed Burning (acres)	4,111	4,111	\$150	\$616,650	\$616,650
Site Prep/Seeding of Native Plants (acres)	308	308	\$3,000	\$918,000	\$918,000
Herbicide Non-woody Vegetation/NNIS (acres)	345	345	\$400	\$138,000	\$138,000
Herbicide Woody Vegetation (acres)	3,061	3,061	\$400	\$1,224,400	\$1,224,400
Road Decommissioning or Gating (gates)	8	10	\$1,000	\$8,000	\$10,000
Design and Construction of the Non-motorized Trail System (miles)	12.2 miles new construction of single-track trail	0	\$1,000 per mile of new construction	\$12,200	0
	7.5 miles designated on closed forest roads.	0	\$200 per mile of designation	\$1,500	0
Parking Lot Development	1 Horse Parking Area	No Horse Parking Area	\$120,000 Total Cost	\$122,500	\$2,500
	1 Angler Parking Area	1 Angler Parking Area	\$2,500 Total Cost		
Campsite Development (\$1,000/site)	11	11	1,000	\$11,000	\$11,000

¹Calculations for these activities are based on the maximum potential area treated. Actual costs for these activities would vary by the effectiveness of treatments and the results of monitoring.

(3.15d) Cumulative Effects

Alternative 1

Taking no action within the Project Area would provide no additional employment and income, other than that available under the prevailing general conditions within Northern Lower Michigan. No timber harvesting in the Project Area would most likely shift these effects to other areas where an equivalent amount of employment opportunity occurs. Payments from the 25% Fund that would be generated by implementing Alternatives 2 and 3 would shift away from Oceana and Muskegon Counties. As the existing forested stands would remain classified as such, these areas would be eligible for commercial harvesting entries in the future. Payments to the respective counties would be deferred until the time when harvesting activities occurred.

The Forest would continue to provide wood products as opportunities arise in the reasonably foreseeable future. The harvesting and use of these products would continue to be influenced by supply and demand. Historically, the price of timber increases as the demand increases. During these times, the amount of harvesting that occurs on private land also increases. Conversely, timber prices decrease as demand decreases. During these times, the amount of harvesting that occurs on private lands also decreases. While the availability of timber on National Forest System lands would remain consistent, the revenue generated from the sale of timber would continue to fluctuate with the market demand.

Timber harvesting in Northern Lower Michigan accounted for 40% of the State's industrial roundwood and 52% of its saw log production in 1998 (USDA Forest Service 2003). A current search of the MDNRE forest products database lists 544 reported businesses that employ personnel connected to the procurement, processing, and manufacture of wood products in the northern lower peninsula of Michigan (MDNRE, 2010). This is an increase of 10 businesses since 2008, though it is unclear if this increase is due to better reporting or an actual net increase in the total. Within the recent past, two large pulp mills have closed or reduced production, largely for competitive business reasons (Traverse City Record Eagle 2006).

These events have reduced the total employment in the timber harvesting and manufacturing sectors by a significant factor in Northern Lower Michigan. The competitive, global nature of the paper industry will likely reduce employment in pulp mills in the future; however, employment in saw mills will decline at a smaller rate due steady saw log production levels and fewer capital investments (Leefers 2006). A decrease of over 22,000 or 25% of the forest product industry jobs were lost between 2000 and 2004 with only 99 of these job losses from the logging and forestry category which is less than 5% of this category (Berghorn 2005)

Opportunities for recreation would continue to be provided on private and public lands within the Project Area and throughout Northern Lower Michigan. While the exact locations and types of recreation that people engage in throughout the region is impossible to predict, this part of Michigan has an economy that is based on providing goods and services in support of recreational tourism throughout the year. This would not change as a result of this project.

Property values throughout Northern Michigan fluctuate greatly based on the type of land, the location, and the use. The existing land-use mosaic includes the following trends: 1) urban areas are expanding, with adjacent areas that were formerly larger blocks of contiguous ownership being broken up into smaller parcels; 2) areas with soils capable of sustaining agriculture are still in production; 3) areas without soils capable of sustaining agriculture remain in a forested, open, or developed condition; 4) few large tracts of private land remain in single ownership; 5) public lands remain largely fragmented by private ownership; and 6) private property within the Forest boundary (and adjacent to waterways) includes seasonal homes or non-homestead property.

Fluctuations in property values may occur due to local, state, or national market trends and as a result of the site-specific characteristics of individual properties. Individual consumers have little control over the market trends in real estate. The site-specific values associated with individual properties are in some ways related to personal preference. For example, one person may place more value on a solitary dwelling in a country setting, while another may place more

value on an urban dwelling with neighbors close by. Therefore, management activities that affect an existing environment may decrease the value of that environment to one landowner and increase the value of the environment to another. This alternative would continue to provide adjacent landowners with an environment that is consistent with what has been present historically.

Alternatives 2 and 3

Under Alternatives 2 and 3, there would be additional employment opportunities associated with timber harvesting activities and the creation and restoration of the savanna ecosystem. Employment opportunities would likely be in the form of contractors and seasonal and permanent staff. Included would be such activities as: timber sale layout and administration, timber harvesting, timber stand site preparation, regeneration surveys, savanna site preparation, NNIS/savanna herbicide application, seeding and planting, road and parking lot construction and maintenance, and wildlife surveys. Further contributions to the economy would occur through the purchasing of materials and supplies necessary to accomplish the work. These activities would occur over a period of up to 10 years and, when compared with the economy of Northern Lower Michigan, would have little to no impact on the prevailing conditions.

In addition to the projects that would be implemented under Alternatives 2 and 3, other similar types of projects would also be likely to occur within this Project Area and in other locations of the HMNF. These projects would also contribute to the economy of Northern Lower Michigan and would likely have beneficial cumulative effects on the public and private natural resource management sector.

In addition, the implementation of either of these alternatives would provide payments from the 25% Fund which would be used to assist in the funding of improved transportation systems and education within the counties where treatment activities are proposed. These same types of funds would be available to other counties where similar types of projects occur. While individual projects would likely have only a small impact on the respective county coffers, cumulatively the income generated from the 25% Fund could serve as an important supplement in counties that have been hit the hardest by the recent economic downturn.

Under Alternatives 2 and 3, the acres receiving savanna creation/restoration treatment would be removed from the suitable commercial forest land base of the Forests. While the respective counties would receive payments as a result of the receipts from this project, similar payments from the savanna creation/restoration areas would not occur in the future. This loss of income would likely be off-set by payments from the 25% Fund as a result of other harvesting activities occurring in areas of the Forest that remain part of the commercial base. Currently, the Forest has approximately 400,000 acres of land suitable for timber management to meet the allowable sale quantity (ASQ) for the first decade. This equates to 15.2 million cubic feet per year (FEIS Appendix A and H). Forested timberlands are those which produce a minimum of 20 cubic feet of fiber/acre/year and that are currently not withdrawn from timber production. Approximately 380,000 acres of forested timberlands are required to meet the current ASQ. The remaining Forest lands are not targeted for timber production, but are anticipated to contribute some timber volume that does not contribute to the ASQ in the next 20 years. In conjunction

with Project Area non-timber resources, Alternatives 2 and 3 contribute to the positive increase of Non-market Present Net Values in the Table III-54 in the FEIS.

Under Alternatives 2 and 3, opportunities for recreation would continue to be provided on both private and public lands within the Project Area and throughout Northern Lower Michigan. While the exact locations, types, and future trends of recreational use throughout the region is impossible to predict, this part of Michigan has an economy that is based on providing goods and services in support of recreational tourism throughout the year. This would not change as a result of this project.

As a result of the activities associated with the creation and restoration of savanna, Alternatives 2 and 3 would alter the viewshed of adjacent private landowners within portions of the Project Area. While these changes may impact the perceived property values to the existing private landowners, there may be others who would prefer the viewshed that will be created. The projects proposed under these alternatives are not expected to cause fluctuations in the values of real estate within or adjacent to the Project Area, especially when compared with occurring trends across the Northern Lower Peninsula of Michigan.

Other cumulative economic effects would be similar to those discussed under Alternative 1.

Conclusion: The duration and magnitude of either Alternatives 1, 2, or 3 will not incrementally add to past, present and reasonably foreseeable economic forces and events within the Manistee National Forest, primarily because the Forest contributes less than 2% of the employment and income effect to the local economy.